

KLAMATH BASIN COORDINATING COUNCIL

# Second Annual Report

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Klamath Basin Settlement Agreements

March 30, 2012



The Klamath Basin Coordinating Council has prepared this second annual report on the accomplishments implementing the Klamath Basin Settlement Agreements.

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# **Second Annual Report Implementing the Klamath Basin Settlement Agreements**

**Prepared by the Klamath Basin Coordinating Council**

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## Summary

This is the second annual report from the Klamath Basin Coordinating Council on the accomplishments in implementing the Klamath Basin Restoration Agreement (Restoration Agreement or KBRA) and the Klamath Hydroelectric Settlement Agreement (Hydroelectric Settlement or KHSa), known collectively as the Klamath Basin Agreements. The Parties to these agreements have made significant progress in implementing a number of the provisions of the agreements.

This Second Annual Report was prepared by the non-federal parties to the Klamath Basin Agreements. The Department of the Interior and National Oceanic and Atmospheric Administration signed the KHSa; the federal agency parties are not signatories to the KBRA. The KBRA includes provisions that these agencies will become parties when Federal authorizing legislation is enacted.

### **Klamath Basin Restoration Agreement**

- The Parties have established the Klamath Basin Coordinating Council to provide coordination and oversight for the implementation of the Restoration Agreement. The KBCC has held eight public meetings, established a website for all documents, and developed operations and communications protocols.
- The KBCC has reviewed and updated the cost estimates to implement the Restoration Agreement. This process reduced the seven-year cost estimates by 38 percent and the 15-year cost estimates by 18 percent.
- The Klamath Water and Power Agency is developing the On-Project Plan. The purpose of this Plan is to align water supply and demand for irrigation in the Klamath Reclamation Project in light of limitations on diversions of water that will arise under the Restoration Agreement. With these limitations, the availability of water from Upper Klamath Lake and the Klamath River for irrigation would be approximately 100,000 acre feet less than current demand in the driest years, with irrigation water availability increasing on a sliding scale with increasingly wet conditions.
- The Drought Plan Lead Entity has completed the KBRA Drought Plan and it is under review by the Department of the Interior. The KBRA Drought Plan provides a collaborative approach for intensified resource management actions in circumstances of drought and extreme drought. When it and other provisions of the Restoration Agreement are authorized and implemented it would provide more water for fishery resources in very low-water years and more certainty for irrigators than current conditions.
- The Fishery Managers have agreed on an outline and approach to develop the Klamath Basin Fisheries Restoration and Monitoring Plan. However, funding is not available for the development of the Plan.

- Reclamation has made progress on studies of additional water storage in the Klamath Basin that could benefit agriculture and fish resources.

Implementation of a number of the Klamath Basin Restoration Agreement programs will be delayed until Congress passes Federal authorizing legislation and funding is available. Programs and actions that have been delayed include:

- Preparation of the Fisheries Restoration and Monitoring Plan;
- Work on the Off-Project Water Settlement;
- Implementation of Power for Water Management Program, including the Interim Power and Conservation and Renewable Resources Programs;
- Implementation of the Drought Plan;
- Preparation of the Emergency Plan;
- Full implementation of the Interim Flow and Lake Level Program; and
- Implementation of the Tribal Program to participate in implementation activities.

#### **Klamath Hydroelectric Settlement Agreement**

- The Department of the Interior has completed the engineering, scientific, and economic studies related to potential removal of four hydroelectric dams owned by PacifiCorp, as called for in the Hydroelectric Settlement and held public meetings throughout the Klamath Basin.
- The Department of the Interior has issued a draft of the Klamath Dam Removal Overview Report and a peer review panel has completed its review of the draft.
- The Department of the Interior and the California Department of Fish and Game have released a draft Environmental Impact Statement / Environmental Impact Report; these environmental reports were developed in coordination under the provisions of the Hydroelectric Settlement.
- The Secretary of the Interior, Ken Salazar, announced on February 27<sup>th</sup> that he will not make a Secretarial Determination on March 31, 2012 because Congress has not yet enacted the necessary authorizing legislation.
- The public utility commissions in California and Oregon have approved the collection of funds to pay for decommissioning the dams. As of the end of January 2012, the combined balance of the Oregon and California dam removal trust accounts was \$28,336,773.78.

- The interim measures to improve environmental conditions within the Klamath Hydroelectric Project to benefit aquatic habitat and listed species, improve water quality, and improve hatchery operations are being implemented on the schedule called for in the Hydroelectric Settlement.

## Background

The Klamath Basin Restoration Agreement and the Klamath Hydroelectric Settlement Agreement were signed on February 18, 2010. They provide a comprehensive solution for water, fishery, and power issues in the Klamath Basin. There are 45 Parties to these agreements, representing Federal agencies, California and Oregon, three Indian tribes, two counties, irrigators, and conservation and fishing groups. The Parties are listed at the end of Appendix A<sup>1</sup>.

The Restoration Agreement is intended to result in effective and durable solutions which will: 1) restore and sustain natural fish production and provide for full participation in ocean and river harvest opportunities of fish species throughout the Klamath Basin; 2) establish reliable water and power supplies which sustain agricultural uses, communities, and National Wildlife Refuges; and 3) contribute to the public welfare and the sustainability of all Klamath Basin communities.

The Hydroelectric Settlement lays out the process for additional studies, environmental review, and a decision by the Secretary of the Interior regarding whether removal of four dams owned by PacifiCorp: 1) will advance restoration of the salmonid fisheries of the Klamath Basin; and 2) is in the public interest, which includes but is not limited to consideration of potential impacts on affected local communities and tribes. The four dams are Iron Gate, J.C. Boyle, Copco 1 and Copco 2 dams on the Klamath River. The Hydroelectric Settlement includes provisions for the interim operation of the dams and the process to transfer, decommission, and remove the dams.

This annual report describes the accomplishments during the first two years in implementing the agreements. The Parties to the agreements have made good progress on establishing the coordination and oversight organizations called for in the Restoration Agreement and implementing many of the near-term KBRA actions. Some actions have been delayed because of a lack of funding and Federal authorizing legislation. The Parties have also made excellent progress on implementing the provisions of the Hydroelectric Settlement.

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<sup>1</sup> The Department of the Interior and National Oceanic and Atmospheric Administration signed the KHSAs; the federal agency parties are not signatories to the KBRA. The KBRA includes provisions that these agencies will become parties when Federal authorizing legislation is enacted. PacifiCorp signed the KHSAs; it is not a Party to the KBRA.

# **Klamath Basin Restoration Agreement**

The actions taken during the past two year to implement the Klamath Basin Restoration Agreement are summarized below; for a copy of the KBRA, KHSA, and the documents described in this report please go to: [www.klamathcouncil.org](http://www.klamathcouncil.org).

## **1. General Provisions**

### **1.1 Formation of the Klamath Basin Coordinating Council**

A key feature of the Restoration Agreement is a commitment by the parties to cooperate fully in its implementation. The KBRA Parties have established the Klamath Basin Coordinating Council (KBCC) to facilitate coordination, cooperation, collaboration, and accountability by the KBRA Parties and to ensure that the commitments in the Restoration Agreement are carried out effectively. However, the KBRA does not create any new governmental entities, nor does it supersede, change or modify any of the existing governments' legal authorities (see KBRA Section 2).

The KBCC provides for general implementation oversight, including activity and program coordination, information sharing, priority setting, fund seeking, and dispute resolution related to implementation of the Restoration Agreement. It also serves as the primary forum for informing the public and for public involvement (See KBRA Appendix D).

The KBCC held its first organizational meeting on July 21 and 22, 2010 in Redding California. The KBCC has held eight meeting since the Agreements were signed. These meetings have rotated between Klamath Falls and Ashland/Medford areas of Oregon, the Arcata and Eureka areas in California, and Redding, California. A listing of the meetings and all of the materials from the meetings are posted on the website.

The KBCC has adopted internal operating protocols and a communications plan. All KBCC meetings are open to the public and there are public comment periods at each meeting for people to make general comments or to comment on specific issues before the KBCC.

The KBCC has also formed the Interim Klamath Basin Advisory Council and the Interim Technical Advisory Team pursuant to KBRA Appendix D. Those accomplishments were described in the First Annual Report. The Department of the Interior is reviewing charters for these entities under the Federal Advisory Committee Act.

### **1.2 Revised Cost Estimates to Implement the Klamath Basin Agreements**

In June 2011, the KBRA Non-Federal Parties revised the estimated costs for implementing the activities that were originally set forth in the 2010 KBRA. The revised total cost estimate for implementing the KBRA (2007 dollars) is \$799 million for 2012



through 2026 (see Table 1); this is an 18 percent reduction from the cost estimates in the 2010 KBRA. The revised estimated costs now average \$53 million per year for Federal funding for the KBRA. The revised cost estimates also shifted a number of costs to later years; this reduced the cost estimates in the first seven years by 38 percent.

**Table 1: Revised Appendix C-2 Cost Estimates for Federal Funding to Implement the Klamath Basin Restoration Agreement\***  
**Summary by Program**  
 Adopted June 17, 2011  
 (\$2007 Millions)

Program	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	Total
Coordination	\$ 0.1	\$ 0.1	\$ 0.1	\$ 0.1	\$ 0.1	\$ 0.1	\$ 0.1	\$ 0.1	\$ 0.1	\$ 0.1	\$ 0.1	\$ 0.1	\$ 0.1	\$ 0.1	\$ 0.1	\$ 1.5
Fisheries																
Restoration	\$ 0.9	\$ 7.9	\$ 10.7	\$ 12.5	\$ 14.5	\$ 16.6	\$ 21.9	\$ 44.4	\$ 44.0	\$ 21.7	\$ 15.4	\$ 13.4	\$ 11.5	\$ 9.9	\$ 8.3	\$ 253.4
Reintroduction	\$ 0.4	\$ 1.3	\$ 1.9	\$ 2.4	\$ 2.6	\$ 4.2	\$ 13.9	\$ 5.3	\$ 8.5	\$ 4.8	\$ 3.6	\$ 3.6	\$ 3.6	\$ 3.6	\$ 3.6	\$ 63.4
Monitoring	\$ 0.1	\$ 5.9	\$ 6.3	\$ 5.9	\$ 5.9	\$ 6.2	\$ 6.7	\$ 7.3	\$ 8.2	\$ 8.3	\$ 8.8	\$ 8.8	\$ 9.2	\$ 8.9	\$ 8.6	\$ 104.7
Water Resources	\$ 10.4	\$ 30.7	\$ 36.8	\$ 31.7	\$ 33.2	\$ 29.4	\$ 29.7	\$ 30.5	\$ 14.3	\$ 3.7	\$ 1.5	\$ 1.5	\$ 1.5	\$ 1.5	\$ 1.5	\$ 257.8
Regulatory Assurances	\$ -	\$ -	\$ -	\$ 0.4	\$ 1.0	\$ 0.8	\$ 1.0	\$ 12.4	\$ 14.3	\$ 0.5	\$ 0.5	\$ -	\$ -	\$ -	\$ -	\$ 30.7
Counties*	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
Tribes	\$ 12.3	\$ 16.3	\$ 4.5	\$ 4.5	\$ 4.5	\$ 4.5	\$ 4.5	\$ 4.5	\$ 4.5	\$ 4.5	\$ 4.5	\$ 4.5	\$ 4.5	\$ 4.5	\$ 4.5	\$ 87.0
<b>TOTAL KBRA COSTS*</b>	<b>\$ 24.2</b>	<b>\$ 62.1</b>	<b>\$ 60.4</b>	<b>\$ 57.4</b>	<b>\$ 61.8</b>	<b>\$ 61.8</b>	<b>\$ 77.7</b>	<b>\$ 104.4</b>	<b>\$ 93.9</b>	<b>\$ 43.5</b>	<b>\$ 34.2</b>	<b>\$ 31.9</b>	<b>\$ 30.4</b>	<b>\$ 28.4</b>	<b>\$ 26.5</b>	<b>\$ 798.5</b>

\*This is not a Federal budget product, it was developed by the states, agency representatives, tribes, and other non-federal parties to the KBRA.

The Non-Federal Parties have also identified the non-federal funding for implementing parts of the KBRA and the KHSA. For example, the states of California and Oregon will fund the counties program, the state regulatory activities, and certain of the fisheries activities that would not be funded by Federal agencies. In addition, PacifiCorp will fund the interim measures prior to the potential removal of the four PacifiCorp dams and ratepayers in California and Oregon and taxpayers in California would fund the removal of the dams under the KHSA. These non-federal activities total \$550 million and average \$61 million per year through 2020 (see Table 2). Most of the costs related to the KHSA end in 2020 because the dams would be removed by that year if the Secretary of the Interior makes an affirmative determination under provisions of the KHSA; however, PacifiCorp would continue to fund hatchery production for a period of eight years after the removal of Iron Gate dam. These non-federally funded activities are in addition to the cost estimates for Federal funding of the KBRA.

**Table 2: Non-Federal Funding to Implement the Non-Federally Funded Activities in the Klamath Agreements**  
 June 17, 2011 (\$2007 Millions)

Matching Funding	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	Total
Counties Program*					\$ 3.2			\$ 20.0								\$ 23.2
Other CA & OR Funding**	\$ 5.4	\$ 6.5	\$ 6.8	\$ 7.1	\$ 6.3	\$ 6.6	\$ 6.3	\$ 5.9	\$ 0.6	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ 51.4
California/Oregon rates	\$ 25.0	\$ 25.0	\$ 25.0	\$ 25.0	\$ 25.0	\$ 25.0	\$ 25.0	\$ 25.0								\$ 200.0
California Bond KHSA									\$ 250.0							\$ 250.0
PacifiCorp Funding***	\$ 9.0	\$ 2.0	\$ 2.0	\$ 2.0	\$ 2.0	\$ 2.0	\$ 2.0	\$ 2.0	\$ 2.0	***	***	***	***	***	***	\$ 25.0
<b>TOTAL</b>	<b>\$ 39.4</b>	<b>\$ 33.5</b>	<b>\$ 33.8</b>	<b>\$ 34.1</b>	<b>\$ 33.3</b>	<b>\$ 33.6</b>	<b>\$ 33.3</b>	<b>\$ 32.9</b>	<b>\$ 252.6</b>	<b>\$ -</b>	<b>\$ -</b>	<b>\$ -</b>	<b>\$ -</b>	<b>\$ -</b>	<b>\$ -</b>	<b>\$ 549.6</b>

\* California and Oregon are funding Counties Program

\*\* California and Oregon funding for fisheries restoration, and regulatory assurances and funding and tax credits for renewable energy

\*\*\* PacifiCorp is voluntarily funding interim measures under the KHSA. Numbers include estimated capital costs in 2009-2011 and estimated ongoing O&M for years 2011-2020, including 14 KHSA Appendix D measures only. Estimated capital costs and annual O&M for 5 Interim Conservation Plan Interim Measures described in Appendix C of the KHSA and hatchery operations for 2020-2028 have not been estimated and cannot be determined pending regulatory approvals.

In 2011, the Non-Federal Parties to The Klamath Agreements pursued these cost estimate revisions in part to update the preliminary estimates that were developed in 2007, and in part based on the desire to ensure cost efficiencies, budget feasibility, and consistency with current circumstances.

KBRA Section 4.1.2.B provides a process for the Klamath Basin Advisory Council (KBAC) or the Klamath Basin Coordinating Council (KBCC) to amend Appendix C-2, which contains the implementation budget estimates, based on changed circumstances:

The KBAC or KBCC, as applicable, shall amend estimated funding in Appendix C-2 or any successor as appropriate if any event occurs that materially affects the cost, feasibility, or benefits of performance of an obligation under this Agreement, including adaptive management pursuant to Section 5.4.1.

A broadly representative workgroup began meeting in January 2011 to review the cost estimates made in 2007 and recommend changes in the schedule, funding reductions, and in some cases, the elimination of funding for some measures. The Revised Appendix C-2 was reviewed and approved by the KBCC at the June 17, 2011 meeting.

The budget revisions are based on various factors. First, the KBRA Appendix C-2 line-by-line cost estimates no longer include all funding called for by the KBRA, but only Federal funding through the Federal entities that would become Parties to the agreement if Federal legislation is approved by Congress (see KBRA Section 1.1.2). As a result, items that were previously shown in Appendix C-2 that would be funded by states have been removed and placed in Table 2. This change does not, for example, change the state funding commitments to counties that other Non-Federal parties will support. Similarly, items currently fully funded by non-party Federal agencies (such as water quality monitoring by the U.S. Environmental Protection Agency) are excluded in the revised Appendix C-2 on the assumption that this funding would continue. If funding changes in the future, the Non-Federal Parties may adjust Appendix C-2 again.

Second, the KBRA cost estimates were revised to reflect a 15-year implementation plan (rather than the 10 years assumed in the original KBRA Appendix C-2). This change harmonizes the KBRA implementation with the companion KHSa (the original cost estimates were developed with the assumption that the dams would be removed earlier than 2020) and results in a more focused and realistic schedule for implementing habitat restoration.

Third, the Non-Federal Parties refined prior estimates to create a more focused and tighter budget. For example, a thorough cost estimate review produced changes in the assumptions about the quantity of aquatic habitat that would be restored and the costs of those actions and resulted in savings. This review also resulted in cost savings by removing overlaps between proposed KBRA programs and expenditures for interim measures in the KHSa that are being funded by PacifiCorp. Additional savings since the execution of KBRA in February 2010 were also identified.

Fourth, consistent with the terms of the KBRA and letters of support received from the Secretaries of the Interior, Agriculture, and NOAA, a limited number of existing budgetary resources have been identified that can be redirected or reprogrammed to

enhance the efficiency of the existing Federal effort in the basin and reduce needed funding.

The KBRA Parties are developing an extensive monitoring and evaluation program. The results of the monitoring information will be used to adaptively manage the implementation of the program. If changes in the program are needed or if there is new information that affects costs, feasibility, or benefits of actions under the KBRA, the KBCC would revise the agreement or amend the estimated funding in Appendix C-2 in the future.

### **KBRA Costs Compared to Current Federal Spending**

Based on updated analysis, Federal agencies are currently spending approximately \$17 million per year in base funding in the Klamath Basin specifically related to the activities called for in the KBRA. This available Federal funding analysis is based on the President's Fiscal Year 2012 budget. If this funding were available over the next 15-years, it would cover one-third of the Federal cost estimates described above and the new funding needed to implement the KBRA would average \$36 million per year and the total additional funding needs would be approximately \$537 million.

The Federal government has also provided significant funding for emergencies (shutdowns of agriculture or fishing) over the past ten years. For example, according to the Congressional Research Service, emergency funding to commercial fishermen in 2006 under Public Law 110-28 totaled \$60.4 million. The activities in the KBRA and KHSA are designed to reduce the emergency funding over the long term by comprehensively addressing the problems in the Basin.

### **FY 2013 Federal Funding Request**

Although the Department of the Interior is not yet a party to the Restoration Agreement since authorization is pending in Congress, there are a number of restoration/water supply enhancement actions called for under the Klamath Basin Restoration Agreement that are authorized under existing law.

The 2013 budget request includes \$7.1 million for Reclamation to begin implementation of actions that address water supply enhancement and restoration of natural resources that support the Klamath Basin Restoration Agreement. The budget request for the Department of the Interior also includes \$7.0 million to fund acquisition of former reservation lands that will support economic and cultural activities which make settlement possible. The Fish and Wildlife Service budget includes \$1.6 million that will be leveraged with funding from other sources to support projects listed in both the Restoration Agreement and the Hydroelectric Settlement. Projects will include fish related monitoring and modeling – such as fish population, water temperature, hydrology, water quality, fish disease, stock assessments, fish and watershed habitat planning and assessments; fish and watershed habitat planning and restoration projects; and projects to improve instream flows for fish. The USGS budget includes \$901,000 for science

activities to understand the relationship between water quality and availability and fish habitat and survival.

## **Federal Nexus**

The Federal government has a significant interest in the Klamath River Basin, including: the protection and restoration of fish species listed under the Endangered Species Act (ESA); improving aquatic habitat and water quality for salmonid and resident fish populations important to Native American tribes; and restoring the economic viability of the commercial and sport fishing industries. The Klamath Basin historically supported one of the most abundant salmon fisheries in the nation, with an estimated pre-development run size of up to a million salmon per year. As a result of multiple stressors, these fisheries have declined steeply in the Klamath Basin. Fall-run Chinook salmon are now estimated to be 14 percent of their highest historic estimated abundance; and coho salmon abundance is at an estimated 2 percent. Two species of suckers that reside in and around Upper Klamath Lake are listed as endangered under the ESA and coho salmon in the Klamath River are listed as threatened.

The U.S. Department of the Interior's (Interior) Bureau of Reclamation (Reclamation) manages the Klamath Reclamation Project (authorized in 1905) that diverts water from Upper Klamath Lake and the Klamath River for irrigated agriculture. Interior's U.S. Fish and Wildlife Service (FWS) manages six National Wildlife Refuges in the Klamath Basin that depend on water from the Klamath River system. The U.S. Department of Agriculture's U.S. Forest Service and Interior's Bureau of Land Management (BLM) manage other public and Federal lands along the Klamath River and on tributaries to the river. The United States has trust obligations for the Federally-recognized tribes that use the river. The Yurok, Karuk, and Klamath Tribes are parties to the KBRA as well as the KHSA. The U.S. Department of Commerce's NOAA Fisheries Service manages the west coast commercial salmon fishery under the Magnuson-Stevens Fishery Conservation and Management Act which relies on healthy Chinook stocks from the Klamath River.

## **Economic Effects of the Agreements**

To provide context for the cost estimates to implement the Klamath Basin Agreements the Non-Federal Parties developed estimates of the economic activities that would benefit from implementation of the Agreements. For example, the Non-Federal Parties estimate that agricultural production in the Upper Klamath Basin contributes \$600 million per year in farm-gate and other commercial revenues. Farming is one of the leading sustainable businesses within this region and is relied upon for household income, property and other taxes, and 4,500 jobs. Salmon fisheries reliant on fish from the Klamath River result in more than \$150 million per year in economic benefits in Oregon and California. In addition, six National Wildlife Refuges provide habitat for most of the migratory waterfowl on the Pacific Flyway. Representatives of Interior, including the Secretary's office, the Solicitor's office, the Bureau of Indian Affairs, BLM, Reclamation, and FWS, the NOAA Fisheries Service and the Forest Service worked with 44 State, Tribal,

irrigation, commercial fishing, conservation organizations and business entities to develop the Klamath Agreements.

Implementation of The Klamath Agreements would generate significant economic benefits in the four counties in the Basin. The KBRA Non-Federal Parties estimate that these measures would provide an estimated 707 jobs in Oregon, increase business revenues by \$40 million per year, and increase personal income by \$29 million per year. In California, these measures would provide 465 jobs, increase business revenues by \$30 million per year, and increase personal income by \$24 million per year. In addition, improved Klamath salmon runs would support an additional 4,300 jobs in the ocean fishing industry.

### **1.3 Legislation**

Senator Merkley and Congressman Thompson have introduced legislation in the Senate and House of Representatives to implement the Klamath Basin Agreements. The Non-Federal Parties are working with congressional offices and committees to provide information and support the passage of legislation to implement the Agreements.

A number of the actions in the KBRA and KHSA can be implemented under existing authorities. The Non-Federal KBRA Parties have identified the actions that require additional authority (See KBRA Section 3.1.1.B and Appendix A and KHSA Appendix E).

### **1.4 Monitoring implementation of Klamath Basin Restoration Agreement**

The KBCC has developed a process to track implementation of all near-term commitments in the KBRA. The facilitator prepares a status report on all these actions and it is reviewed at each KBCC meeting. Copies of these reports are posted on the website. The status of the implementation of these actions is summarized in this report. (See KBRA Appendix C-1). The KBCC also reviews the status of the implementation of the KHSA as each meeting. See Appendix C for the latest report.

### **1.5 Public Information and Involvement Plan**

The KBCC was established to “promote continued collaboration, cooperation, coordination, and consultation among Parties and others as elements of the Restoration Agreement are implemented. The KBCC will provide for general oversight and administration, including activity and program coordination, information sharing, priority setting, fund seeking, and dispute resolution related to implementation of the Agreement...The KBCC will serve as the primary forum for public involvement in implementation of the Agreement.” (KBRA Appendix D-1, page D.3)

The KBCC has independent obligations under the KBRA not only to encourage public involvement in KBRA implementation, but also to keep the public informed about KBRA activities.

Many of the actions contemplated by the KBRA are also actions by federal or state agencies. Additional public input to such actions will be managed by the relevant agencies pursuant to applicable laws which mandate public participation in the decision making process such as the National Environmental Policy Act or California Environmental Quality Act. However, the KBCC serves as an information clearing house so that members of the public have a one-stop access point to what could otherwise be scattered information on these related agency processes.

The KBCC has also established communication objectives, developed tools for meeting these objectives, and defined the scope of its communications responsibilities. That scope, however, relates to official KBCC communications, and does not limit the communications efforts of any of its member Parties.

**Communication Plan Scope:** The KBCC purpose and function as stated in the KBRA (see Appendix D-1, Sec. II) commits the KBCC to the following in terms of communications:

1. Provide public updates on the progress of KBRA implementation.
2. Provide public access to relevant KBCC decisions and recommendations along with any minority reports.
3. Provide a forum and mechanism to solicit, receive, and consider public input on KBCC activities.

The KBCC has adopted communications protocols to meet these objectives.

**Public comment:** The KBRA outlines a responsibility to implement its programs and to operate in a publicly transparent manner, actively solicit public input, and consider public input in decision making.

To facilitate this, the KBCC provides public notice of upcoming meetings through general notices to local media outlets, emails to individuals requesting information, and on the KBCC website.

Each KBCC meeting provides an opportunity for general public comment and comment on any agenda item where the KBCC will make a decision.

**KBCC Website;** the KBCC has a website that lists meetings, meeting materials, and official documents. See [www.klamathcouncil.org](http://www.klamathcouncil.org).

## 2. Fisheries Program

The goals of the Fisheries Program are to: 1) restore and maintain ecological functionality and connectivity of historic fish habitats; 2) re-establish and maintain naturally sustainable and viable populations of fish to the full capacity of restored habitats; and 3) provide for full participation in harvest opportunities for fish species.

The Fisheries Program will: 1) provide for reintroduction of anadromous species above the current site of Iron Gate Dam, including tributaries to Upper Klamath Lake; 2) establish conditions that, combined with effective implementation of the Water Resources Program and the Hydroelectric Settlement will contribute to the natural sustainability of fisheries and full participation in harvest opportunities, as well as the overall ecosystem health of the Klamath River Basin; 3) monitor the status and trends of fish and their habitats; and 4) assess the effectiveness of actions and provides for adaptive management.

### 2.1 Fisheries Restoration and Monitoring Program

Under Sections 10.1 and 12 of the KBRA, the Klamath Fish Managers are working to prepare a Fisheries Restoration Plan and a Monitoring Plan. This section describes the progress to date.

Fish Managers have been meeting since July 2010 to work on the Fisheries Restoration and Monitoring Plan. The Fish Managers prepared a draft *KBRA Phase I Fisheries Restoration and Monitoring Plan: Proposed Outline and Approach* on November 29, 2010 and made a presentation to the KBCC on December 15, 2010. Comments from KBCC members were due by December 30, 2010.

The *KBRA Phase I Fisheries Restoration and Monitoring Plan: Proposed Outline and Approach* was finalized on February 4, 2011 and was the culmination of a series of meetings among Fish Managers. The purpose of the document was to outline the initial steps and general approach toward achieving the KBRA directive to develop a monitoring plan and a restoration plan. The document expressed the group's general consensus to integrate the restoration and monitoring plans into a single "Phase I Fisheries Restoration and Monitoring Plan" using a multiple-scale approach and to base restoration and monitoring actions on basin-scale ecological goals. Integrating the plans in this manner ensures that science is connected with decision making, that Fish Managers make good use of existing knowledge, and that goals and objectives are defined early so as to serve as the basis for prioritization of methods and actions.

As an interim step, Fish Managers developed a budget justification document to provide further explanation of the restoration and monitoring budget presented in KBRA Appendix C-2, which details specific restoration actions and associated costs. Although the budget justification is based on best professional judgment at the time of its development, Fish Managers intend to implement a more goal-driven, comprehensive landscape-based restoration prioritization strategy and associated monitoring approach

based on adaptive management and consistent with the collaboratively produced outline. The details within the budget justification are thus subject to evaluation and review as outlined within the document. To illustrate the use of this approach, road decommissioning is a restoration action that is identified within the budget justification document with some associated costs defined. The fisheries restoration and monitoring plan would likely conform to the initial cost estimates but would also include a process to geographically prioritize roads for decommissioning based on environmental variables (e.g., fish passage or slope stability criteria) that affect the severity of road impacts and thus the ecological benefits of decommissioning.

The next steps necessary to achieve progress toward the development of a Phase I Fisheries Restoration and Monitoring Plan would include the following:

1. Develop a scope of work to develop detailed costs for preparing the draft Phase I Fisheries Restoration and Monitoring Plan and continue to work on funding.
2. Develop a synthesis of existing scientific studies, restoration planning efforts, and monitoring activities to inform the process and to reduce duplication of effort. This activity would also serve as the basis for the introduction and background sections of the Phase I Restoration and Monitoring Plan and potentially populate a metadata library for use by program partners.
3. Collectively, define goals and objectives consistent with KBRA associated with restoration and monitoring (instream, riparian and upland) so as to directly benefit existing fish resources and significantly contribute to protecting and preparing habitats for use by anadromous fish.
4. Identify and develop an initial prioritization of restoration actions based on defined goals so as to directly benefit existing fish resources and significantly contribute to protecting and preparing habitats for use by anadromous fish. Develop government cost estimates for tasks based on this prioritization that can be used to refine initial cost estimates provided in KBRA Appendix C-2.
5. Develop adaptive monitoring processes to evaluate restoration effectiveness, fish population status and trends, and environmental water quality/quantity as described in the KBRA.

These steps are proposed to allow for objective prioritization of tasks using a process-driven approach that can then be compared and used to modify the tasks listed in the budget justification details, where appropriate. It should be noted that each of the activities listed above will draw from existing information and incorporate existing programs, where practical, to avoid redundancy and improve cost effectiveness.



On February 8, 2011, Fish Managers agreed to move forward with the outline and approach document and begin to work towards achieving the next steps. Because dedicated funds have not yet become available, agencies are currently working together to identify funds to address items 1 and 2 above. Completion of these tasks will jumpstart the prioritization process and provides a strong foundation for the development of the full Phase I Fisheries Restoration and Monitoring Plan. The Fish Managers understand that items 1 and 2 must be completed in a collaborative manner that incorporates the participation of stakeholders and partners.

On February 14, 2011, the Fishery Managers requested an extension for the draft until 18 months after the Fish Managers receive funding necessary to develop the draft plan.

The Klamath Fish Managers are comprised of: the California Department of Fish and Game, the Karuk Tribe, the Klamath Tribes, the National Marine Fisheries Service, the Oregon Department of Fish and Wildlife, The U.S. Bureau of Land Management, the U.S. Fish and Wildlife Service, the U.S. Forest Service, and the Yurok Tribe.

## 2.2 Fisheries Reintroduction Plan

### Oregon Plan

The Oregon Fish and Wildlife Commission adopted an amendment to the Klamath River Basin Fish Management Plan on July 18, 2008. The 2008 Amendment (OAR 635-500-3890 *et seq.*) provides policy direction for the Oregon Department of Fish and Wildlife's (ODFW) participation in the implementation of this section of the KBRA. (See KBRA Section 11.3)

**General Policy:** Oregon's Wildlife Policy (ORS 496.012) recognizes that the Oregon Fish and Wildlife Commission represents "the public interest of the State of Oregon" and further will implement the goal "to develop and manage the lands and waters of the state in a manner that will enhance the production and public enjoyment of wildlife." By statutory definition, wildlife includes fish. Nothing in the Restoration Agreement modifies or abrogates the Oregon Fish and Wildlife Commission's statutory responsibilities.

**Amended Klamath Policy:** Oregon's goal is to re-establish in Oregon self-sustaining, naturally-produced populations of chinook, steelhead, coho, and lamprey that were historically present in the Upper Klamath Basin, into historic habitats currently vacant of anadromy.

The 2008 Amendment to the Klamath River Basin Fish Management Plan (1997) directs ODFW to develop a Reintroduction Implementation Plan and an Anadromous Fish Conservation Plan for the Oregon portions of the Klamath River Basin. The Reintroduction Implementation Plan corresponds with the Phase I Plan described in KBRA Section 11.2 and 11.3.1. The Anadromous Fish Conservation Plan corresponds with the Phase II Plan described in KBRA Section 11.3.2.

The 2008 Amendment to the Klamath River Basin Fish Management Plan (1997) provides policies that direct ODFW to: develop a Reintroduction Implementation Plan prior to release of any chinook above Upper Klamath Lake; monitor the volitional re-colonization of the Oregon portion of the Klamath River and tributaries by chinook salmon, steelhead, coho salmon, and Pacific lamprey, and not release anadromous fish into the Oregon portion of the Klamath River and tributaries below Upper Klamath Lake unless re-colonization is proceeding too slowly according to criteria developed in the Reintroduction Plan; and develop a Reintroduction Implementation Plan prior to release of any chinook above Upper Klamath Lake.

Under KBRA Section 11.3, ODFW and Klamath Tribes, in collaboration with other tribes and Fish Managers will initiate plan development when funding is available, but no later than State Concurrence of an Affirmative Declaration by the Secretary of the Interior under KHSA Section 3.3. In preparing the plan, these agencies will seek input from interested KBRA Parties and others with technical expertise. The schedule calls for completing the Phase I Plan within 12 months.

### **California Plan**

The California Department of Fish and Game (CDFG), in collaboration with other Fish Managers will initiate the California Reintroduction Plan when State Concurrence of an Affirmative Declaration by Secretary of Interior under KHSA Section 3.3 is complete. CDFG will seek input from other Parties and public and complete the plan within 24 months. (See KBRA Section 11.4)

## **3. Water Resources**

The Restoration Agreement contains a number of measures to provide water supply reliability. The Restoration Agreement also includes a number of actions to increase the amount of water to improve instream flows in the Klamath River and tributaries, maintain the elevation of Upper Klamath Lake, and provide specific allocations and delivery obligations for water for the Lower Klamath and Tule Lake National Wildlife Refuges.

### **3.1 File validation actions**

The Klamath Project Water Entities filed actions in accordance with Applicable Law seeking validation or confirmation of the Restoration Agreement. (See KBRA Section 15.3.1.B) A total of three actions were filed, with several of the Klamath Project Water Entities joining together in some of the cases. In two of the three cases, the state courts have issued judgments confirming the validity of the KBRA and KHSA or the obligations of the Klamath Project Water Entity under the Agreements. In the third case, the court has ruled that judgment should also be entered in favor of the Klamath Project Water Entities, although that judgment has yet to be issued.

### **3.2 Collaboration to Benefit Agriculture and Wildlife Refuges.**

The U.S. Fish and Wildlife Service (FWS) and Klamath Project Water Users are working on interim actions under KBRA Section 15.1.2.J to resolve outstanding issues related to water rights for the Refuges. Other provisions will be implemented on a schedule that will allow implementation when the diversion limits in Appendix E-1 become effective in 2020 or 2021. (See KBRA Section 15.1.2.C)

### **3.3 On-Project Plan**

The Restoration Agreement established limitations on the quantity of water diverted from Upper Klamath Lake and the Klamath River for use in the Klamath Reclamation Project; based on historical records, the difference between the amount of such water available for irrigation in the Project and the demand for such water is approximately 100,000 acre-feet in the driest years, with irrigation water availability increasing on a sliding scale with increasingly wet conditions. The Restoration Agreement calls for Klamath Water and Power Agency (KWAPA)—a joint powers entity comprised of irrigation districts—to develop a long-term plan which will include measures to operate within the KBRA diversion limits. KWAPA has begun work toward preparing a draft On-Project Plan (see Section 15.2.2.B.i). KWAPA presented a workplan and schedule at the KBCC meeting on February 24, 2011. The projected completion date is September 30, 2013. The parties understand that federal approval and funding of plan implementation will follow the enactment of legislation approving the Restoration Agreement.

### **3.4 Groundwater Technical Investigations**

USGS, in cooperation with OWRD, has initiated groundwater studies pursuant to the workplan in Appendix E-2. (See Section 15.2.4.B).

KWAPA will meet with OWRD and other interested Parties at least once during development of On-Project Plan and at least 30 days prior to completion of the On-Project Plan (Section 15.2.4.B.iv.a) regarding groundwater issues.

### **3.5 Klamath Basin Adjudication Process**

KPWU and Klamath Tribes filed amended stipulations by May 18, 2010 (Section 15.3.2.B). The Klamath Basin Adjudication (KBA) has been proceeding on schedule.

In December 2011, an Administrative Law Judge in the State of Oregon's Klamath Basin Adjudication issued a proposed order following a contested case hearing on contests to the Klamath Tribes' claims to water bodies throughout their homeland area. The Administrative Law Judge ruled in favor of the tribes' claims for six large water bodies located in the former Klamath reservation area. His proposed order effectuated the Klamath Treaty of 1864 by awarding to the Tribes sufficient instream flows and water

levels necessary to create a productive habitat for animals, plants, and fish so that the Klamath can exercise their treaty hunting, fishing, trapping and gathering rights. Parties to the contested case may elect to file exceptions to the Judge's proposed order. Any exceptions are to be filed with the Adjudicator.

The rulings encompass the Williamson, Sycan, Sprague and Wood Rivers, along with their tributaries, as well as the Klamath Marsh and over 200 springs scattered throughout the former reservation. Another decision is expected in April 2012 that will address tribal claims for the waters of Upper Klamath Lake and the Klamath River.

The State of Oregon manages surface and groundwater through the Oregon Department of Water Resources. The water agency commenced the Klamath Basin Adjudication in 1974 to determine who has legal rights to surface water in the Klamath River Basin and to quantify their water rights.

"These rulings emphasize the need for Basin water interests to work together to find ways to share the water, share the pain of drought, and share the bounty of our waterways," said Tribal Vice-Chairman Don Gentry. "The Tribes are committed to restoring fisheries and water bodies in the Basin, and we believe that agricultural and other water dependent communities can be restored at the same time. That is what the KBRA can do," he said.

The Oregon Water Resources Department is scheduled to submit its Findings of Fact and Order of Determination of Rights to the Klamath County Circuit Court by the end of 2012 or early 2013.

### **3.6 D Pumping Plant Costs**

Reclamation, TID, and LKNWR have reviewed cost allocation in Section 15.4.2.A. The parties agreed to maintain the allocation stated in this section.

### **3.7 Klamath Reclamation Project operations**

The Secretary of the Interior is working with Project contractors to establish a process to analyze the Klamath Reclamation Project costs (Section 15.4.7).

### **3.8 Off-Project Water Settlement negotiations**

The purposes of the Off-Project Water Program are to: (i) develop an Off-Project Water Settlement (OPWAS) if possible that, upon approval, resolves water rights disputes between the Off-Project Irrigators, Klamath Tribes, and BIA; and (ii) through the OPWAS, or the Water Use Retirement Program (WURP) described in KBRA Section 16.2.2, provide for increased stream flow and inflow into Upper Klamath Lake through voluntary retirement of water rights or water uses, or other means as agreed to by the OPWAS Parties, or the Upper Basin Team (UBT) consistent with KBRA Section 16.2.2,

to improve Fisheries habitat and also to provide for stability of irrigation water deliveries in the Off-Project Water Program.

The area for the Off-Project Water Program (Off-Project Area) includes the following sub-basins: the Wood River, Sprague River, Sycan River, and Williamson River sub-basins. The Parties who develop the OPWAS, referred to as the “OPWAS Parties,” are the Klamath Tribes, Upper Klamath Water Users Association (UKWUA), and the BIA.

The deadline for OPWAS was February 2012; the Klamath Tribes, Upper Klamath Water Users Association have provided notice that they will need an extension because funding has not been available to implement this action. Also, Congress has not passed the authorizing legislation; therefore, BIA has not become a Party under KBRA Section 1.1.2.

### **3.9 Power for Water Management Program**

The purposes of the Power for Water Management Program are to ensure affordable electricity for eligible On-Project and Off-Project irrigators to: (i) allow efficient use, distribution, and management of water within the Klamath Reclamation Project and the National Wildlife Refuges, and facilitate the return of water to the Klamath River; (ii) implement the WURP and OPWAS; (iii) realize objectives of the Fisheries Restoration Program; and (iv) provide power cost security to assist in maintaining sustainable agricultural communities in the Upper Klamath Basin. The program includes a number of actions that are designed to achieve a delivered power cost target level at or below the average cost of similarly situated Reclamation irrigation and drainage projects in the surrounding area. The actual realization of the delivered power cost target depends on several factors and variables, and is not guaranteed by the KBRA. The overall program includes an interim power program, access to federal power, and a long-term program to implement energy efficiency and new renewable resource generation.

Authorization and funding are currently not available for the Interim Power Program or the Energy Efficiency and Renewable Resources Program and the federal power component of the overall program is not yet available to irrigators. In the meantime, Upper Klamath Basin irrigators are exposed to significantly higher power costs. Until recently, costs for pumping were established in 1956 contracts entered into in connection with the original Federal license for the four Klamath River dams owned by PacifiCorp; the rates were approximately 0.4 to 0.7 cents per kilowatt-hour, depending on the type and location of pumping. The license and contract expired in 2006; under Federal law, the license automatically renews for one-year terms until FERC acts on a new license; the contracts did not. Since the expiration of the contract, electricity rates have been escalating towards irrigation pumping rates approved by the Oregon and California public utility commissions. Irrigators in California face tariff rates that are roughly 2000 percent higher than the previous contract rate. Irrigators in Oregon are phasing into full tariff in 2013; the full tariff in Oregon is currently 9 cents per kilowatt-hour.

These higher rates have a significant effect on irrigators and the management of water and realization of the goals and purposes of the Restoration Agreement.

The Klamath Water and Power Agency (KWAPA) and the Upper Klamath Water Users Association (UKWUA) have formed the Management Entity known as the Klamath Basin Power Alliance or KBPA and developed operating protocols and guidelines. KBPA has also developed a communications plan. Other guidelines are pending completion of the power sales contract between Reclamation and BPA. (See Section 17.4.1 and 17.4.3).

KBPA is working to identify eligible customers and provided a status report at the KBCC February 24, 2011 and September 9, 2011 meetings (See Section 17.3). KBPA will develop a system to distribute funds to eligible customers (Section 17.4.4). KBPA is working with PacifiCorp; some of this work is pending funding for the interim power program and Federal power program.

Reclamation and KBPA are working to negotiate a power sales contract with BPA. (See Section 17.6). This work includes preparation of an interconnection agreement with BPA and other technical work. KBPA is developing the technical information needed for the contract. KBPA described the workplan and schedule for this work at the April 7, 2011 KBCC meeting: 1) the pre-bid conference was April 6, 2011; 2) proposals were due May 24, 2011; 3) KBPA staff made recommendations to Board on June 7, 2011; 4) the project began on June 22, 2011.

KBPA is working on a financial and engineering plan. (See Section 17.7.2).

### **3.10 Williamson River Delta**

In accordance with the preferred alternative described in an Environmental Impact Statement and with funding provided by Reclamation, PacifiCorp, Natural Resource Conservation Service and the U.S. Fish and Wildlife Service (FWS). The Nature Conservancy (TNC) completed the breaching of the levies in November 2007 to restore approximately 28,800 acre-feet (gross) of lake storage capacity when Upper Klamath Lake elevations are between 4143.3 and 4136.0 feet. The Parties have agreed to support efforts to monitor the effects on fish populations and water quality associated with this restoration project. (See KBRA Section 18.2.1)

### **3.11 Agency Lake and Barnes Ranch**

To achieve water management outcomes consistent with this Agreement, the diked and drained areas of Agency Lake and Barnes Ranches that once were part of Agency Lake will be operated as pumped storage within existing dikes subject to KBRA Section 18.2.2.D, with the goal of reconnecting to Agency Lake by breaching existing dikes.

Reclamation and FWS completed a transfer of the lands, including the related data and documentation. (See Section 18.2.2.B).

FWS provided a status report to the KBCC at the September 2011 meeting. It is working to complete a study on options identified in KBRA Section 18.2.2.C.

### **3.12 Wood River Wetland**

To achieve water management outcomes consistent with the Restoration Agreement, the Parties' ultimate goal is to reconnect Wood River Wetland to Agency Lake when physical and biotic conditions are sufficient to provide the wetland restoration benefits for which the property was acquired.

BLM currently manages the Wood River Wetland to restore wetlands adjacent to Agency Lake. In furtherance of the Restoration Agreement and the ultimate goal, BLM, in collaboration with the KBAC and TAT is preparing a study, by March 31, 2012, that evaluates options for enhancing water management flexibility in providing benefits for water storage, fish, wildlife, and wetlands habitat. This study will consider options including, among others, whether diked and drained areas of Wood River Wetland that once comprised Agency Lake should be operated as pumped storage within existing dikes, or fully reconnected to Agency Lake by breaching dikes. Either option would result in a total water volume of approximately 16,000 acre-feet of gross storage between elevations 4143.3 and 4136.0 feet, but would provide differing arrays of water management opportunities and ecosystem benefits.

### **3.13 Future Storage**

Reclamation is working on a study on potential sites that could provide more storage in the Upper Klamath Basin (See Section 18.3.1). Reclamation has provided progress reports to the KBCC. A copy of the Upper Klamath Basin Off-Stream Storage report is available at: [http://www.usbr.gov/mp/kbao/special\\_projects.html](http://www.usbr.gov/mp/kbao/special_projects.html).

### **3.14 Develop Drought Plan**

The Restoration Agreement includes a number of programs related to water diversion and use, and improvements for fish habitat and passage. The Parties to the Agreement recognized that additional measures would be needed in certain low-water years and committed to developing a Drought Plan under Section 19.2 of the Agreement. The Drought Plan's purpose and use is limited exclusively to implementation of the applicable terms of the Restoration Agreement.

In the instances of Drought and Extreme Drought, the Parties intended that water and resource management actions be taken such that no Klamath Basin interest would bear an unreasonable portion of burdens imposed or the risk of loss or injury.



The Klamath Basin experienced low-water conditions in 2010; the current water year appears to be shaping up to be a little below average after experiencing very low precipitation and inflows in the upper basin from October through February. Full implementation of the water resource measures in the KBRA, including the Drought Plan would provide coordinated and effective plans and operations making water available for fishery resources and wildlife refuges and providing greater certainty for irrigators.

Nothing in the Drought Plan is intended to limit the applicability or effect of the Endangered Species Act or other Applicable Law. Neither the Restoration Agreement nor the Drought Plan creates responsibilities for non-Parties to the Restoration Agreement. While not altering rights of any Party or non-Party that exist outside the Restoration Agreement and the Plan, Drought Plan implementation is not intended to require any action which affects water use from Clear Lake or Gerber Reservoirs, or operation of Harpold Dam. The Drought Plan is subject to Section 2 and all other provisions of the Restoration Agreement and does not alter the authority of any Party or non-Party over the management and use of water consistent with Applicable Law and the Restoration Agreement. The Drought Plan is intended to be consistent with, and incorporates the provisions of the Restoration Agreement but does not constitute an amendment to the Restoration Agreement. In the event of a conflict between the Drought Plan and the Restoration Agreement, the Restoration Agreement shall control.

The Drought Plan was developed by the Drought Plan Lead Entity identified in the Restoration Agreement. The Lead Entity is comprised of: Klamath Tribes, Karuk Tribe, Yurok Tribe, Upper Klamath Water Users Association, the Klamath Water and Power Agency, the Klamath Basin National Wildlife Refuges, Oregon Water Resources Department, California Department of Fish and Game, and Trout Unlimited, as the representative of the conservation and non-tribal fishing Parties to the Restoration Agreement.

## **Status**

The Drought Plan Lead Entity completed a draft Drought Plan on February 28, 2011. The Drought Plan Lead Entity sought comment from the KBRA Parties and the public. The draft was posted on the website and copies were sent to a distribution list of interested parties. The KBCC took comment on the draft at its April 7, 2011 meeting; written comments were due on April 15, 2011.

The Drought Plan Lead Entity reviewed the comments and completed a final plan on July 11, 2011. That plan is currently being reviewed by the Department of the Interior for approval and funding; this review will also include environmental and any other procedures required by law. No funding is available to implement the Drought Plan.

## **Drought Plan Summary**

A copy of the Drought Plan is available at [www.klamathcouncil.org](http://www.klamathcouncil.org). This section summarizes the key provisions.



Section 3 of the Drought Plan describes the organization for implementing the Drought Plan. The Oregon Water Resources Department (OWRD) is designated as the entity responsible for declaring, and revoking a declaration of, Drought or Extreme Drought. Section 3 also describes the Drought Fund Administration Entity and funding procedures. It also describes the role of the Technical Advisory Team (TAT).

Section 4 describes the processes by which OWRD will declare or revoke a declaration of Drought and Extreme Drought. The process begins with early monitoring of conditions. Technical Advisory Team (TAT) will monitor water conditions between the end of the growing season and March 1<sup>st</sup> of the next water year. If conditions indicate the potential for Drought or Extreme Drought conditions or low elevations in Upper Klamath Lake, the TAT may recommend measures that can be taken prior to March 1<sup>st</sup> to address the potential of Drought or Extreme Drought.

In January, February and March of each year, OWRD will make a preliminary determination as to whether or not the potential for Drought or Extreme Drought exists and provide notice to Klamath Basin communities. OWRD would make a decision to declare Drought or Extreme Drought by April 5<sup>th</sup>.

Section 5 describes the preparation of the drought response. The steps include the quantification of available water from the measures described in Sections 6 and 7; this information will be used to develop and implement the Drought Plan. This section also describes the fisheries management considerations for implementing the Drought Plan.

Section 6 describes the voluntary measures that will be used to implement the Drought Plan, including conservation and management programs, use of stored water, and reductions in the use of surface water for irrigation. The section also describes the next priority of other measures.

Section 7 describes the provisions and conditions for limiting or reducing diversions to the Klamath Reclamation Project in Extreme Drought conditions. The section describes the provisions before the DIVERSION limitations as described in Section 15 of the Restoration Agreement are in effect and the provisions after they are in effect.

Section 8 describes the adaptive management provisions to assess and improve the actions under the Drought Plan.

Section 9 describes a process for the periodic review and amendment of the Drought Plan.

### **3.15 Prepare Emergency Response Plan**

Reclamation and KWAPA are the lead parties for developing a draft Emergency Plan to address problems associated with dikes that might fail in the Upper Klamath Lake area.

(See Section 19.3). KWAPA does not have funding to work on the plan and has requested an extension until 12 months after funding is available.

### **3.16 Climate Change Assessment**

The KBRA Parties will determine how long-term climate change may affect the fisheries and communities of the Klamath Basin. The parties would then re-convene to negotiate any supplemental terms to the Restoration Agreement which may be necessary to address changes in the climate in order to achieve the parties' goal of maintaining sustainable fisheries and communities.

The Oregon Water Resources Department (OWRD) and California Department of Fish and Game (CDFG), in coordination with Water Managers and Fish Managers are co-lead parties for this assessment. These agencies initiated the assessment process in February, 2012. OWRD and CDFG are currently reviewing existing and planned climate change studies to determine whether they will be adequate for the assessment called for in KBRA Section 19.4. OWRD and CDFG then plan to develop a process and schedule for the assessment and meet with the KBCC to seek comments. OWRD and CDFG expect to coordinate the assessment with the work being conducted by Reclamation under the Secure Water Act.

Since Congress passed the Secure Water Act, Reclamation has been working toward completing two phases of the Act. The first phase is the West Wide Climate Risk Assessment which broadly looks at the risks to water supplies, power and the ecosystem throughout Reclamations facilities in the west but with emphasis on eight critical basins including the Klamath. The second phase is being referred to as the Basin Studies, which will look at the entire Klamath River water shed from the headwaters to Upper Klamath Lake to the estuary. The Klamath Basin Study should get underway toward the end of this summer and involve many stakeholders from throughout the basin.

### **3.17 Interim Flow and Lake Level Program**

The Secretary of the Interior will plan and implement a water leasing and purchase program under KBRA Section 20.4 to provide additional flows and maintain lake levels for fish species until the other water programs are fully implemented. The Parties understand that Reclamation must have new or additional authority in order to fully administer the Interim Flow and Lake Level program.

## **4. Regulatory Assurances**

The Restoration Agreement includes commitments by the parties to take every reasonable and legally-permissible step consistent with environmental laws and regulations to avoid or minimize any adverse impact, in the form of new regulation or other legal or funding

obligation, that might occur to users of water or land upstream of Iron Gate Dam from introduction or reintroduction of aquatic species to currently unoccupied habitats or areas.

The Restoration Agreement also establishes steps designed to comply with the Endangered Species Act, including the preparation of biological opinions on specific federal actions called for in the agreement. The agreement also establishes a process to develop general conservation plans or habitat conservation plans that would be designed to assist non-federal parties to comply with the ESA. Participation in these plans would be voluntary.

#### **4.1 Fish Entrainment Alleviation**

Reclamation will evaluate methods, locations, and potential need to construct facilities to prevent fish entrainment at key upper basin water diversion points (Section 21.1.3.A). Reclamation will work with its Denver engineering office to develop strategies. This program would be implemented prior to the removal of PacifiCorp's hydroelectric dams, if there is an affirmative Secretarial Determination under the KHSA, so reintroduced salmon and other aquatic species are not entrained in Klamath Reclamation Project diversions.

#### **4.2 California Laws**

CDFG will evaluate the necessity for incidental take coverage following concurrence with an affirmative Secretarial Determination, by the Governor of California. Within 90 days of such concurrence, CDFG will advise the Parties of its determination and recommend specific procedures for obtaining any necessary coverage.

CDFG will also evaluate the necessity for revisions to existing Fish and Game Code sections 5515(b) and 3511(b). Within sixty days following concurrence by the Governor of California with an affirmative Secretarial Determination, CDFG will provide the parties with draft legislation proposing any necessary modifications to these referenced statutes. (See Section 24)

#### **4.3 Oregon Laws**

ODFW will determine schedules for any environmental reviews in coordination with potential facilities removal. (See Section 25)

### **5. Counties Program**

Klamath County will develop and adopt a Klamath County Program by June 30, 2012. (See Section 27.2). The KBRA Non-Federal Parties will seek funding for this program

by July 1, 2012. (See Section 27.3). The KBRA Non-Federal Parties will support funding for mitigation for property tax impacts to be dispersed by July 1, 2016.

## **6. Tribal Program**

### **6.1 Tribal Participation in Fisheries and Other Programs**

The Non-Federal Parties support funding for the KBRA signatory tribes to build the capability to participate in the implementation of the fisheries and conservation management programs (See Section 32). Funding is not yet available for these activities.

### **6.2 Economic Revitalization**

The Non-Federal Parties support acquisition of funding by the Klamath Tribes to implement the Mazama Forest Project. (See Section 33.2) The Administration has included funding in the FY 2013 budget for this project. Support of this component is consistent with KBRA goals to provide economic stability of Klamath Basin communities. The Parties recognize that restoration of Treaty fisheries, important to the Klamath Tribes' economic stability and culture, will take decades to achieve. Implementation of the Mazama Forest Project will help provide economic stability to the Klamath Tribes and Klamath Basin residents in the interim, and into the future, while fisheries restoration occurs.

The Non-Federal Parties also support funding for the Klamath Tribes, Karuk Tribe, and Yurok Tribe to develop plans to promote economic development. Each tribe will develop plans to promote long-term, sustainable growth and development. These plans will enable the Tribes to establish long term, sustainable economic growth and development within their communities, and to plan long term economic revitalization projects and strategies advancing efforts to provide a sustainable and achievable approach to lifting tribal communities out of generational poverty.

### **6.3 Klamath Tribes' Interim Fishing Site**

CDFG, the Klamath Tribes and relevant agencies of U.S. have developed a process for joint petition to California Fish and Game Commission for the interim fishing site. CDFG and the Klamath Tribes have agreed to defer the submittal of a joint petition. (See Section 34).

# Klamath Hydroelectric Settlement Agreement

## 7. Studies, Environmental Review, and Secretarial Determination

Under the Hydroelectric Settlement, The Secretary of the Interior, in cooperation with the Secretary of Commerce and other Federal agencies, will determine whether, in his judgment, the conditions of the Hydroelectric Settlement have been satisfied, and whether facilities removal: 1) will advance restoration of the salmonid fisheries of the Klamath Basin; and 2) is in the public interest, which includes but is not limited to consideration of potential impacts on affected local communities and tribes. The KHSA calls on the Secretary to use best efforts to complete this determination by March 31, 2012.

On February 27, 2012, Secretary of the Interior Ken Salazar announced that he will not make a decision by March 31, 2012 on potential removal of the dams because Congress has not yet enacted legislation necessary to authorize a Secretarial Determination under the terms of the KHSA. Interior also provided notice under Sections 3.2.5.D and 3.3.4 of the KHSA that the schedule for the environmental reviews and Secretarial Determination would be delayed.

In a press release, Secretary Salazar said: “The Department of the Interior, working with our partners at NOAA and the U.S. Forest Service, has upheld our commitments in these agreements that are so important to strengthening the health and prosperity of those that depend on the Klamath River for their way of life. I am proud of the work of our team of experts who have completed more than 50 new studies and reports that are providing significant new information on the potential effects of Klamath River dam removal as part of a transparent, science-based process.”

These studies were conducted in coordination with the parties to the Hydroelectric Settlement and the public. The California Department of Fish and Game is in the process of conducting the review required under the California Environmental Quality Act, and the State of Oregon will address applicable Oregon state laws, prior to deciding whether to concur with any affirmative determination by the Secretary of the Interior.

### 7.1 Studies and Environmental Review

Federal agencies have been working on the studies described in this section. Many of these studies have been reviewed by expert panels or peer reviewed. Public meetings have been held throughout the Klamath Basin to describe the studies and take public comment. The Federal Management Team has also sought comment from the Klamath Hydroelectric Settlement Agreement Parties and the public. These studies are summarized below.

**Studies and Environmental Review:** The KHSA called for the Secretary of the Interior, in cooperation with the Secretary of Commerce and other Federal agencies to:

- Use existing studies and other appropriate data, including those in the FERC record for this project;
- Conduct further appropriate studies, including but not limited to an analysis of sediment content and quantity;
- Undertake related environmental compliance actions, including environmental review under NEPA; and
- Take other appropriate actions as necessary to determine whether to proceed with facilities removal.

Facilities removal is defined in the KHSA as the physical removal of all or part of each of the four PacifiCorp dams to achieve at a minimum a free-flowing condition and volitional fish passage, site remediation and restoration, including previously inundated lands, measures to avoid or minimize adverse downstream impacts, and all associated permitting.

**Detailed Plan for Facilities Removal:** The KHSA also included provisions for the Secretary to prepare a detailed plan that describes:

- The methods and timetable for facilities removal;
- Plans for management, removal, and/or disposal of sediments, debris, and other materials;
- A plan for site remediation and restoration;
- A plan for measures to avoid or minimize adverse downstream impacts;
- A plan for compliance with all applicable laws, including anticipated permits and permit conditions;
- A detailed statement of the estimated costs of facilities removal; and
- A statement of measures to reduce risks of cost overruns, delays, or other impediments to facilities removal.

### **Scientific, Engineering, and Economic Studies**

The purpose of these studies was to fill in data gaps to ensure that the Secretary will be able to make a fully informed Secretarial Determination.

The Secretary of the Interior is committed to utilizing the best available science and the highest standards of scientific integrity to determine whether removal of four dams on the Klamath River will help restore salmonid fish to the Klamath Basin and whether dam removal is in the public interest.

The Federal Team, in assembling new and existing studies to help make this decision, followed the guidance from the White House Office of Management and Budget on scientific peer review, using a system of checks and balances to gain the best understanding possible of the costs and benefits of potential dam removal.

The following studies/reports have been conducted and provided to the Secretary as part of the draft Klamath Dam Removal Overview Report (Overview Report). The studies and reports are available on [www.KlamathRestoration.gov](http://www.KlamathRestoration.gov).

### **Reservoir Studies**

- Klamath Reservoir Sediment Investigation

### **Engineering, Geomorphology/Construction Studies & Information**

- Preliminary Assessment of Gravel Mobility below Iron Gate Dam
- Value Engineering Study for Dam Removals
- Yreka Water Supply Modification Report
- Keno Dam Fish Passage Report (including cost estimates and drawings)
- Feasibility Design Summary for Dam Removals (including cost estimates and drawings)
- Design Estimating Construction (DEC) Review Report and Designers' Response
- Hydrology, Hydraulic and Sediment Analysis of Klamath Dam Removal
- Reservoir Area Management Plan (including cost estimates)

### **Water Quality Studies & Information**

- Interpretive Report of Sediments and Contaminants
- Synthesis Report on Water Quality
- Report on Sediment/Oxygen Demand
- Nutrients and Restoration Analysis

### **Biological (Fish and Wildlife) Studies & Information**

- Biological Synthesis/Nonuse Valuation Document
- Fish Production Modeling
- Report from Independent Science Panel on Lamprey
- Report from Independent Science Panel on Resident Fish
- Report from Independent Science Panel on Coho/Steelhead
- Report from Independent Science Panel on Chinook Salmon
- Report on Wildlife Refuge Effects
- Study of Effects of Dam Removal on Klamath River Fish and Wildlife

### **Economic Studies & Information**

- Report on the Effects on Reservoir Recreation
- Report on the Effects on Non-fishing Recreation (whitewater, refuge)
- Report on the Effects on Real Estate

- Report on the Effects on Non-tribal Fisheries (ocean commercial/ocean & in-river recreational)
- Report on the Effects on Tribal Fisheries (ceremonial/subsistence/commercial)
- Report on the Effects on Agriculture
- Report on the Effects on Hydropower
- Report on the Effects on Tribal Health
- Report on County Impacts with changes in nontribal fisheries, reservoir recreation, non-fishing recreation, real estate, agriculture, hydropower, engineering/other costs
- Non-Use Values Survey Report

### **Real Estate Studies & Information**

- Real Estate Evaluation Report

## **7.2 Draft Klamath Dam Removal Overview Report**

In January 2012, the Department of the Interior released a draft *Klamath Dam Removal Overview Report for the Secretary of the Interior: An Assessment of Science and Technical Information* (Overview Report). The Draft Overview Report summarized all of the studies that had been conducted. Excerpts from the report are summarized below; a copy of the Executive Summary is attached as Appendix B.

### **Purpose of the Report**

The Draft Overview Report presents a synthesis of new peer-reviewed scientific studies conducted by a multi-agency Technical Management Team (TMT), as well as other relevant existing reports. The Draft Overview Report addressed the following four questions:

1. Will dam removal and KBRA implementation advance salmonid and other fisheries of 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 major potential risks and uncertainties associated with dam removal?
4. Is dam removal in the public interest, which includes, but is not limited to, consideration of potential effects on local communities and tribes?

The Draft Overview Report focuses on addressing these four KHSA-derived questions and thus is not a comprehensive synthesis of all the literature available on the Klamath Basin. Findings and conclusions addressing the first three questions are contained in this report; the fourth question, as to whether dam removal and KBRA implementation is in



the public interest, is not directly answered since that determination will be made by the Secretary of the Interior. The Draft Overview Report, however, does summarize findings in subject areas relevant to a public interest determination, including the potential effects of dam removal and KBRA implementation on:

- National and regional economic development,
- Tribal communities,
- PacifiCorp customers,
- Cultural resources,
- Real estate values,
- National Wildlife Refuges,
- Wild and Scenic River values,
- Recreational opportunities,
- Water quality, and
- Greenhouse gas emissions, among other subject areas.

The report also provides some indicators of individuals' and households' views regarding declining fisheries and fish populations in the Klamath Basin and whether the KHSA and KBRA should be implemented. These views were obtained with surveys 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 advisory votes in Siskiyou County, California, and Klamath County, Oregon, regarding dam removal and KBRA, respectively.

The Executive Summary addresses each of the questions; the sections below summarize key findings.

### **Will Dam Removal and KBRA Advance Restoration of Salmonid and Other Fisheries of the Klamath Basin?**

The TMT concluded that dam removal and KBRA implementation would improve salmon, steelhead, and redband trout populations and associated fisheries primarily by increasing access to historical habitat and thermal refuge areas in the upper basin, restoring mainstem and tributary habitat, and improving key biological and physical factors heavily influencing the health and survival of these fish populations (e.g. hydrology, sediment transport, water temperature, and water quality).

Improvements to the resiliency of the Klamath Basin ecosystem would likely occur from the integrated benefits of (1) increased habitat area related to the reconnection of 420 miles of river by removal of the Four Facilities; (2) coordinated basin-wide improvements to aquatic habitat through active restoration; (3) a real-time water management program that incorporates key elements of the natural hydrograph; (4) an active salmon reintroduction program; and (5) a fisheries monitoring and evaluation program that supports adaptive management. Dam removal and KBRA implementation are anticipated to improve the quality of currently accessible fish habitat, provide access to historical interior habitats that are currently unavailable due to the dams, and improve

the viability of native fish populations by increasing their abundance, life history diversity, productivity, and spatial distribution.

Fish modeling results show that dam removal, combined with restoration of aquatic habitats as anticipated in the KBRA, is expected to increase the annual production of adult Chinook salmon by an average of 83 percent beginning in 2020 with dam removal. The ocean commercial and sport harvests of Chinook salmon are also forecasted to increase by an annual average of 50 percent, the in-river tribal harvest would increase by an annual average of 59 percent, and the in-river recreational fishery would increase by an annual average of 9 percent after dam removal. A fisheries expert panel convened to independently assess whether dam removal would advance Klamath Basin Chinook fisheries concluded that dam removal and KBRA implementation would better address the core factors that affect fish populations and would have a much higher likelihood of success than progressing under current conditions with the dams remaining in place.

With dam removal, coho salmon would be expected to rapidly recolonize habitat upstream of Iron Gate Dam. Assuming coho salmon distribution would extend up to Spencer Creek after dam removal, coho salmon from the upper Klamath River population would reclaim 68 miles of habitat: approximately 45 miles in the mainstem Klamath River and tributaries and 23 miles currently inundated by the reservoirs. Dam removal and KBRA implementation are also expected to result in significant improvements to mainstem Klamath River hydrology, instream habitat, water quality, and decrease the incidence of disease downstream of Iron Gate Dam thereby improving coho populations throughout the Klamath Basin. Populations currently in the vicinity of Iron Gate Dam are most affected by dam-related factors, and these populations would receive the most benefits from dam removal. The benefits of dam removal and KBRA implementation for coho salmon go beyond increased abundance. Colonization of the Klamath River between Keno and Iron Gate dams by the upper Klamath coho salmon population would likely improve the viability of the Southern Oregon/Northern California Coast Evolutionary Significant Unit (ESU) by increasing its diversity, productivity, and spatial distribution. In general, as habitat availability, quality, and diversity increase for an ESU, so does the resilience of the population, reducing the risk of extinction and increasing chances for recovery.

Dam removal would reestablish steelhead upstream of Iron Gate Dam and increase habitat available to this species by 420 stream miles. Because of their ability to navigate steeper gradient channels and spawn in smaller, intermittent streams, and their ability to withstand a wide range of water temperatures, steelhead distribution in the basin would be expected to expand to a greater degree than that of any other anadromous salmonid species, thereby increasing steelhead abundance in the Klamath Basin. This conclusion is based on the likelihood of steelhead having access to substantial new habitat that will undergo restoration, the fact that other similar species (resident redband trout) are doing well in the upstream habitat, and that steelhead are currently at lower abundances than historical values but not yet rare. In general, removing dams and implementing KBRA would likely support a greater number of spawning areas, increase genetic diversity, and allow for a wider variety of life history patterns, which could increase the population's resilience.

Dam removal would increase free-flowing redband/rainbow trout habitat downstream of Keno Dam by restoring river channel habitat inundated by reservoirs, eliminating

extreme daily flow and water temperature fluctuations in the J.C. Boyle Peaking Reach, and increasing flows in the J.C. Boyle Bypass Reach. This would expand the total distribution of a resident trophy-trout fishery by approximately seven times in this area. Benefits to redband/rainbow trout in tributaries to Upper Klamath Lake would be realized by habitat improvements stemming from implementation of the KBRA, and are expected to increase trout productivity upstream of Upper Klamath Lake.

Overall, dam removal and KBRA implementation would be a major step forward to restoring anadromous fish and in the conservation of native fish populations in the Klamath Basin. When estimates of mortality and sublethal effects in the short-term from sediment discharge are considered in conjunction with potential increases in habitat area and improvements in water quality, it is expected that populations would fully recover from any adverse effects from sediments within one to five years following dam removal. Dam removal and implementation of the KBRA would have substantial and important benefits for other fish species in the Klamath Basin.

### **What Would Dam Removal Entail, What Mitigation Measures May be Needed, and What Would These Actions Costs?**

The TMT developed a detailed deconstruction plan, titled *Detailed Plan for Dam Removal – Klamath River Dams* (See [www.klamathrestoration.gov](http://www.klamathrestoration.gov)). This plan integrated requirements in the KHSR for hydroelectric operations through 2019; considered the full range of flow conditions that could be encountered during dam removal; considered the unique features of each dam and each reservoir; and, considered reservoir drawdown rates that minimize bank slumping and address the need to minimize impacts on the ecosystem.

Reservoir drawdown and facilities removal was designed to minimize impacts on fish species and to protect threatened coho salmon. These goals resulted in the formation of a plan that calls for drawdown of the three larger reservoirs in the winter of a single year (2020). The plan ensures that the majority of reservoir sediments are transported downstream in January through March 15 when coho salmon, along with several other native fish species, are not present in large numbers in the Klamath River mainstem. This time period also corresponds to higher river flows needed to erode and transport the fine-grained reservoir sediments to the Pacific Ocean

Several mitigation measures were identified to help reduce the effects of dam removal. Additional mitigation actions may be identified at a later date in a “Definite Plan” for dam removal if there is an Affirmative Secretarial Determination. Moreover, a Record of Decision (ROD) on removal of the Four Facilities could include additional mitigation actions.

The TMT developed cost estimates for removal of the four dams. The most probable cost for removing all of the structures related to the four dams was \$291.6 million (in 2020 dollars). The most probable cost for partial removal of the four dams (where some structures might be left in place) was \$234.6 million with additional operation and maintenance costs of \$12.4 million (in 2020 dollars). The TMT also developed a range of costs that are described in the Executive Summary.

## **What are the Major Potential Risks and Uncertainties Associated with Dam Removal?**

Large dam removals involve inherent risks and uncertainties. Through the Detailed Plan and other studies, the TMT identified four primary risks that could result in changes to the expected effects of dam removal or anticipated construction activities.

**Extended Downstream Sediment Transport:** Downstream sediment transport could result in risks to aquatic resources beyond those already anticipated if mitigation, engineering and/or technical difficulties during dam removal extend the reservoir drawdown period. If the planned timeline for reservoir drawdown (January 1 through February 1) is not achieved, aquatic species would be exposed to high suspended sediment concentrations (SSCs) potentially extending into critical fish migratory periods.

**Cost Exceedence:** The large and complex construction activities associated with removal of the four dams have the potential to include unexpected changes or unforeseen events, which could result in project costs greater than those originally estimated. Also, project challenges could impede the dam removal process or extend the project timeline, and could result in the accrual of additional project costs.

Risk to a Federal Dam Removal Entity (DRE) would occur during facilities removal if the DRE anticipated exceeding the state cost cap for dam removal but was unable to stop a portion of facilities removal due to safety considerations. Under these conditions, the Federal DRE could be incurring dam-removal expenses without a known source of funding. As stated in the KHSA, the Federal government is not responsible for any dam removal costs. To reduce this potential risk, the DRE construction management team would utilize construction cost forecasting continuously during facilities removal to determine early whether cost overruns were likely and to give the Parties to the KHSA time to address funding issues in a timely manner.

**Short-term Flooding:** Small flooding risks during dam removal are associated with initial reservoir drawdown and dam excavation at either Iron Gate or J.C. Boyle dams stemming from (1) an overly rapid drawdown rate resulting in embankment instability and failure, or slumping of the exposed dam face; or (2) the possibility of flows from a large event exceeding the available water bypass capacity and overtopping the earthen dam embankment during dam removal.

To address this risk, the *Detailed Plan for Dam Removal - Klamath River Dams* specifies that the embankment sections at Iron Gate and J.C. Boyle dams be removed beginning June 1, 2020, with the full removal completed by September 15, 2020. This period corresponds to the lowest river flows and would allow for the construction of coffer diversion dams to route flows around the earthen embankments greatly reducing the risk of overtopping. The Plan also specifies the maximum reservoir drawdown rates to reduce the chance of embankment failure.

**Cultural and Historic Resources:** Dam removal and reservoir drawdown could affect five sites reported to be submerged in the reservoirs, as well as other unknown sites that may be submerged in the reservoirs, and any human remains associated with these sites. Culturally sensitive sites, artifacts, or human remains could be exposed when the reservoirs are drained as a result of (1) the river cutting a new channel, (2) decades of wind and wave action along the reservoirs' shores that caused localized scour, or (3) slumping of reservoir banks. Once exposed, these sites would need to be documented and protected from vandalism or looting. In addition, applicable Federal and state laws regarding cultural resources, historic preservation, and burials would be followed.

While every precaution would be taken to avoid disruption of these resources, in the case that they are discovered during dam removal and other construction activities, they pose a risk. Encountering traditional cultural properties or other culturally sensitive resources could affect the timeline and cost of dam removal.

### **Is Facilities Removal in the Public Interest?**

The KHSA calls on the Secretary of the Interior to determine whether Facilities Removal is in the public interest, which includes but is not limited to consideration of potential impacts on affected local communities and Tribes (see KHSA Section 3.3.1).

The TMT concluded that dam removal and KBRA implementation would provide substantial social and economic benefits to the Klamath Basin. However, dam removal would also alter or change the availability or quality of some resources and would negatively affect specific recreational resources, jobs, and real estate values closely associated with the dams and reservoirs. The Executive Summary provides a summary of the potential effects of dam removal and KBRA implementation on national, regional, tribal, and local communities, including economic and non-economic effects. Portions of the summary are excerpted below.

### **National Economic Impacts**

The National Economic Development (NED) analysis evaluated the net economic benefits of dam removal with implementation of the programs in KBRA over the 50 year period from 2012 through 2061. All costs and benefits were discounted to 2012 dollars.

The NED benefit cost analysis indicates that the net economic benefits of Dam Removal and Implementation of the KBRA are strongly positive. For both partial and full facilities removal the NED benefit cost analysis ranges from approximately nine to one to forty-eight to one. This implies that dam removal and KBRA implementation (including the partial facilities removal option) is justified from an economic perspective.

The impacts on specific activities are summarized below.

**Commercial fishing:** The four dams affect stocks of SONCC coho salmon ESU and Klamath River fall- and spring-run Chinook salmon. Under dam removal, coho retention would likely continue to be prohibited in the California and Oregon troll fisheries south

of Cape Falcon. Troll harvest of Klamath Chinook salmon is expected to increase by an average 43 percent (2012 to 2061 time period)<sup>2</sup> with dam removal. Annual net revenue associated with total Chinook salmon harvest (all stocks) would increase under dam removal. The difference in annual net revenue between the dams remain and dam removal scenarios would be an increase of \$7.296 million (2012 dollars) or a total of \$134.5 million for the 50-year period of analysis.

**In-river sport fishing:** The four dams affect stocks for in-river recreational fisheries, including salmon, steelhead and redband trout, and the recreational sucker fishery, which has been closed since 1987. Dam removal would result in increased fish harvests, which would increase net economic values of in-river sport fishing. In-river recreational harvest of Klamath Chinook salmon is expected to increase by 8 percent (2012 to 2061 time period)<sup>2</sup>. The resulting average annual net economic value would increase \$126,000 per year (2012 dollars). The incremental river sport fishery benefits for dam removal equates to a discounted present value of \$1.75 million (2012 dollars) for the 50-year period of analysis. The prospects for restoration of the recreational sucker fishery appear limited for either a dams remain or dam removal scenario. The in-river sport fishing economic value does not include likely increases in steelhead and redband/rainbow trout fisheries, which was not quantified.

**Ocean sport fishing:** The ocean recreational harvest of Klamath Chinook salmon is expected to increase by 43 percent (2012 to 2061 time period)<sup>2</sup> under dam removal. Increased Klamath Chinook salmon availability would result in increased annual net economic values related to ocean sport fishing. Existing regulations for the recreational coho salmon fishery in California and Oregon are expected to continue in the future under both the dams remain and dam removal scenarios. The average annual increase in net economic value (for all areas combined) under a dam removal scenario is \$2.865 million (2012 dollars). The incremental ocean sport fishery benefits for dam removal equates to a discounted present value of \$52.9 million (2012 dollars) for the 50-year period of analysis.

**Irrigated agriculture:** Increased water supplies during dry and drought years under the dam removal and KBRA implementation would increase gross farm revenues from irrigated agriculture, which would result in economic benefits in about one out of every 10 years.

**Refuge recreation:** Dam removal and KBRA implementation are estimated to increase waterfowl abundance at refuges and hunting trips to the refuges. Increased hunting trips would result in increased economic value related to waterfowl hunting activities. The difference in net revenue between the dams remain and dam removal scenarios would be an increase of \$4.3 million (2012 dollars) over the 50-year period of analysis.

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<sup>2</sup> These values include on average the improvement to the fisheries that would occur from 2012 to 2020 prior to dam removal with the implementation of the KBRA measures. These averages would have been larger, as reflected in the Executive Summary Section ES.2.2, if the 42-year period following dam removal was used.

**Nonuse values:** Nonuse values were estimated using a stated preference survey. The survey collected information from households in three strata: the 12-county Klamath area; the rest of Oregon and California; and the rest of the nation. Through their stated willingness to pay for specific scenarios for ecosystem restoration within the Klamath Basin, survey respondents indicated they placed significant value on the KBRA, the KHSA, and the restoration of Klamath Basin resources.

Overall, the study results indicated that the majority of respondents in the Klamath 12-county area, in the two states, and throughout the rest of the nation, are concerned about declines of Chinook salmon and steelhead trout that return to the Klamath River, are concerned about the extinction of fish species in the Klamath Basin; and, they agree that restoration should be guided by an action plan that includes Klamath dam removal, water sharing agreements, and basin restoration. Using a conservative methodology for determining the nonuse value associated with Klamath dam removal and restoration of Klamath Basin resources, the survey identified \$15.6 billion in nonuse benefits.

Some economic benefits, including in-river steelhead fishing, redband trout fishing, and refuge wildlife viewing could not be readily quantified and monetized because sufficient data for an analysis was not available. Improved Klamath Basin fisheries would also provide benefits that cannot be quantified to tribes because of the expansive and integral value of fish to tribal members and tribal culture. Given the positive effects of dam removal on fishery resources and refuge recreation, it is expected that tribal benefits associated with these categories would also be positive.

The NED analysis compares economic benefits and costs of the dam removal with KBRA Implementation scenario with dams remain without the KBRA. Costs include construction costs related to dam removal, site mitigation, and KBRA implementation. In addition to costs incurred from dam removal, there would be some costs savings related to lowered operation, maintenance and replacement (OM&R) costs of the four dams following dam removal.

Dam removal would also result in some foregone benefits which occur when the dam removal scenario provides fewer benefits than the dams remain scenario. Foregone benefits occur in the following categories:

**Hydropower:** The four dams would generate an average of 895,847 megawatt hours of electricity annually over the period 2012-2061 if the existing dams were left in place and planned efficiency upgrades were completed. Under the dam removal scenario, the four dams would operate normally during 2012–2019 (8 years). After this time period, the production of electrical energy and capacity at the four dams would be zero from January 1, 2020 through the end of 2061 (42-years). Under a dam removal scenario, the estimated mean present value of hydropower economic benefits was approximately \$289.2 million (2012 dollars), over the 50-year period of analysis. Relative to the dams remain scenario, this represents a mean reduction in economic benefits of approximately \$1.32 billion (2012 dollars).

**Whitewater boating:** With dam removal, whitewater boating activity on the upper Klamath River would decrease beginning in 2020 because of the dependence of water releases from the J.C. Boyle Dam to provide sufficient and predictable flows, primarily for whitewater boating in the heavily used Hell's Corner Reach. The average number of days with acceptable flows for whitewater boating on the Hell's Corner Reach would decline by 47 percent during the five month period from May through September. The total discounted loss in economic value associated with whitewater boating recreation with dam removal is estimated at \$6.1 million for the 50-year period of analysis.

**Reservoir recreation:** With dam removal, the use of reservoirs for flat-water boating, fishing and other uses would be lost. The dam removal scenario results in a loss of 2.03 million total recreation days. The total discounted loss in economic value associated reservoir recreation is \$35.4 million for the 50-year period of analysis.

## **Regional Impacts**

Dam removal actions have short-term and long-term positive and negative effects on jobs in the regional economy. Construction activities associated with dam removal, mitigation actions, and implementation of KBRA programs would add jobs, labor income, and economic output to the region in the short-term (2012 -2026). For example, jobs associated with KBRA implementation spending would span 15 years, jobs associated with dam removal would likely span just a single year, and jobs associated with mitigation measures would span about 8 years. Over the longer term, dam removal and KBRA programs would result in the addition of jobs in the region related to irrigated agriculture, commercial fishing, in-river sport fishing, ocean sport-fishing, and refuge recreation. Added jobs in these areas would increase regional labor income and economic output; producing a long-term positive effect on regional economic development.

Dam removal would eliminate long-term jobs related to annual operation and maintenance (O&M) expenditures associated with the four dams. In addition, changes to whitewater boating opportunities and loss of open-water and flat-water recreation activities at the Klamath Hydroelectric Project reservoirs would also result in lost regional jobs.

Implementation of the KHSR and KBRA would add regional short-term and long-term jobs and would increase labor income and regional economic output. Added jobs include full time, part time, and temporary positions. The regional economic analysis compares two scenarios: dam removal and implementation of the KBRA, and leaving the dams in place without implementation of the KBRA. It is important to note that regional impacts were analyzed by scenario specific definitions, periods of occurrence, and other factors; therefore, the potential impacts (such as jobs) should not be summed across a category or region.

The largest decrease in annual average jobs (estimated at 49) and average annual regional output (- \$5 million) associated with dam removal would occur because of reduced spending on Operation and Maintenance of the four dams between 2020 and 2061.



The largest increases in jobs and regional output would be associated with dam decommissioning, implementation of mitigation actions associated with dam decommissioning, implementing the KBRA programs, and the resultant improvements in agricultural (during drought years) and commercial fishing.

Dam decommissioning would result in an estimated 1,400 regional jobs and a regional output of \$163 million; these would occur during the single year of dam decommissioning in 2020.

Implementing mitigation measures would result in an estimated 217 short-term jobs and regional output of \$30.86 million between 2018 and 2025; annual jobs and annual regional output would vary year by year proportionate to actual regional spending.

Implementation of KBRA programs would result in about 300 annual jobs (4,600 jobs over 15 years) and \$29.6 million in average annual regional output from 2012 through 2026. Jobs and regional output estimates would also vary year by year proportionate to actual KBRA regional spending. Through the KBRA Water Program, agriculture would not decrease as markedly during drought years (which occur about once every 10 years) and would result in an estimated 70 to 695 more jobs (depending on the severity of the drought) than would occur without KBRA. The corresponding range of the estimated increase in regional output would be \$9 to \$84 million. Implementation of the two agreements would improve commercial fishing in five management areas along the Oregon and California coastlines. The three largest average annual increases would be in the San Francisco Management Area (219 jobs and \$6.6 million), Central Oregon Management Area (136 jobs and \$4.07 million), and Fort Bragg Management Area (69 jobs and \$2.41 million).

### **Survey Results on Improving Fisheries in the Klamath River Basin**

Responses to the nonuse value survey questions indicate a majority of respondents place a relatively high level of importance on improving the fisheries in the Klamath River Basin. This importance was indicated at the 12-county Klamath area level, statewide for Oregon and California, and for the rest of the nation.

In response to a question inquiring about the level of concern with declines in the number of Chinook salmon and steelhead trout that return to the Klamath River each year, the majority of respondents expressed concern.

- From the 12-county Klamath area, 73.8% expressed concern.
- For the rest of Oregon and California, 82.5% expressed concern.
- For the rest of the United States, 78.8% expressed concern.

Respondents surveyed indicated that an action plan to remove the dams and restore the basin was preferred to no-action. No-action was defined as not implementing an agreement that includes dam removal, fish restoration, and a water sharing agreement.

- From the 12 county Klamath area, 54.7% favored an action plan
- For the rest of Oregon and California, 71.3% favored an action plan
- For the rest of the United States, 66.3% favored an action plan

### **Impact on PacifiCorp Customers**

A prerequisite to the \$200 million (2020 dollars) customer surcharges necessary for KHSA implementation was concurrence from the California Public Utility Commission (CPUC) and the Oregon Public Utility Commission (OPUC) with PacifiCorp's conclusion that implementing the KHSA would be in the best interest of their customers and that the incremental increases were fair and reasonable. PacifiCorp's records and testimony before both commissions compared two scenarios: (1) customers' cost and risks under the KHSA dam removal, and (2) customers' cost and risks from relicensing the Four Facilities. It is important to note that the TMT did not evaluate the potential costs or risks to PacifiCorp customers for relicensing the dams.

PacifiCorp reported that relicensing would require implementing new mandatory flow conditions for the project (decreasing power generation by 20 percent and reducing peaking-power opportunities), constructing and operating fish passage at the dams, and addressing water-quality issues in and below the reservoirs. PacifiCorp estimated these actions would cost in excess of \$460 million (2010 dollars) in capital and operating expenses. PacifiCorp also reported that these are uncertain and uncapped costs and thus represent a substantial financial risk to its customers. For example, if fish passage measures installed at the four dams were unsuccessful, upgraded facilities, altered operations, and/or dam decommissioning may be required, and these additional uncapped expenses would likely be borne by PacifiCorp customers.

In PacifiCorp's analysis of the financial impacts of dam removal, they assumed that customer costs associated with dam removal would be capped at \$172 million in 2010 dollars (or \$200 million in 2020 dollars). Implementing Interim Measures (as defined in KHSA Appendix C and D) would cost about \$79 million (2010 dollars); these costs would be largely capped and would carry only a small financial risk for its customers. In addition, PacifiCorp customers would also have to pay for replacement power after removal of the Four Facilities in 2020.

Table ES-13 in the Executive Summary provides a summary of PacifiCorp's analysis of the above two scenarios in terms of operational changes, costs, risks, and liabilities to their customers. PacifiCorp's analysis submitted to the CPUC and OPUC demonstrated that the KHSA resulted in less cost and less risk for its customers as compared to FERC relicensing, even with the inclusion of costs associated with replacement power. The CPUC concluded that if "the KHSA surcharge is not instituted....ratepayers would be exposed to an uncertain amount of costs" associated with relicensing. The OPUC concluded that the KHSA "mitigates the risks associated with decommissioning and removal of the [four] facilities for PacifiCorp, and is therefore the least risky alternative for customers compared to relicensing" (OPUC 2011). Based on PacifiCorp's analysis and testimony, both PUCs agreed with the company's analysis and approved collection of the customer surcharges necessary to fund the removal of the four dams in 2020, as described in KHSA.

## 7.3 Peer Review and Expert Panels

### Peer Review

The Department of the Interior convened an independent peer review panel to evaluate the accuracy, clarity, thoroughness, and objectivity of the scientific findings in the draft Overview Report. Facilitated by Atkins North America, an independent consulting firm specializing in peer reviews, a panel of six independent subject-matter experts from across the nation conducted the peer review of the Draft Overview Report

The peer review panel found generally that the report “connects to the sound science that underlies its conclusions, provides a depth of coverage suitable for the anticipated audience, and provides clearly stated concepts and conclusions,” and further finds that the “science appears to be reliable for a Secretarial Determination.” The panel also makes recommendations for how the final report can be edited to improve its effectiveness. The peer-review report and its recommendations are available at [www.KlamathRestoration.gov](http://www.KlamathRestoration.gov).

Over the next few months, the federal agencies will finalize the Overview Report, taking into account the recommendations from the peer review panel. The final Overview Report will provide foundational scientific information to inform a Secretarial Determination as to whether dam removal would advance salmon and steelhead fisheries in the basin and would be in the public interest.

The draft Overview Report is one part of the overall multi-step science process for the Klamath Secretarial Determination. One step was the development of 50 federal science reports - all of which were subjected to a rigorous review, including, in many instances, peer review - completed in September 2011. Over 150 federal, state, and other subject-matter scientists, engineers, and technical experts were involved in conducting the studies and preparing the federal science reports.

### Expert Panels

A second step involved four independent expert panel reports on Klamath River fisheries that were published between January and July 2011. These expert panels, which were also administered by Atkins North America, conducted their own assessment of the potential impacts of dam removal on the Klamath River fisheries.

The federal team contracted with an independent consulting firm to convene and facilitate four expert panels on Klamath River fish species under two scenarios: 1) if the four dams on the Klamath remain without modification, and 2) if the dams are removed and the restoration actions contemplated under KBRA are implemented. These four Independent Science Panels evaluated studies on populations of lamprey, coho salmon and steelhead trout, Chinook salmon, and resident fish including trout and suckers.

The evaluations from these experts, generally university professors and resource managers, were independent and not a product of any federal agency. As such, they did not necessarily represent the views and conclusions of the federal government. The results of the panel reviews will be considered, along with other available information, in the Interior Secretary's determination on dam removal.

**Major Conclusions from Chinook Salmon Expert Panel:** The Chinook Salmon Expert Panel (Goodman et al. 2011) assessment was that the Proposed Action (dam removal with KBRA implementation) appears to be a major step forward in conserving target fish populations compared with decades of vigorous disagreements, obvious fish passage barriers, and continued ecological degradation. They concluded that a substantial increase in Chinook salmon is possible in the reach between Iron Gate Dam and Keno Dam; an increase above Keno Dam could be large but was less certain. Achieving substantial gains in Chinook salmon abundance and distribution in the Klamath Basin is contingent upon resolving key factors, including the following:

- Limitations on access to the upper basin due to water quality problems in Upper Klamath Lake and the Keno Impoundment are resolved.
- Disease is reduced.
- Free migration into the upper basin and successful completion of their life cycle is provided.
- Harvest is managed appropriately.
- Hatchery salmon do not overwhelm genetics of colonizing populations.
- Predation in newly accessible habitat is sufficiently low.
- The buffering effect of upper basin access to groundwater springs is not overwhelmed by climate change.
- Any reduced productivity associated with lower fall flows is small.
- Impacts from dam removal do not have substantial multi-year adverse impacts on mainstem Chinook salmon.

The panel did voice strong reservations, based on their experience or knowledge of other large restoration programs, as to whether KBRA would be implemented effectively. Overall, the panel indicated that most available information indicates that dam removal is likely to increase the abundance of naturally-spawned Klamath River Chinook above that expected without dam removal. In their opinion, the Proposed Action offers greater potential than the current conditions to improve conditions for water quality, disease, recolonization, increased harvest and escapement, predation, and tolerating climate change and changes in marine survival.

Finally, the panel concluded with certainty that if the four dams are not removed, the Klamath Chinook salmon will continue to decline.

**Major Conclusions of the Lamprey Expert Panel:** The Lamprey Expert Panel's (Close et al. 2011) assessment was that dam removal and the KBRA could eventually increase Pacific lamprey carrying capacity in the Klamath Basin by a maximum of 14 percent (based on an analysis of mainstem habitat), and potentially more if the upper Klamath

Basin is accessible and contains suitable habitat. Adult Pacific lamprey would be expected to recolonize newly accessible habitat following dam removal, but in the absence of active reintroduction measures, recolonization could take decades.

Should the release of sediment from dam removal result in short-term mortality of lamprey downstream of Iron Gate Dam, the panel expects that larval lamprey from tributaries would recolonize this habitat during normal downstream movements. Pacific lamprey larval rearing capacity downstream of Iron Gate Dam would likely increase for a short time after dam removal because of fine sediment released from dam removal. This habitat would decrease over time, but likely remain higher than under current conditions because sediment transport would no longer be interrupted by the presence of the dams and reservoirs.

Under a dam removal with KBRA scenario, Pacific lamprey harvest rates would be expected to eventually increase by 1 to 10 percent downstream of Iron Gate Dam. The panel indicated that the carrying capacity for freshwater resident lamprey species would not likely change significantly with dam removal; but implementation of the KBRA could result in modest increases.

**Major Conclusions of the Coho, Salmon and Steelhead Expert Panel on Coho:** The Coho Salmon and Steelhead Expert Panel's (Dunne et al. 2011) assessment was that current conditions will likely continue to be detrimental to coho salmon. The Panel also concluded that while there would be an increase in coho salmon due to dam removal and KBRA, it would likely be small, especially in the short term (0–10 years following dam removal).

The Panel concluded that larger (moderate) responses would be possible under a dam removal scenario contingent on the following:

- The KBRA is fully and effectively implemented.
- Mortality caused by the pathogen *C. shasta* is reduced.

Coho salmon colonization of the Klamath Hydroelectric Reach between Keno and Iron Gate dams would likely increase the abundance and distribution of the ESU by some amount, which are key factors used by NOAA Fisheries Service to assess viability of the ESU.

The panel indicated that under a dams out with KBRA, newly established coho salmon populations upstream of Iron Gate Dam reduce risks to long-term viability in the face of continuing stresses from land and water resource use, as well as climate change. This may be particularly relevant for populations that may be able to access sources of cold groundwater discharge, which would allow coho salmon to persist in spite of possible water temperature increases.

The Coho Salmon and Steelhead Expert Panel's assessment was optimistic that dam removal paired with the KBRA would increase the abundance and distribution of steelhead in the basin relative to current conditions (Dunne et al. 2011).

If dam removal and KBRA are implemented effectively, and the other related actions occur (e.g., full attainment of TMDLs), then the response of steelhead may include broader spatial distribution and increased numbers of individuals within the Klamath Basin. The panel indicated that key issues affecting success would depend on how the KBRA is implemented, the degree of colonization of the upper watershed by steelhead, the success of passage through the unfavorable summer and fall water quality conditions in Keno Reservoir and Upper Klamath Lake, how reliant the current population is on hatchery fish, the outcome of interactions between steelhead and resident *rainbow trout* (*Onchorhynchus mykiss*), and the influence of hatchery releases on the fitness of wild fish.

Additional information on the panels can be found on the independent contractor's website at [www.pbsj.com/KlamathRiver/Pages/default.aspx](http://www.pbsj.com/KlamathRiver/Pages/default.aspx).

#### **7.4 Environmental Review Process**

Environmental review under the National Environmental Policy Act (NEPA), the California Environmental Quality Act (CEQA), and other applicable laws has been coordinated by the federal agencies and California to prepare a single, joint environmental document.

The NEPA and CEQA processes is being led by the U.S. Department of the Interior (DOI) and the California Department of Fish and Game (CDFG), respectively. The Bureau of Reclamation is managing environmental compliance on behalf of the U.S. Department of Interior. Reclamation awarded a contract to CDM Federal Programs for preparation of both NEPA and CEQA environmental compliance documents, in addition to participating in the scientific studies track. Oregon will prepare environmental documents as directed by state law.

Both NEPA and CEQA require public involvement opportunities. The DOI and the CDFG conducted seven public scoping meeting in July of 2010. In addition, many state, local and tribal governments, as well as federal agencies, were invited to participate as cooperating agencies under NEPA. Cooperating agencies have opportunities to provide input on the Environmental Impact Statement/Environmental Impact Report prior to public review of these documents.

On September 21, 2011 the Department of the Interior and California Department of Fish and Game released a draft Environmental Impact Statement/Environmental Impact Report for public comment. A copy of the EIS/EIR is available at [www.KlamathRestoration.gov](http://www.KlamathRestoration.gov).

## **7.5 Public Involvement Process on the Secretarial Determination Studies**

As part of the Secretarial Determination process, the Department of the Interior held quarterly public meetings in 2010 and 2011 to gather input and provide updates to the general public. These meetings were held in Eureka, Copco Lake, Orleans, and Yreka California and Klamath Falls, Oregon. These meetings were separate from the NEPA/CEQA related meetings.

The Department posted all studies and documents, along with presentations from the public meeting on the website called [KlamathRestoration.gov](http://KlamathRestoration.gov). The Interior Department encouraged the public and interested parties to use the website to track the science studies, peer review, and independent panel processes, to view science studies as they are completed, to access background documents and information on the project, to sign up for email/mailed updates on the process and to stay informed of upcoming meetings.

## **8. Implementation of Other KHSA Provisions**

The Hydroelectric Settlement includes detailed actions for the operation of the dams and mitigation activities prior to removal of the dams. The KBCC has reviewed the status of these actions at each of its meetings. A copy of the latest status report is attached as Appendix C.

PacifiCorp and the KHSA Parties have made good progress in implementing the interim measures called for in the KHSA. Progress includes:

- PacifiCorp has provided over \$2.5 million in funding for the Coho Enhancement Fund; the projects that are being implemented are described in Appendix C.
- In February, the National Marine Fisheries Service approved PacifiCorp's Habitat Conservation Plan for Coho Salmon.
- PacifiCorp is operating a new turbine venting blower in increased dissolved oxygen below Iron Gate Dam.
- California Department of Fish and Game and PacifiCorp developed a Hatchery and Genetic Management Plan in September 2010.
- PacifiCorp completed variable flow releases in the winter of 2011/2012.
- PacifiCorp is funding fish disease studies.
- PacifiCorp is funding gravel placement and habitat enhancement below J.C. Boyle Dam.
- KHSA Parties are working to convene a water quality conference.
- PacifiCorp and the Interim Measures Implementation Committee (IMIC) selected a series of water quality studies and pilot projects.
- PacifiCorp installed gages for Spencer Creek and J.C. Boyle bypass reach.
- PacifiCorp is funding water quality monitoring.
- PacifiCorp is continuing to fund the Iron Gate Hatchery.

- BLM provided PacifiCorp a final work plan for cultural resources, road maintenance, and invasive weed management.

### **Dam Removal Surcharge Approval**

On March 18, 2010, PacifiCorp filed applications with the California and Oregon public utility commissions requesting authorization to begin collecting dam removal surcharges from customers in those states. Regulatory orders from both the California and Oregon public utility commissions approving the collection of dam removal surcharges have since been issued, consistent with the framework for the Customer Contribution towards dam removal costs established in Section 4.1.1 of the Klamath Hydroelectric Settlement Agreement (KHSA).

The Oregon customer surcharges, with accrued interest, are designed to provide approximately \$184 million in funding for dam removal in 2020. The California customer surcharges, with accrued interest, are designed to provide approximately \$16 million in funding for dam removal in 2020. The surcharges on Oregon customers have been collected since March 18, 2010 while the surcharges on California customers began in January 2012. As of the end of January 2012, the combined balance of the Oregon and California dam removal trust accounts was \$28,336,773.78.

A copy of the June, 2011 annual implementation report for measures in the KHSA is at: [www.klamathcouncil.org](http://www.klamathcouncil.org).

### **Habitat Conservation Plan**

On February 23, 2012, the National Marine Fisheries Service (“NMFS”) issued a federal Endangered Species Act Incidental Take Permit to PacifiCorp Energy for the Company’s ongoing operations of its Klamath Hydroelectric Project (“Project”) under a Habitat Conservation Plan.

The Habitat Conservation Plan and associated Incidental Take Permit (“Permit”) have been under development for over two years and were subject to environmental review and public comment through NMFS’s formal review process. Issuance of the Permit by NMFS authorizes potential incidental take of listed coho salmon that may occur as a result of ongoing Project operations on the basis that implementation of the conservation strategy contained in the Habitat Conservation Plan will minimize and mitigate to the maximum extent practicable Project-related effects to coho salmon during the Permit term. The Permit issued by NMFS authorizes the incidental take until the planned transfer and removal of the Klamath Hydroelectric Project under the terms of the Klamath Hydroelectric Settlement Agreement.

Under the terms of the Permit, PacifiCorp will fund projects to enhance coho conservation in the Klamath River below Iron Gate dam – the lowermost dam on the mainstem Klamath River, consistent with an interim conservation plan developed by PacifiCorp, in coordination with NMFS. PacifiCorp will work with NMFS, the



California Department of Fish and Game, and the National Fish and Wildlife Foundation to identify, select, and implement conservation projects that will benefit coho salmon in the Klamath River.

In addition to funding and implementing habitat conservation actions, PacifiCorp will work closely with the U.S. Bureau of Reclamation, NMFS, and other stakeholders to implement flow regimes in the Klamath River to benefit listed species. PacifiCorp will also alter its project operations to improve water quality in the Klamath River, and PacifiCorp will fund scientific research activities in support of NMFS' coho salmon conservation objectives, and NMFS' recently-developed coho salmon recovery plan.

# **Appendix A: Summary of the Klamath Basin Agreements**

## **Summary**

Representatives of 45 organizations, including Federal agencies, California and Oregon, Indian tribes, counties, irrigators and conservation and fishing groups have agreed to a comprehensive solution for the Klamath Basin. On February 18, 2010, most of the participants in the Klamath settlement process signed the Klamath Basin Restoration Agreement and Klamath Hydroelectric Settlement Agreement.

The Restoration Agreement is intended to result in effective and durable solutions which will: 1) restore and sustain natural fish production and provide for full participation in ocean and river harvest opportunities of fish species throughout the Klamath Basin; 2) establish reliable water and power supplies which sustain agricultural uses, communities, and National Wildlife Refuges; and 3) contribute to the public welfare and the sustainability of all Klamath Basin communities.

The Hydroelectric Settlement lays out the process for additional studies, environmental review, and a decision by the Secretary of the Interior regarding whether removal of four dams owned by PacifiCorp: 1) will advance restoration of the salmonid fisheries of the Klamath Basin; and 2) is in the public interest, which includes but is not limited to consideration of potential impacts on affected local communities and tribes. The four dams are Iron Gate, J.C. Boyle, Copco 1 and Copco 2 dams on the Klamath River. The Hydroelectric Settlement includes provisions for the interim operation of the dams and the process to transfer, decommission, and remove the dams.

Settlement organizations had 60 additional days to sign the agreements. The organizations that have signed the agreements are listed at the end of this summary. Organizations that participated in the settlement process and any other organization can apply to become a party. Key provisions of the agreements are summarized below; for a copy of both agreements please go to the following website: [www.klamathcouncil.org](http://www.klamathcouncil.org).

## **Klamath Basin Restoration Agreement**

### **Rebuilding Fisheries**

**Goal:** the goals of the Fisheries Program are to: 1) restore and maintain ecological functionality and connectivity of historic fish habitats; 2) re-establish and maintain naturally sustainable and viable populations of fish to the full capacity of restored habitats; and 3) provide for full participation in harvest opportunities for fish species.

**Program Elements:** The Fisheries Program will: 1) provide for reintroduction of anadromous species above the current site of Iron Gate Dam, including tributaries to Upper Klamath Lake; 2) establish conditions that, combined with effective

implementation of the Water Resources Program and the Hydroelectric Settlement will contribute to the natural sustainability of fisheries and full participation in harvest opportunities, as well as the overall ecosystem health of the Klamath River Basin; 3) monitor the status and trends of fish and their habitats; and 4) assess the effectiveness of actions and provides for adaptive management.

**Approaches:** The Fisheries Program will use collaboration, incentives, and adaptive management as preferred approaches. In the basin above Upper Klamath Lake, program planning will involve and reflect collaboration among Upper Basin irrigators, tribes, and other appropriate parties. It will emphasize strategies and actions to restore and maintain properly functioning lake and river processes and conditions, while also striving to maintain or enhance economic stability of adjacent landowners. Further, it will prioritize habitat restoration and monitoring actions to ensure the greatest return on expenditures.

**Geographic Scope:** The focus of restoration and monitoring will be the Klamath River Basin, excluding the Trinity River watershed above its confluence with the Klamath River. The focus of reintroduction program will be the Upper Klamath Basin. The Restoration Agreement is not intended and will not be implemented to establish or introduce populations of salmon, steelhead, or Pacific lamprey in the Lost River or its tributaries or the Tule Lake Basin.

**Fisheries Restoration:** The Restoration Agreement provides a detailed process to restore fish in the Klamath Basin. Elements include:

- **Phase I Plan:** The plan will establish restoration priorities and criteria for selecting restoration projects over the next ten years. Specific elements will include, but may not be limited to, restoration and permanent protection of riparian vegetation, restoration of stream channel functions, remediation of fish passage problems, and prevention of entrainment of fish into diversions.
- **Phase II Plan:** Within seven years of finalizing the Phase I plan, the fish managers will develop a long-term plan based on the monitoring results of the Phase I actions. The Phase II plan will establish elements, restoration priorities, and an adaptive management process for the remainder of the Restoration Agreement. The fish managers will revise the plan as appropriate.

**Fish Passage and Water Quality:** In the Restoration Agreement the parties commit to support the Hydroelectric Settlement that establishes a process for the potential removal of Iron Gate, J.C. Boyle, Copco 1 and Copco 2 dams on the Klamath River. These dams block coho salmon, Chinook salmon, steelhead, and Pacific lamprey from migrating above Iron Gate Dam. Removal of these dams would give salmon access to an additional 300 miles of habitat in the Klamath River Basin. The two agreements also include measures to improve water quality.

**Fisheries Reintroduction:** The Reintroduction Plan will include actions to reintroduce fish to the areas currently blocked by the hydroelectric dams (except the Lost River). The

Oregon Fish and Wildlife Commission has adopted a policy to establish self-sustaining, naturally-produced populations of Chinook, steelhead, coho, and lamprey that were historically present in the Upper Klamath Basin.

- Phase I: This plan will address the near-term investigations, facilities, actions, monitoring, and decisions necessary to initiate and accomplish the reintroduction of anadromous fish species.
- Phase II: This plan will address the management of re-established fish populations in presently un-occupied habitats when fish have access to these areas.
- Screening Program: One objective for the reintroduction program is to prevent reintroduced salmon and other aquatic species from entering irrigation diversions. The Bureau of Reclamation will evaluate appropriate methods and locations to address such entrainment at Klamath Reclamation Project diversions, including: Lost River diversion channel or associated diversion points; North Canal, Ady Canal, and other diversions from Reclamation or Reclamation contractor-owned facilities diverting water from the Klamath River or Lake Ewauna.

**Additional Water for Fish:** The Restoration Agreement includes a number of actions to increase the amount of water to improve instream flows and maintain the elevation of Upper Klamath Lake; these measures include:

- Interim Program: The parties will support funding to implement a water leasing and purchase program to reduce surface water diversions from the Klamath River and from its tributaries above Upper Klamath Lake and to apply the water obtained toward improving the status of anadromous and resident fish. The parties intend that this program will be administered to increase, to the extent technically feasible, the amount of water in the Klamath River and Upper Klamath Lake toward the amounts which will result from the permanent instream water supply enhancement actions in the Restoration Agreement.
- Permanent Increase in Water for Fish Management: The Restoration Agreement establishes limitations on the quantity of water diverted from Upper Klamath Lake and the Klamath River for use in the Klamath Reclamation Project. The Restoration Agreement calls for the Klamath Water and Power Agency (KWAPA)—a joint powers entity comprised of irrigation districts—to develop a long-term plan which will include measures to operate within the permitted diversion limits. The Department of the Interior and the Yurok Tribe have estimated that the limitation will result in the availability of water for irrigation being approximately 100,000 acre feet less than current demand in the driest years, with irrigation water availability increasing on a sliding scale with increasingly wet conditions.
- Upper Klamath Basin Water Program: The Restoration Agreement establishes a voluntary program for water use retirement in the Wood River, Sprague River, Sycan River (excluding the drainage from the Sycan Marsh upstream), and the Williamson

River (from the confluence with the Sprague River upstream to Kirk) that will be designed to secure 30,000 acre feet of water for additional inflow to Upper Klamath Lake. The program also includes a voluntary program to improve fisheries habitat and provides federal regulatory assurances to landowners in these sub-basins in a manner that seeks to maintain landowner economic stability.

- **Additional Water Supply, Conservation, and Storage:** The Restoration Agreement includes additional obligations to enhance water conservation and provide for further water storage. Measures to increase water supply in Upper Klamath Lake include the breaching of levees in the Williamson River Delta that reconnected approximately 28,800 acre feet of storage; reconnecting Barnes Ranch and Agency Lake Ranch to Agency Lake to restore approximately 63,700 acre feet of storage; and management of, and ultimate reconnection of Wood River Wetlands to Agency Lake to provide approximately 16,000 acre feet of storage. The parties will also support completion of the feasibility report under the Klamath Basin Water Supply Enhancement Act of 2000, ongoing investigations of additional storage, and criteria for the use of water from such storage.
- **Protection for Additional Water:** The Restoration Agreement has provisions to ensure to the extent permitted by applicable law that all the additional water generated by the programs will remain in Upper Klamath Lake or the Klamath River to benefit fish.
- **Management of Environmental Water:** All of the additional water will be managed for the benefit of fisheries in Upper Klamath Lake and the Klamath River. The Restoration Agreement establishes a Technical Advisory Team that will develop an Annual Water Management Plan that will provide recommendations to the Secretary of the Interior. During each water year, the Technical Advisory Team will also recommend ongoing, real-time operations to adjust for changing conditions.
- **No Adverse Impacts from Groundwater Use:** The Restoration Agreement includes provisions to ensure that groundwater use under the On-Project Plan in the Klamath Reclamation Project does not have significant impacts on river flows important to fisheries. If monitoring by the U.S. Geological Survey identifies defined adverse impacts, the Restoration Agreement provides procedures to implement a remedy. The agreement also sets up a process if further technical investigations warrant other measures to respond to effects on fisheries.

**Additional Water for Wildlife Refuges:** The Restoration Agreement provides specific allocations and delivery obligations for water for the Lower Klamath and Tule Lake National Wildlife Refuges. It also increases the water availability and reliability above historical levels.

**Drought Plan:** The Klamath Tribes, Karuk Tribe and Yurok Tribe, Upper Klamath Water Users Association, the Klamath Water and Power Agency (KWAPA), the Klamath Basin National Wildlife Refuges, Oregon Water Resources Department, California Department of Fish and Game, and a representative of conservation and fishing groups

will develop a Drought Plan. This Plan will include a process to ensure increasingly intensive water management for agriculture, National Wildlife Refuges, and in-lake and in-river fishery purposes in drought years, and in preparation for the potential of an extreme drought to avoid or minimize adverse impacts to Klamath Basin communities and natural resources in response to drought conditions of increasing severity.

**Climate Change:** The parties will determine how long-term climate change may affect the fisheries and communities of the Klamath Basin. The parties will re-convene to negotiate in good faith any supplemental terms to the Restoration Agreement which may be necessary to address changes in the climate in order to achieve the parties' goal of maintaining sustainable fisheries and communities.

**Monitoring:** The fish managers will develop a fish monitoring plan that will assess the status and trends of fish populations and their habitats; this effort will also evaluate factors that are limiting the restoration of fish populations. It will provide information for the restoration actions and the management of fisheries.

The Monitoring Plan will collect data on instream flows and Upper Klamath Lake elevations to evaluate the outcomes of the Water Resources Program. This information will also be used by the Technical Advisory Team in developing the Annual Water Management Plan.

The Monitoring Plan will also assess the effectiveness of the restoration actions. This information will be used to determine restoration priorities and other adaptive management actions.

**Implementation:** The Restoration Agreement establishes an annual process to determine funding needs and funding availability, set priorities for the Fisheries Program, and engage with the public. The fish managers will also prepare annual reports on all activities that were implemented.

## **Sustainable Communities**

**Water Supply Reliability:** The Restoration Agreement contains a number of measures to provide water supply reliability:

- On-Project Plan: The Restoration Agreement establishes a permanent limitation on the amount of water that will be diverted from Upper Klamath Lake and the Klamath River for the Klamath Reclamation Project. KWAPA will have the sole responsibility to develop and implement the On-Project Plan. The plan will align irrigation water supply and demand for the project consistent with the diversion limits. KWAPA will evaluate the following measures to meet the purpose of the plan: conservation easements, forbearance agreements, conjunctive use programs, efficiency measures, land acquisitions, water acquisitions, groundwater development, groundwater substitution, other voluntary transactions, water storage, and any other applicable measures.

- Funding: The parties will support the funding estimates for the plan that are in the Restoration Agreement. Reclamation will consider whether funds made available for the interim flow and lake level program that are not expended in a year should be made available to accelerate the implementation of the On-Project Plan.
- Additional On-Project Water: The Restoration Agreement would increase the allocation of water to the Klamath Reclamation Project in some years by 10,000 acre feet if the four PacifiCorp dams are removed or additional storage is available. The Klamath Basin Coordinating Council could also provide this increase after February 2020 after receipt of recommendations from the Technical Advisory Team.
- Change in Authorized Purposes of the Klamath Reclamation Project: The Restoration Agreement would provide support for federal legislation which would add fish and wildlife and national wildlife refuges as authorized purposes of the Klamath Reclamation Project, with terms to protect the existing agricultural uses in a manner consistent with the agreement. The change will facilitate the ability to provide reliable water supplies to the National Wildlife Refuges.
- On-Project Water Rights Assurances: The Restoration Agreement includes provisions to provide water rights assurances related to water diversions from the Klamath Tribes, Karuk Tribe, and Yurok Tribe, and the United States as a trustee of the tribes to the Klamath Reclamation Project and includes resolution of certain contests in the Klamath Basin Adjudication.
- Drought Plan: The Restoration Agreement identifies a number of strategies that would be used to deal with extreme drought conditions including voluntary water conservation measures, additional stored water, leasing water on a willing-seller basis, the use of groundwater (for irrigation purposes or to replace water that would otherwise be diverted), and reduction of water diversions by exercise of water rights priorities. Water diversions to the Klamath Reclamation Project could only be limited in an extreme drought (e.g. 1992 or 1994) and if these other measures were not sufficient.
- Off-Project Water Settlement: The Restoration Agreement establishes a process to develop an Off-Project Water Settlement (OPWAS) to: 1) resolve claims between Off-Project Irrigators, the Klamath Tribes, and the Bureau of Indian Affairs in the Klamath Basin Adjudication in Cases 277, 279, 280, 281, 282, 284, 285 and 286; 2) or provide reciprocal assurances for maintenance of instream flows and reliable irrigation water deliveries, notwithstanding the outcome of any unresolved contests; and 3) provide for a voluntary Water Use Retirement Program. This program will be designed to maintain the economic character of the off-project agricultural community and to not adversely impact the water rights of any remaining contestants who are not signatories to the OPWAS.

- Off-Project Reliance Program: The Restoration Agreement establishes a program consistent with the Water Use Retirement Program. The program funds will be used to avoid or mitigate the immediate effects of unexpected circumstances that could affect the amount of water available for irrigation in the Off-Project area.

**Keno and Link River Dams**: The parties will support provisions in the Hydroelectric Settlement to transfer Keno Dam to the Bureau of Reclamation. Keno and Link River dams would continue to provide water to the Klamath Reclamation Project.

**Maintain Lease Land Farming**: Under the Restoration Agreement, parties will support continued lease land farming on Lower Klamath and Tule Lake National Wildlife Refuge that uses practices that enhance waterfowl management while optimizing agricultural use and maximizing lease revenues recognizing the authorities and obligations of federal agencies.

**Maintain Walking Wetlands and Other Wildlife and Agriculture Partnerships**: The Restoration Agreement would continue a refuge-approved program that incorporates managed wetlands into agricultural crop rotations on the National Wildlife Refuges as well as on private lands in the Klamath Reclamation Project. Such wetlands support the diversity of waterfowl species endemic to the Upper Klamath Basin. Walking wetlands that are returned to agricultural production enhance agricultural crop yields and reduce or eliminate the need for chemical inputs by enhancing soil fertility and reducing soil pests and diseases to crops.

**Consistency with State Water Law**: The Restoration Agreement would not limit the authority of the Oregon Water Resources Department to administer existing water rights or determine water rights in the ongoing Klamath Basin Water Rights Adjudication. The agreement also will not affect the California Water Resources Control Board's regulatory authority.

**Regulatory Assurances**: The Restoration Agreement includes commitments by the parties to take every reasonable and legally-permissible step to avoid or minimize any adverse impact, in the form of new regulation or other legal or funding obligation, that might occur to users of water or land upstream of Iron Gate Dam from introduction or reintroduction of aquatic species to currently unoccupied habitats or areas.

- Unforeseen Circumstances: If unforeseen circumstances result from reintroduction during the course of the agreements, the parties will meet and confer to determine any necessary future actions, including, but not limited to, consideration of whether narrowly tailored regulations or legislation is necessary to minimize any impacts.
- Endangered Species Act: The Restoration Agreement establishes steps designed to comply with the Endangered Species Act, including the preparation of biological opinions on specific federal actions called for in the agreement. The agreement also establishes a process to develop general conservation plans or habitat conservation



plans that would be designed to assist non-federal parties to comply with the ESA. Participation in these plans would be voluntary.

- **Regulatory processes:** Before seeking any further limitations on diversion, use and reuse of water related to the Klamath Reclamation Project beyond the limitations in the Restoration Agreement, NMFS and FWS will consider, to the maximum extent consistent with the ESA and any other applicable law, whether increased water supply in Upper Klamath Lake and all other relevant obligations for the protection of the affected resources have been implemented. NMFS and FWS will also consider whether there are any alternatives, including additional habitat restoration actions or alternative sources of water. If other parties believe that listed species are in jeopardy of extinction, the agreement also describes the steps that the parties would take to ensure timely implementation of the measures in the agreement, explore other alternatives, and pursue dispute resolution before a party would initiate litigation that could limit the diversions.

**Power Program:** The purpose of the power program is to ensure affordable electricity for eligible On-Project and Off-Project irrigators to maintain sustainable agricultural communities. The program includes a number of actions that are designed to achieve a delivered power cost target level at or below the average cost of similarly situated Reclamation irrigation and drainage projects in the surrounding area. The program includes an interim power program, access to federal power, and a long-term program to implement energy efficiency and new renewable resource generation.

The program also delivers affordable power as part of the implementation of the On-Project plan and for moving water to the National Wildlife Refuges and the return of water to the Klamath River.

**Counties Program:** This program includes programs to reflect specific economic impacts associated with implementation of the Hydroelectric Settlement, including programs to offset potential property tax losses and address economic development.

**Tribal Program:** Under the Restoration Agreement, the parties will support the goals of each tribe to achieve the revitalization of tribal subsistence and related economies. The parties support the tribes as they strive to meet a reasonable standard of living, a standard recognized in the reservation of tribal fishing and other related rights, until the fisheries are restored to a level that allows full participation in harvest opportunities. Under the agreement, the parties will support funding to assist the tribes in developing the capacity to participate as grantees and in the collaborative management of the Fisheries Program.

The parties acknowledge that the Restoration Agreement addresses primarily tribal fishing and water matters, and accordingly agree that they will also support efforts by the tribes to secure economic revitalization programs and funds such that the tribes may achieve long-term economic self-sufficiency. Funding will be provided to each tribe that is a party for the development and planning of long-term economic revitalization

projects. The parties will also support funding for the Mazama Forest Project in Klamath County, Oregon.

## **Implementation and Funding**

A key feature of the Restoration Agreement is a commitment by the parties to cooperate fully in its implementation.

**Coordination and Oversight:** The Restoration Agreement establishes the Klamath Basin Coordinating Council to facilitate coordination, cooperation, collaboration, and accountability by the parties to ensure that elements of the agreement are carried out effectively. The KBCC will provide for general implementation oversight, including activity and program coordination, information sharing, priority setting, fund seeking, and dispute resolution related to implementation of the agreement. It will also serve as the primary forum for public involvement. The agreement also establishes the Klamath Basin Advisory Council to advise federal agencies in the implementation of the agreement, consistent with the Federal Advisory Committee Act.

**Dispute Resolution:** The Restoration Agreement establishes a process to resolve issues among the parties. The process includes four steps: 1) clear notice of a dispute; 2) informal meetings to resolve the dispute; 3) referral of the dispute to the Klamath Basin Coordinating Council; and 4) mediation. The agreement also includes enforcement provisions and a party may take actions to enforce any contractual obligation under the agreement after complying with the dispute resolution procedures. The parties acknowledge that resorting to litigation will be a last resort, made only after careful consideration of the potential collateral consequences for the agreement.

**Funding:** The parties have revised the estimates for the costs of implementing the Restoration Agreement and will support authorization and appropriation of funds from federal and state governments.

## **Klamath Hydroelectric Settlement Agreement**

### **Studies, Environmental Review, and Secretarial Determination**

**Studies and Environmental Review:** The Secretary of the Interior, in cooperation with the Secretary of Commerce and other Federal agencies, will:

- Use existing studies and other appropriate data, including those in the FERC record for this project;
- Conduct further appropriate studies, including but not limited to an analysis of sediment content and quantity;
- Undertake related environmental compliance actions, including environmental review under NEPA; and
- Take other appropriate actions as necessary to determine whether to proceed with facilities removal.

Facilities removal is defined as the physical removal of all or part of each of the four PacifiCorp dams to achieve at a minimum a free-flowing condition and volitional fish passage, site remediation and restoration, including previously inundated lands, measures to avoid or minimize adverse downstream impacts, and all associated permitting.

These studies will be conducted in coordination with the parties to the Hydroelectric Settlement and the public. The California Department of Fish and Game will conduct review required under the California Environmental Quality Act, and the State of Oregon will address applicable Oregon state laws, prior to deciding whether to concur with any affirmative determination by the Secretary of the Interior as described below.

**Detailed Plan for Facilities Removal:** The Secretary will prepare a detailed plan that describes:

- The methods and timetable for facilities removal;
- Plans for management, removal, and/or disposal of sediments, debris, and other materials;
- A plan for site remediation and restoration;
- A plan for measures to avoid or minimize adverse downstream impacts;
- A plan for compliance with all applicable laws, including anticipated permits and permit conditions;
- A detailed statement of the estimated costs of facilities removal; and
- A statement of measures to reduce risks of cost overruns, delays, or other impediments to facilities removal.

**Secretarial Determination:** The Secretary of the Interior will use this information, in cooperation with the Secretary of Commerce and other Federal agencies, to determine whether, in his judgment, the conditions of the Hydroelectric Settlement have been satisfied, and whether facilities removal: 1) will advance restoration of the salmonid fisheries of the Klamath Basin; and 2) is in the public interest, which includes but is not limited to consideration of potential impacts on affected local communities and tribes.

**Conditions:** The Hydroelectric Settlement describes the conditions that need to be satisfied before the Secretarial Determination:

- Passage of federal legislation materially consistent with the proposed legislation to implement the Hydroelectric Settlement and the Restoration Agreement;
- The states of California and Oregon have authorized funding for facilities removal;
- Development of a plan to address any costs over the limits in the Hydroelectric Settlement; and
- Designation of a Dam Removal Entity, and, if the DRE is a non-federal entity, a finding by the Secretary that the entity meets the qualifications specified in the Hydroelectric Settlement, the states of California and Oregon concur, and the designated DRE has committed to perform facilities removal within the cost cap.

The Hydroelectric Settlement also identifies other actions that need to be taken prior the Secretarial Determination.

**Affirmative Determination:** In the event of an affirmative determination, the Secretary will also decide whether the Department of the Interior or a non-federal entity will serve as the DRE. California and Oregon will provide notice to the Secretary and other parties within 60 days whether each state concurs with the affirmative determination. In its concurrence decision, each state will 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. If the Secretary selects a non-federal DRE, the states would also decide whether to concur with that selection.

**Negative Determination:** If the Secretary determines not to proceed with facilities removal, the Hydroelectric Settlement terminates unless the parties agree to a cure for this potential termination event. Prior to adopting or public release of such a determination, the Secretary will notify the parties of his tentative determination and its basis. The parties will consider whether to amend the Settlement in a manner that will permit the Secretary to make an affirmative determination.

## **Costs**

**Cost cap:** The Hydroelectric Settlement sets a cost cap of \$450 million for facilities removal. In addition, pending regulatory approval, the Hydroelectric Settlement allows for the recovery of costs of the existing investment in the facilities, the ongoing operating costs and the costs of replacement power.

**Funding sources:** \$200 million of the costs would come from customer contributions on a pro rata basis (up to \$184 million from PacifiCorp's Oregon consumers and up to \$16 million from customers in California); the public utility commissions in the two states have approved the collection of these funds. These contributions are designed so they would not increase any customer's rate by more than two percent. In addition, up to \$250 million to fund the difference between the costs of facilities removal and the customer contribution would come from the State of California through the sale of bonds or another appropriate funding mechanism. The Federal government and its taxpayers will not be responsible for facilities removal costs.

**Management of the funds:** The states of California and Oregon have established trust accounts and provide instructions for the management and distribution of the funds. If the customer contributions are determined to result in rates that are not fair, just, and reasonable, the surcharges would be refunded to customers in accordance with the Oregon Surcharge Act and the trustee instructions. If the California or Oregon public utilities commissions determine that there are excess funds in the accounts, the surplus funds would be returned to customers. If one or more of the dams are not removed, any remaining funds would be returned, first, to costs of relicensing, and then to customers.

## **Implementation**

**Interim Measures:** The Hydroelectric Settlement includes detailed actions for the operation of the dams and mitigation activities prior to removal of the dams.

**Dam Removal Entity:** The DRE must have the following capabilities:

- Accept and expend non-federal funds;
- Seek and obtain necessary permits and other authorizations to implement facilities removal;
- Enter into appropriate contracts;
- Accept transfer of title to the Facilities for the express purpose of facilities removal;
- Perform, directly or by oversight, facilities removal;
- Prevent, mitigate, and respond to damages the DRE causes during the course of facilities removal, and, consistent with applicable law, respond to and defend associated liability claims against the DRE, including costs thereof and any judgments or awards resulting therefrom;
- Carry appropriate insurance or bonding or be appropriately self-insured to respond to liability and damages claims against the DRE associated with facilities removal; and
- Perform such other tasks as are reasonable and necessary for facilities removal, within the authority granted by the authorizing legislation or other applicable law.

**Definite Plan:** The DRE would develop a definite plan for facilities removal and include it as a part of any applications for permits or other authorizations. The definite plan will be consistent with the Settlement, the authorizing legislation, the detailed plan, and the Secretarial determination. The Settlement includes a detailed list of the elements that would be in the detailed plan.

**Schedule:** In the event of an affirmative determination by the Secretary, the target date to begin decommissioning the facilities is January 1, 2020. Preparatory work for facilities removal may be undertaken by the DRE before January 1, 2020, consistent with the Secretarial determination, the definite plan, applicable permits, and other provisions of the settlement. The target date for facilities removal is December 31, 2020.

The Hydroelectric Settlement also provides a procedure to accelerate facilities removal by up to twelve months if certain conditions are met. If the parties determine that the schedule for facilities removal must extend beyond December 31, 2020, then the parties will also consider whether 1) modification of interim measures is necessary to appropriately balance costs to customers and protection of natural resources, and 2) continuation of the collection of the customer surcharges up to the maximum customer contribution is warranted.

**Yreka water system:** The parties understand that facilities removal may affect the City of Yreka. In recognition of this potential, the Hydroelectric Settlement includes provisions to mitigate impacts to the city's water supply system.

**Keno:** If the Secretary makes an affirmative determination, PacifiCorp and the Bureau of Reclamation would enter into an agreement to transfer Keno Dam to Reclamation. In preparation for such a transfer, the Secretary, in consultation with the affected parties would study environmental compliance, water quality, and fish passage with the goal of addressing these issues and maintaining the benefits the dam currently provides.

**Transfer:** PacifiCorp would transfer each facility when the DRE provides notice that all necessary permits and approvals have been obtained for removal of a facility, all contracts necessary for facility removal have been finalized, and facility removal is ready to commence. After the transfer, the DRE would remove the facility.

**Legislation:** Implementation of the agreements would require legislation. The Non-Federal Parties developed a proposal for federal legislation to recommend to the Administration and Congress. The proposed legislation, based on Appendix A-1 of the KBRA and Appendix E of the KHSA, includes the authorization for federal agencies to implement the two agreements and specific authorities that require Congressional action. Under the provisions in the proposed federal legislation related to the Hydroelectric Settlement, operation of the four dams would continue under FERC annual licenses; in the event of an affirmative determination, the legislation would authorize the decommissioning and removal process in the Hydroelectric Settlement. In the event of a negative determination or if the Hydroelectric Settlement terminates, PacifiCorp would return to the FERC relicensing process. Another provision of the proposed legislation would provide liability protection for PacifiCorp from the effects of removing a dam after it had been transferred to the Dam Removal Entity.

## **Klamath Settlement Organizations**

### **United States<sup>1</sup>**

National Marine Fisheries Service

The United States Forest Service

The United States Department of the Interior, including Bureau of Indian Affairs, Bureau of Land Management, Bureau of Reclamation, and Fish and Wildlife Service

### **State of California**

California Department of Fish and Game

California Natural Resources Agency

### **State of Oregon**

Oregon Department of Environmental Quality

Oregon Department of Fish and Wildlife

Oregon Water Resources Department

### **PacifiCorp<sup>2</sup>**

### **Tribes**

Karuk Tribe

Klamath Tribes

Yurok Tribe

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<sup>1</sup> The Department of the Interior and National Oceanic and Atmospheric Administration signed the KHSA; the federal agency parties are not signatories to the KBRA. The KBRA includes provisions that these agencies will become parties when Federal authorizing legislation is enacted.

<sup>2</sup> PacifiCorp signed the KHSA, but is not a Party to the KBRA.

**Counties**

Humboldt County, California

Klamath County, Oregon

**Parties Related to Klamath Reclamation Project**

Ady District Improvement Company

Collins Products, LLC

Enterprise Irrigation District

Don Johnston & Son

Inter-County Properties Co, which acquired title as Inter-County Title Company

Klamath Irrigation District

Klamath Drainage District

Klamath Basin Improvement District

Klamath Water Users Association

Klamath Water and Power Agency

Bradley S. Luscombe

Malin Irrigation District

Midland District Improvement Company

Pioneer District Improvement Company

Plevna District Improvement Company

Reames Golf and Country Club

Shasta View Irrigation District

Sunnyside Irrigation District

Tulelake Irrigation District

Van Brimmer Ditch Company

Randolph and Jane Walthall 1995 Trust

Westside Improvement District #4

Winema Hunting Lodge, Inc.

**Upper Klamath Irrigators**

Upper Klamath Water Users Association

**Non-Governmental Organizations**

American Rivers

California Trout

Institute for Fisheries Resources

Northern California/Nevada Council Federation of Fly Fishers

Pacific Coast Federation of Fishermen's Associations

Salmon River Restoration Council

Trout Unlimited

# Appendix B: Executive Summary for the Secretarial Determination Overview Report

## ES.1 INTRODUCTION

The Klamath Basin covers over 12,000 square miles in southern Oregon and northern California (see Figure ES-1) and contains many natural resources and economic opportunities related to fisheries, farming, ranching, timber harvest, mining, and recreation. Each of these resources and opportunities has economically sustained communities throughout the basin for many decades. The Klamath Basin is also home to six federally recognized Indian tribes who have depended on many of these same natural resources for thousands of years to support their way of life and spiritual wellbeing. Natural resources in the basin, including clean water, abundant and reliable supplies of fish, and terrestrial plants and animals, are central to their cultural identity.

The construction of PacifiCorp's<sup>1</sup> hydroelectric dams on the Klamath River combined with the development of irrigated agriculture, both beginning in the early 1900s, contributed to declines in fisheries and water quality as well as to detrimental impacts to tribal resources and culture throughout the Klamath Basin. Crises in agricultural water availability and fish populations, discussed in more detail below, combined with challenges and uncertainties involved in obtaining a new long-term Federal Energy Regulatory Commission (FERC) license for PacifiCorp's Klamath Hydroelectric Project 2082 (inclusive of the J.C. Boyle, Copco 1, Copco 2, and Iron Gate dams) led willing basin stakeholders to come to agreement on the Klamath Hydroelectric Settlement Agreement (KHSa) and the Klamath Basin Restoration Agreement (KBRA) (see Section ES.1.3, *The KHSa and KBRA*).

**Figure ES-1: Klamath River Basin Map.** The Klamath Basin covers over 12,000 square miles and includes PacifiCorp's J.C. Boyle, Copco 1, Copco 2, and Iron Gate dams on the main stem of the Klamath River.



<sup>1</sup> PacifiCorp refers to the current utility and all previous owners.



## ES.1.1 Purpose of this Report

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 peer-reviewed scientific studies conducted by a multi-agency Technical Management Team (TMT), as well as other relevant existing reports. The Overview Report address the following four questions in the KHSA for the Secretary of the Interior to make a fully informed determination (Secretarial Determination) on whether or not to remove four Klamath Hydroelectric Project dams (J.C. Boyle, Copco 1, Copco 2, and Iron Gate) also referred to as the Four Facilities, on the main-stem of the Klamath River. Table ES-1 summarizes these questions and where each is analyzed in this Executive Summary.

**Table ES-1: Four Questions of the Secretarial Determination**

Question	Section
Will dam removal and KBRA implementation advance salmonid and other fisheries of the Klamath Basin over a 50-year time frame?	ES.2
What would dam removal entail, what mitigation measures may be needed, and what would these actions cost?	ES.3
What are the major potential risks and uncertainties associated with dam removal?	ES.4
Is dam removal in the public interest, which includes, but is not limited to, consideration of potential effects on local communities and tribes?	ES.5

**Figure ES-2: Thousands of adult salmon died in the lower Klamath River during September 2002. Causative factors included low flows, high concentration of returning Chinook salmon, warm water temperatures, and disease.**



This Overview Report focuses on addressing these four KHSA-derived questions and thus is not a comprehensive synthesis of all the literature available on the Klamath Basin. Findings and conclusions addressing the first three questions are contained in this report; the fourth question, as to whether dam removal and KBRA implementation is in the public interest, is not directly answered since that determination will be made by the Secretary of the Interior. The Overview Report, however, does summarize findings in subject areas relevant to a public interest determination, including the potential effects of dam removal and KBRA implementation on

- National and regional economic development,
- Tribal communities,
- PacifiCorp customers,
- Cultural resources,
- Real estate values,
- National Wildlife Refuges,
- Wild and Scenic River values,
- Recreational opportunities,
- Water quality, and
- Greenhouse gas emissions, among other subject areas.

This report also provides some indicators of individuals' and households' views regarding declining fisheries and fish populations in the Klamath Basin and whether the KHSA and KBRA should be implemented. These views were obtained with surveys 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 advisory votes in Siskiyou County, California, and Klamath County, Oregon, regarding dam removal and KBRA, respectively.

## ES.1.2 Klamath Basin Background

There are multifaceted issues in the Klamath Basin including water scarcity, environmental degradation, and declining fish populations, each of which adversely affects agricultural and fishery communities, their respective economies, and 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 salmon stocks resulted in the closure of commercial salmon fishing in 2006 in the Klamath Management Zone (KMZ) on the California coast, and severely curtailed the commercial fishing season along the Oregon coast. Since 2005, growth of toxic algae behind two Klamath River dams (Copco 1 and Iron Gate) resulted in posted warnings against water contact in the two reservoirs and the lower Klamath River.

Long-term declines in Klamath Basin fisheries have been estimated at 92 to 96 percent for wild fall-run Chinook salmon, 98 percent for spring-run Chinook salmon, 67 percent for steelhead trout (since 1960), 52 to 96 percent for coho salmon, and 98 percent for Pacific Lamprey. These declines, which are attributable to the cumulative effects of dam construction, hydrologic modifications, changing ocean conditions, agricultural development, timber harvest, overfishing, and mining, have created hardships for commercial fisheries and tribal communities. Of particular note, the Klamath Tribes in the upper Klamath Basin have been without a Chinook salmon fishery for about 90 years (since the completion of Copco 1 Dam in 1922), adversely affecting their way of life. The declines in coho salmon in the Klamath Basin have contributed to their listing as threatened under the Endangered Species Act (ESA) (see Table ES-2).

**Table ES-2: Declines in Klamath River Anadromous Fish**

Species	Historical Level	Percent Reduction from Historical Levels (estimates of individual runs)	Source
Pacific Lamprey	Unknown	98% (Represents reduction in tribal catch per effort)	Petersen Lewis 2009
Steelhead	400,000 <sup>1</sup>	67% (130,000)	Leidy and Leidy 1984; Busby et al. 1994
Coho salmon	15,400–20,000	52% to 95% (760–9,550)	Moyle et al. 1995; Ackerman et al. 2006
Fall-run Chinook salmon	500,000 <sup>2</sup>	92% to 96% (20,000–40,000) <sup>3</sup>	Moyle 2002
Shasta River Chinook salmon <sup>4</sup>	20,000–80,000	88% to 95% (A few hundred to a few thousand)	Moyle 2002
Spring-run Chinook salmon	100,000 <sup>2</sup>	98% (2,000) <sup>2</sup>	Moyle 2002

<sup>1</sup> This estimate is from 1960. Anadromous fish numbers were already in decline in the early 1900s (Snyder 1931).

<sup>2</sup> Includes Klamath River and Trinity River Chinook.

<sup>3</sup> Excludes hatchery-influenced escapement.

<sup>4</sup> Shasta River is a subset of the overall Klamath River Chinook population.

Coincident with these ongoing crises in the Klamath Basin, the 50 year FERC license for PacifiCorp's Klamath Hydroelectric Project 2082 including the Four Facilities (J.C. Boyle, Copco 1, Copco 2, and Iron Gate, shown on Figure ES-1) expired in 2006. PacifiCorp pursued relicensing Project 2082; however, the large cost and liability involved in relicensing encouraged PacifiCorp to enter into collaborative discussions with other basin stakeholders to identify ways to improve basin fisheries, including the possibility of decommissioning the Four Facilities, while protecting the interests of their customers. The high costs of Klamath Hydroelectric Project relicensing are related to Federal Power Act (FPA) regulations which would ultimately required fish passage facilities at the dams and Clean Water Act (CWA) 401 Water Quality Certification which would ultimately require changes to the Four Facilities to improve poor water quality created by the reservoirs. The technical complexities of fish passage and the severity of the water quality problems at the Four Facilities generated substantial uncertainty surrounding the opportunities of success on both factors. In addition, relicensing would result in reduced power generation at the Four Facilities which, together with fish passage and water quality improvements costs and risks, would reduce the economic viability of the Klamath Hydroelectric Project to PacifiCorp and its customers.

### **ES.1.3 The KHSA and KBRA**

The combination of long-term declines in fisheries, recent fishery and water availability crises in the Klamath Basin, and the potentially high cost and risk of relicensing the Four Facilities, led to the realization among many stakeholders in the basin that the status quo was unacceptable and the only sustainable option for solving these basin-wide challenges would be a collaborative and mutually beneficial agreement among willing stakeholders. This realization culminated in the February 10, 2010 signing of the KHSA and KBRA in Salem, Oregon, after several years of negotiation.

The KHSA is a multi-party agreement that, if fully implemented, would result in the removal of the Four Facilities within the Klamath Hydroelectric Project 2082. Their removal would allow fish passage to the upper basin, improve flow and water quality below the dams, and likely reduce juvenile salmon fish disease, all of which will improve tribal, commercial, and sport salmonid fisheries. Table ES-3 provides general information and dimensions of the Four Facilities and Figures ES-3 through ES-6 show the major features of each of the Four Facilities.

**Table ES-3: General Information on the Four Facilities on the Klamath River**

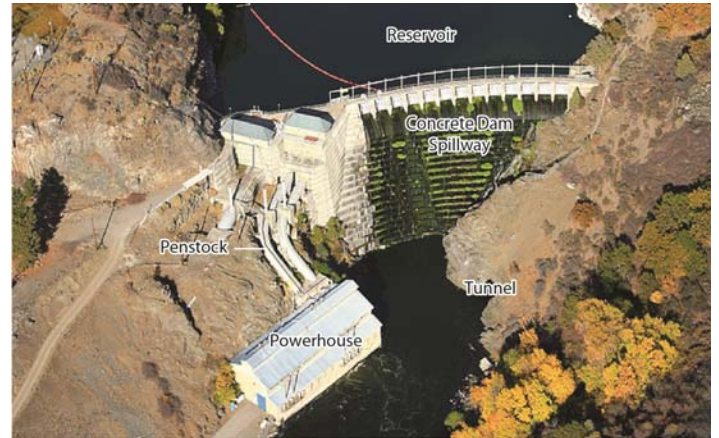
	J.C. Boyle	Copco 1	Copco 2	Iron Gate
Year Operational	1958	1922	1925	1962
Location (RM)	224.7	198.6	198.3	190.1
Dam Type	Concrete & Earthfill Embankment	Concrete	Concrete	Earthfill Embankment
Dam Maximum Height	68 feet	135 feet	33 feet	189 feet
Dam Crest Length	692 feet	410 feet	335 feet	740 feet
Reservoir Surface Area	420 acres	1,000 Acres	N/A	944 Acres
Reservoir Storage Volume	2,629 acre-feet	40,000 acre-feet	73 acre-feet	53,800 acre-feet
Spillway Type	Overflow Spillway with Control Gates & Diversion Culvert	Overflow Spillway with Control Gates & Diversion Tunnel	Overflow Spillway with Control Gates	Uncontrolled Overflow Spillway and Diversion Tunnel
Power Capacity (Megawatts)	98	20	27	18

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

Image from Klamath Riverkeeper



Image from Klamath Riverkeeper

**Figure ES-4: Copco 1 Dam and Powerhouse**

Images from Klamath Riverkeeper



**Figure ES-5: Copco 2 Dam and Downstream Powerhouse**

Images from Klamath Riverkeeper

Signatories of the KHSA, with the exception of the Federal government and PacifiCorp, also signed the 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 basin, counties, Indian tribes, and basin communities. KBRA fisheries programs include extensive habitat restoration, improvements to water flow and quality, and a fish reintroduction program in the upper basin. Since the KBRA would be fully implemented under an Affirmative Secretarial Determination on the removal of the Four Facilities, implementation of the KBRA was evaluated together with the KHSA.

The following sections summarize the analysis and conclusions relative to the four questions in the KHSA.

## **ES.2 WILL DAM REMOVAL AND KBRA ADVANCE RESTORATION OF SALMONID AND OTHER FISHERIES OF THE KLAMATH BASIN OVER A 50-YEAR TIME FRAME?**

The TMT concluded that dam removal and KBRA implementation would improve salmonid fish (salmon, steelhead, and redband trout) populations and associated fisheries primarily by increasing access to historical habitat and

thermal refuge areas in the upper basin, restoring mainstem and tributary habitat, and improving key biological and physical factors heavily influencing the health and survival of these fish populations (e.g. hydrology, sediment transport, water temperature, and water quality). The following two sub-sections discuss the short-term and long-term effects of dam removal on fisheries.

**Figure ES-6: Iron Gate Dam and Powerhouse**

Image from Klamath Riverkeeper

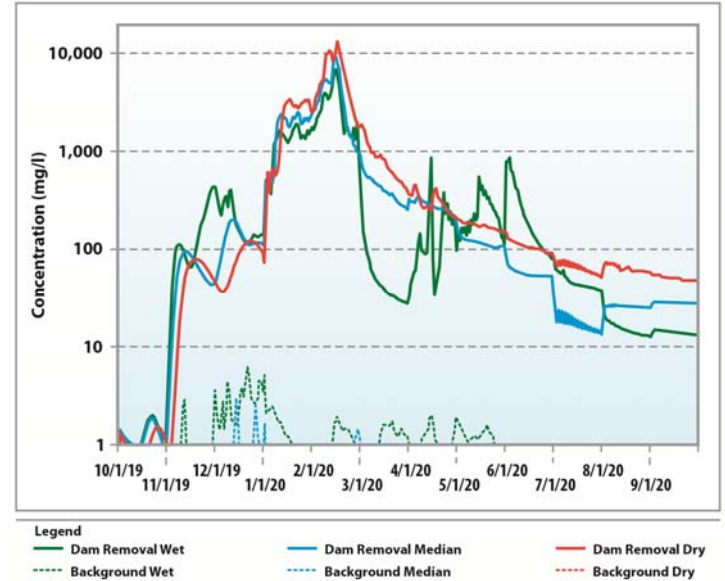
## ES.2.1 Short-Term Effects of Dam Removal

In the short-term, reservoir drawdown associated with dam removal would result in the release of high suspended sediment concentrations (SSCs). Figure ES-7 shows the modeled SSCs immediately downstream of Iron Gate Dam resulting from removal of the Four Facilities.

Although short in duration, this suspended sediment release is expected to result in lethal and sub-lethal effects on a specific part of fish populations, in particular, coho salmon smolts and steelhead trout in the mainstem Klamath River (see Figure ES-8) during the peak sediment release from early January through March 15. Estimates of mortality for all life stages of salmon (Chinook and coho) are expected to be less than 10 percent from high SSCs during dam removal. Estimated mortality for adult and juvenile steelhead would be about 10 to 15 percent; in a worse case situation, mortality of adult steelhead could reach 28 percent.

The timing of reservoir drawdown was selected to coincide with periods of naturally high SSCs in the Klamath River, as aquatic species have already adapted to higher winter SSCs. In addition, based on the distribution and life-history timing of aquatic species in the basin, only a portion of some populations are likely to be present in the mainstem Klamath River during the period of peak SSCs (See Figure ES-9). Most salmon and steelhead life stages would be in tributaries, further downstream where SSCs would be diluted by tributary streams and rivers, or in the Pacific Ocean.

**Figure ES-7: Modeled suspended sediment concentrations (SSC) immediately downstream of Iron Gate Dam for dam removal in dry, median, and wet water years. Background concentrations are modeled using data from all water year types for 1961–2008.**



**Figure ES-8: Estimated mortality impacts on basin-wide production (number of adults or juveniles) resulting from dam removal for key salmonid species for both median (most likely) and low flow (worst case) water years.**

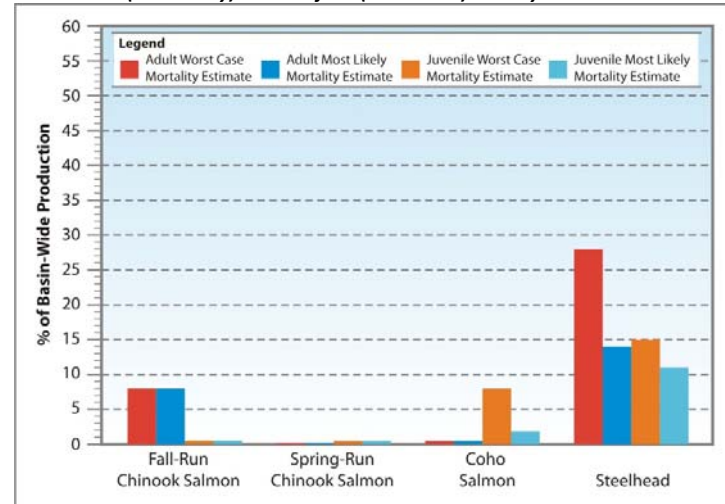
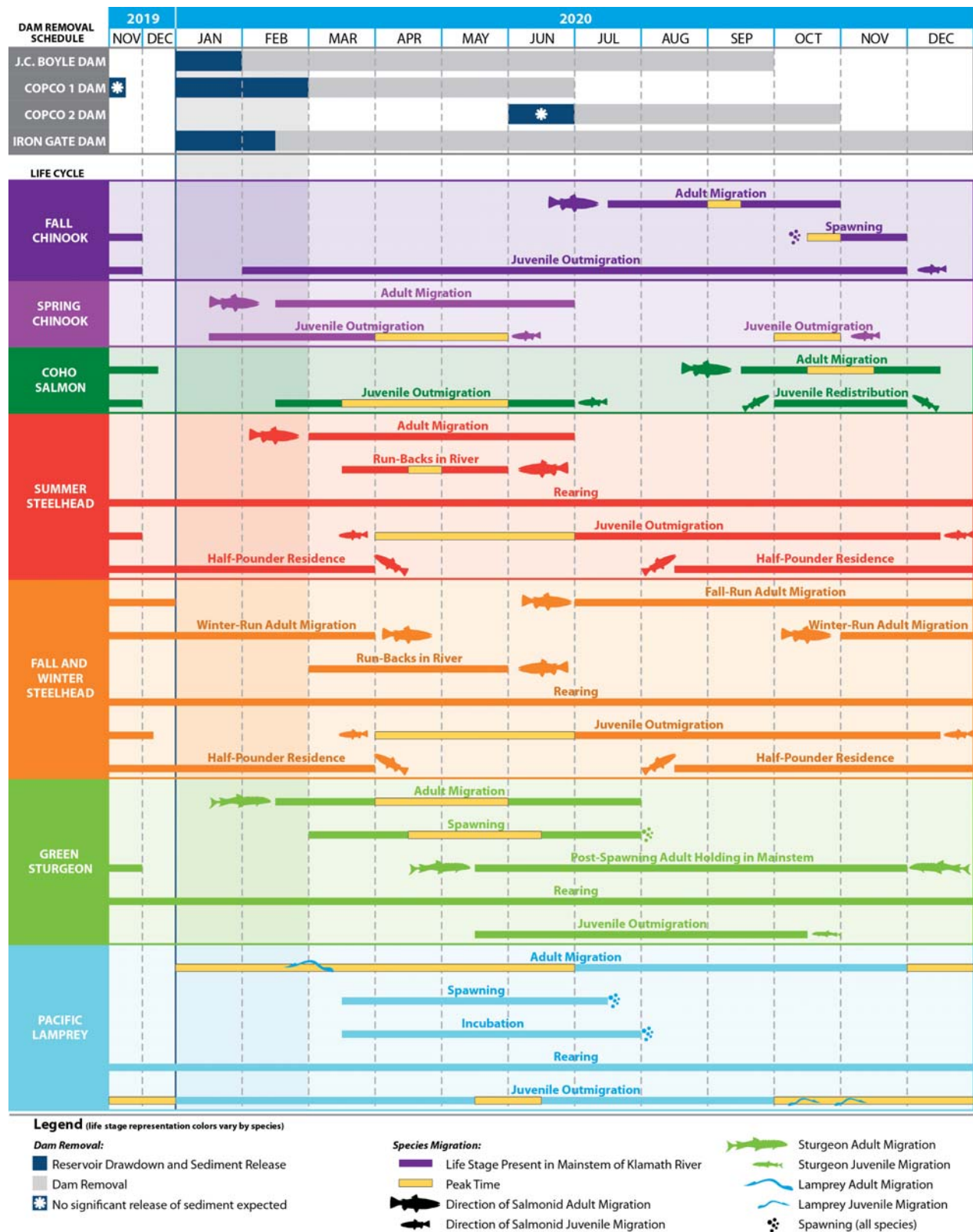




Figure ES-9: Timeline depicting the timing of migratory fish lifecycles in the mainstem of the Klamath River coinciding with dam removal plans.



## ES.2.2 Long-Term Effects of Dam Removal

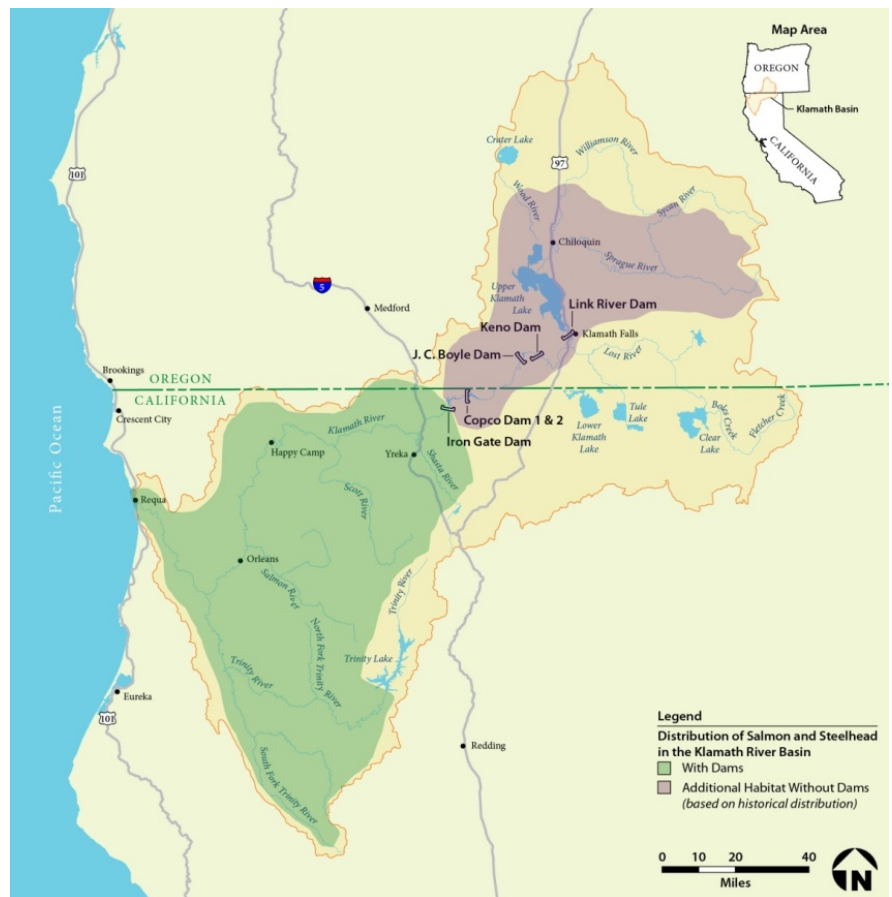
Improvements to the resiliency of the Klamath Basin ecosystem would likely occur from the integrated benefits of (1) increased habitat area related to the reconnection of 420 miles of river by removal of the Four Facilities (see Figure ES-10); (2) coordinated basin-wide improvements to aquatic habitat through active restoration; (3) a real-time water management program that incorporates key elements of the natural hydrograph; (4) an active salmon reintroduction program; and (5) a fisheries monitoring and evaluation program that supports adaptive management. Dam removal and KBRA implementation are anticipated to improve the quality of currently accessible fish habitat, provide access to historical interior habitats that are currently unavailable due to the dams, and improve the viability of native fish populations by increasing their abundance, life history diversity, productivity, and spatial distribution.

Fish modeling results show that dam removal, combined with restoration of aquatic habitats as anticipated in the KBRA, is expected to increase the annual production of adult Chinook salmon by an average of 83 percent beginning in 2020 with dam removal.

The ocean commercial and sport harvests of Chinook salmon are also forecasted to increase by an annual average of 50 percent, the in-river tribal harvest would increase by an annual average of 59 percent, and the in-river recreational fishery would increase by an annual average of 9 percent after dam removal. A fisheries expert panel convened to independently assess whether dam removal would advance Klamath Basin Chinook fisheries concluded that dam removal and KBRA implementation would better address the core factors that affect fish populations and would have a much higher likelihood of success than progressing under current conditions with the dams remaining in place.

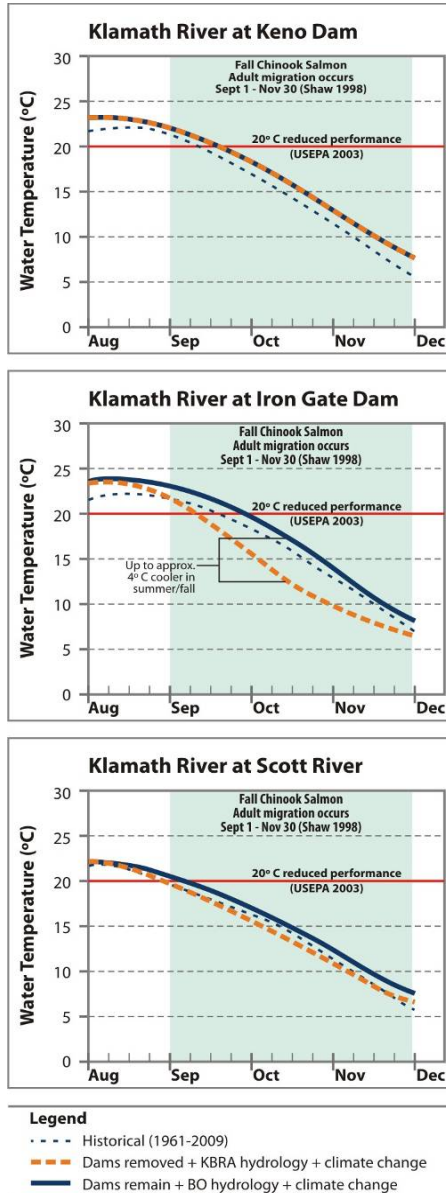
With dam removal, coho salmon would be expected to rapidly recolonize habitat upstream of Iron Gate Dam. Assuming coho salmon distribution would extend up to Spencer Creek after dam removal, coho salmon from the upper Klamath River population would reclaim 68 miles of habitat: approximately 45 miles in the mainstem Klamath River and tributaries and 23 miles currently inundated by the reservoirs. Dam removal and KBRA implementation are also expected to result in significant improvements to mainstem Klamath River hydrology, instream habitat, water quality, and decrease the incidence of

**Figure ES-10: Increased salmon and steelhead distribution in Klamath Basin under current conditions (with dams) compared to historical conditions (without dams).**





**Figure ES-11: Modeled water temperatures during the fall Chinook salmon migration period for the Klamath River indicate that future (2020–2061) water temperatures will be 1–3°C greater than historical (1961–2009) temperatures due to climate change. Dam removal would decrease summer and fall temperatures downstream of Iron Gate Dam, with diminishing effects further downstream. Water temperatures in the Keno Reach would not be affected by dam removal. Simplified patterns from Perry et al. (2011) use standard “GFDL” Global Climate Model output.**



disease downstream of Iron Gate Dam thereby improving coho populations throughout the Klamath Basin. Populations currently in the vicinity of Iron Gate Dam are most affected by dam-related factors, and these populations would receive the most benefits from dam removal. The benefits of dam removal and KBRA implementation for coho salmon go beyond increased abundance. Colonization of the Klamath River between Keno and Iron Gate dams by the upper Klamath coho salmon population would likely improve the viability of the Southern Oregon/Northern California Coast Evolutionary Significant Unit (ESU) by increasing its diversity, productivity, and spatial distribution. In general, as habitat availability, quality, and diversity increase for an ESU, so does the resilience of the population, reducing the risk of extinction and increasing chances for recovery.

Dam removal would reestablish steelhead upstream of Iron Gate Dam and increase habitat available to this species by 420 stream miles. Because of their ability to navigate steeper gradient channels and spawn in smaller, intermittent streams, and their ability to withstand a wide range of water temperatures, steelhead distribution in the basin would be expected to expand to a greater degree than that of any other anadromous salmonid species, thereby increasing steelhead abundance in the Klamath Basin. This conclusion is based on the likelihood of steelhead having access to substantial new habitat that will undergo restoration, the fact that other similar species (resident redband trout) are doing well in the upstream habitat, and that steelhead are currently at lower abundances than historical values but not yet rare. In general, removing dams and implementing KBRA would likely support a greater number of spawning areas, increase genetic diversity, and allow for a wider variety of life history patterns, which could increase the population's resilience.

Dam removal would increase free-flowing redband/rainbow trout habitat downstream of Keno Dam by restoring river channel habitat inundated by reservoirs, eliminating extreme daily flow and water temperature fluctuations in the J.C. Boyle Peaking Reach, and increasing flows in the J.C. Boyle Bypass Reach. This would expand the total distribution of a resident trophy-trout fishery by approximately seven times in this area. Benefits to redband/rainbow trout in tributaries to Upper Klamath Lake would be realized by habitat improvements stemming from implementation of the KBRA, and are expected to increase trout productivity upstream of Upper Klamath Lake.

Overall, dam removal and KBRA implementation would be a major step forward to restoring anadromous fish and in the conservation of native fish populations in the Klamath Basin. Table ES-4 summarizes the main long-term benefits for salmonid species as a result of dam removal and implementation of the KBRA. When estimates of mortality and sublethal effects in the short-term from sediment discharge are considered in conjunction with potential increases in habitat area and improvements in water quality, it is expected that populations would fully recover from any adverse effects from high SSCs within one to five years following dam removal. Dam removal and implementation of the KBRA would have substantial and important benefits for other fish species in the Klamath Basin as summarized in Table ES-5.

**Table ES-4: Major Long-Term Benefits for Salmonid Restoration from Dam Removal and Implementation of the KBRA**

Water Quality Benefits
Accelerates when the river meets Oregon and California water temperature, nutrient, dissolved oxygen, pH, and chlorophyll-a TMDL allocations (see Figure ES-11).
Largely eliminates in 2020 elevated late summer/fall river water temperatures in and below the Hydroelectric Reach (See Figure ES-11).
Largely eliminates in 2020 algal toxins, low dissolved oxygen, and high pH that are produced in Copco 1 and Iron Gate reservoirs and transported downstream.
Habitat Benefits
Provides anadromous fish with up to 420 miles of currently blocked riverine habitat in the upper basin.
Provides access to thermal refuge areas (springs and cool-water tributaries) in the upper basin that would help buffer increased water temperatures associated with future climate change.
Provides for natural recruitment of spawning gravel and river processes within and below the Hydroelectric Reach.
KBRA Fisheries Restoration Plan accelerates restoration of fish habitat throughout the basin starting in 2012.
Expands opportunity to create springtime flushing flows (KBRA Environmental Water Program) to increase flow variability and sediment bed movement, which are anticipated to reduce juvenile salmonid disease (see Figure ES-12).
Reduces incidence of salmon disease by decreasing crowding of adult salmon through expanded migration and spawning areas.
KBRA Fisheries Reintroduction and Management Plan accelerates the effective use of the upper basin by salmonids.
Improves base flows for salmonids, particularly in drought years, through KBRA Water Resources Program.
Eliminates adverse effects of hydroelectric peaking and stranding of fish in the Hydroelectric Reach.

**Figure ES-12: Fish diseases are widespread in the mainstem of the Klamath River during certain time periods and in certain years and have been shown to adversely affect freshwater abundance of Chinook and coho salmon, which are an intermediate host to one prevalent Klamath River fish disease caused by the myxozoan *C. Shasta*. Habitat conditions which support *C. Shasta* and its polychaete host caused by the dams include: stable river flows; relatively stable streambed; crowding of adult salmon at barriers to fish passage; and plankton-rich discharge from reservoirs.**



**Table ES-5: Benefits to Other Fish Species from Dam Removal and KBRA Implementation**

<b>Species</b>	<b>Current Status</b>	<b>Benefits of Dam Removal and KBRA</b>
<b>Short nose and Lost River Suckers</b> in the Upper Klamath Basin	Both species are listed as endangered under ESA and are declining under current conditions. Both species could become extinct in the Klamath Basin unless substantial recruitment events occur.	KBRA implementation would provide greater promise for preventing extinction of these species, and for increasing overall population abundance and productivity, than would occur if the dams were left place and KBRA was not implemented. Implementation of KBRA would improve sucker habitat in Upper Klamath Lake, its tributaries, and wetlands that support multiple life stages of these species.
<b>Bull Trout</b> in the Upper Klamath Basin	<p>Bull trout are currently listed as threatened under the ESA. In the upper Klamath Basin, this species is confined to the far upper reaches of the watershed.</p> <p>Bull trout populations in the Klamath Basin face a high risk of extirpation and are considered extinct in California. Threats to bull trout in the Klamath Basin include habitat loss and degradation caused by reduced water quality, land use, water diversions, roads, and non-native fishes.</p>	KBRA implementation would likely accelerate compliance with TMDL water quality objectives in the upper basin, thereby improving conditions for this species and increasing overall population abundance and spatial distribution.
<b>Pacific Lamprey</b> in the Klamath Main stem	<p>Pacific lamprey have experienced sharp declines in the Klamath River and was petitioned for listing under the ESA in 2003.</p> <p>The Four facilities have blocked the range of Pacific lamprey to areas upstream of Iron Gate Dam.</p>	Removal of the dams is considered to be the only feasible method for expanding the current range of Pacific lamprey above Iron Gate Dam. Dam removal with KBRA implementation could increase Pacific lamprey production by up to 14 percent compared with dams remaining in place. The increase production could potentially be more if habitat in the upper Klamath Basin is accessible and suitable.
<b>Native Lamprey</b> present in the mainstem and upper basin (five resident species)	Native lamprey has experienced sharp declines in the Klamath River and upper basin with three species petitioned for listing under the ESA in 2003.	<p>Dam removal would eliminate the adverse effects of power peaking on resident lamprey species in the Klamath Hydroelectric Reach.</p> <p>Dam removal and KBRA implementation would likely increase lamprey populations as physical, chemical, and biological processes of the Klamath River were restored.</p> <p>Capacity for the freshwater-resident lamprey species in the upper Klamath Basin may increase with implementation of the KBRA aquatic habitat restoration measures.</p>
<b>Eulachon</b> in the Klamath estuary	Eulachon were historically abundant, but currently are rarely observed in the lower Klamath River and Estuary. The Southern Distinct Population Segment of eulachon, which includes the Klamath River, is ESA listed as threatened.	With dam removal and KBRA implementation, and implementation of the TMDLs, water quality will improve in the estuary. It is anticipated that habitat restoration efforts under KBRA and water quality improvements could directly contribute to recovery of any remnant eulachon populations in the estuary.
<b>Green Sturgeon</b> - in the lower 67 miles of the Klamath River	Green sturgeon is designated as a Species of Concern by NOAA Fisheries Service. Their habitat has been affected by the dams' alteration of river temperature and flow regime.	Dam removal and KBRA implementation would return the Klamath River water temperatures and flow regime to a condition that more closely mimics historical patterns and would likely benefit green sturgeon populations.

### ES.3 WHAT WOULD DAM REMOVAL ENTAIL, WHAT MITIGATION MEASURES MAY BE NEEDED, AND WHAT WOULD THESE ACTIONS COST?

The TMT developed a detailed deconstruction plan, titled *Detailed Plan for Dam Removal – Klamath River Dams* (Reclamation 2011b). This plan integrated requirements in the KHSA for hydroelectric operations through 2019; considered the full range of flow conditions that could be encountered during dam removal; considered the unique features of each dam and each reservoir; and, considered reservoir drawdown rates that minimize bank slumping and address the need to minimize impacts on the ecosystem.

Reservoir drawdown and facilities removal was designed to minimize impacts on fish species and to protect threatened coho salmon. These goals resulted in the formation of a plan that calls for drawdown of the three larger reservoirs in the winter of a single year (2020). The plan ensures that the majority of reservoir sediments are transported downstream in January through March 15 when coho salmon, along with several other native fish species, are not present in large numbers in the Klamath River mainstem. This time period also corresponds to higher river flows needed to erode and transport the fine-grained reservoir sediments to the Pacific Ocean (see Figure ES-13).

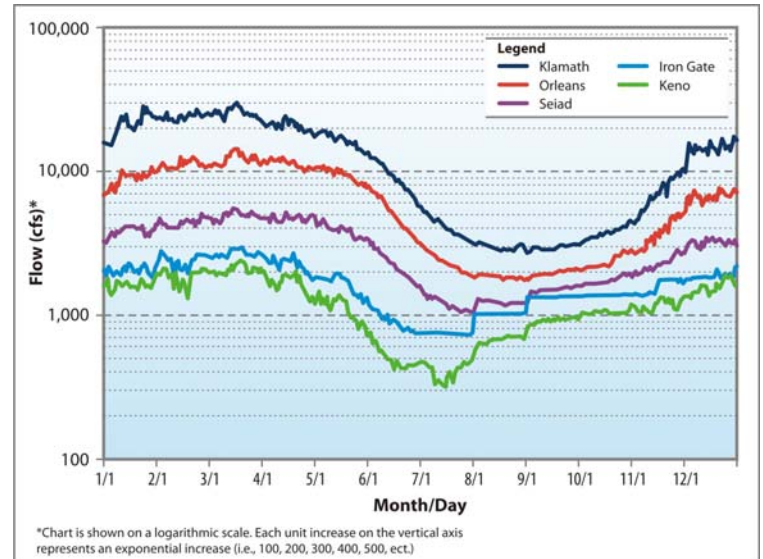
The dam embankments and structures would be removed over the remainder of 2020, taking into account river hydrology and safety considerations. Primary among these factors is the removal of the Iron Gate Dam embankment starting in June 2020 when flows in the Klamath River significantly decrease providing additional protection against the risk of the dam overtopping during its deconstruction.

With dam removal, and the associated drawdown of the reservoir, the reservoir bottoms would be exposed. The DRE would undertake revegetation efforts with the goal of establishing sustainable riparian, wetland, and upland habitats on the newly exposed reservoir bottoms as early as feasible after reservoir drawdown (spring time) and again in the fall. Hydroseeding would be employed with a mixture of native grasses; riparian and wetland plantings would also be established.

#### Partial Dam Removal

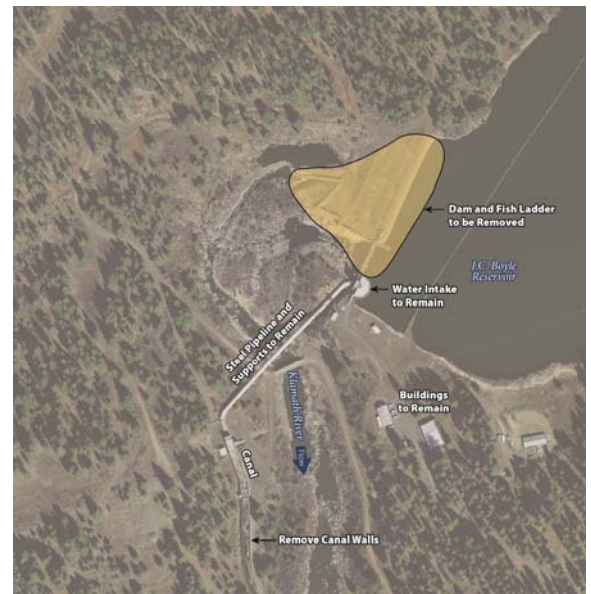
The TMT also evaluated partial removal of the Four Facilities to achieve a free flowing river (see Figure ES-14 through 17). Partial facilities removal would remove most if not all portions of the Four Facilities while some other portions of the Four Facilities (e.g. pipelines, penstocks, and

**Figure ES-13: Chart of the median monthly flows in the Klamath River at specific USGS gages. Reservoir drawdown is planned to occur from January through March 15 (2020), coinciding with typically high flows in the Klamath River.**



Source: Reclamation 2011b

**Figure ES-14: Partial removal of J.C. Boyle Dam would include removal of embankment dam and fish ladder, providing a free flowing river and allowing full volitional fish passage. However, certain structures, including the steel pipeline and supports, would be retained.**





**Figure ES-15: Partial removal of Copco 1 Dam would include removal of the concrete dam, providing a free flowing river and allowing full volitional fish passage. Certain structures, including the penstocks and powerhouse, would be retained.**



**Figure ES-16: Partial removal of Copco 2 Dam would include removal of spillway gates, providing a free flowing river and allowing full volitional fish passage. Certain structures, including the water intake and embankments, would be retained.**



powerhouses) would remain in place. Leaving a portion of the Four Facilities in place would result in the same aquatic effects (short-term and long-term) as full facility removal but would require long-term maintenance (primarily to limit public access for safety) in exchange for reduced construction and mitigation costs.

The removal of Iron Gate Dam would compromise the existing water supply pipeline to the City of Yreka. Under terms of the KHSa, the DRE would modify the pipeline to allow continued water supply service to the City of Yreka. Preliminary designs for an elevated pipeline and steel pipeline bridge, as well as modifications to the water supply intake at Fall Creek, were prepared in order to estimate costs. If dam removal proceeds, final designs for the Yreka pipeline would be prepared in consultation with the City of Yreka.

**Figure ES-17: Partial removal of Iron Gate Dam would include removal of embankment dam, providing a free flowing river and allowing full volitional fish passage. Certain structures, including the spillway and powerhouse, would be retained.**



### ES.3.1 Mitigation Measures

Several mitigation measures were identified to help reduce the effects of dam removal as listed in Table ES-6. Additional mitigation actions may be identified at a later date in a “Definite Plan” for dam removal if there is an Affirmative Secretarial Determination. Moreover, a Record of Decision (ROD) on removal of the Four Facilities could include additional mitigation actions. Additional mitigation actions would likely increase the estimated cost of dam removal.

**Table ES-6: Dam Removal Mitigation Measures**

Mitigation Measure	Action of the DRE
<b>Aquatic Species Relocation</b>	Capture out-migrating juvenile salmonids and Pacific lamprey from several tributaries and release them at locations to avoid the effects of high SSCs. Mussels in the Hydroelectric Reach and in the lower Klamath River downstream of Iron Gate Dam would be relocated to tributary streams or upstream of J.C. Boyle Reservoir.
<b>Protection of Downstream Water Intakes</b>	Modify any intake and pump sites in the lower Klamath River to reduce the temporary effects of high suspended sediment from dam removal.
<b>Protection of Culturally Significant Sites</b>	Protect cultural resource sites eligible for inclusion on the National Register of Historic Places and California Register through construction measures. Protect tribal artifacts or grave sites if encountered.
<b>New or Modified Recreation Facilities</b>	Identify new recreational facilities and river access points to replace facilities removed with the dams and reservoirs.
<b>Bridge and Culvert Relocation</b>	Replace or relocated the Jenny Creek Bridge (Iron Gate Reservoir) and some culvert crossings along Copco Road that could be compromised by reservoir removal.
<b>Bat Habitat Replacement</b>	Construct bat habitat near each dam site to replace bat habitat lost by removing the structures associated with the Four Facilities.
<b>Replace or Deepen Groundwater Wells</b>	Deepen or replace groundwater wells to restore production rates affected by groundwater level declines around Copco 1 and Iron Gate reservoirs.
<b>Reservoir Bottom (Parcel B Land) Fencing</b>	Install fencing around newly exposed reservoir bottoms to protect revegetation and restoration efforts.
<b>Replace Lost Wetlands</b>	Mitigate or replace wetlands, estimated at less than 20 total acres.
<b>Changes in the 100-year Floodplain Downstream of Iron Gate Dam (River Miles 190-172)</b>	Work with willing land owners to flood proof, relocate, or protect against the increase in flood risk at affected structures (estimated to be less than six residences).
<b>Flood Warning System</b>	Inform FEMA of a planned major hydraulic change to the Klamath River that could affect the 100-year floodplain. Inform the National Weather Service’s River Forecast Center of the potential change in the system so they could develop new flood-routing models for their flood-warning system.

### ES.3.2 Estimated Dam Removal Costs

Table ES-7 presents a summary of the total costs for the full facilities removal scenario. The most probable cost is estimated at \$291.6 million (2020 dollars). The partial facilities removal scenario was estimated to be \$234.6 million, with an additional life cycle cost (annual maintenance through 2061) of \$12.4 million (2020 dollars) (see Table ES-8). A Monte Carlo-based simulation process was used to determine the one percent probability minimum and maximum cost ranges. The Monte Carlo-based simulation is a problem-solving technique used to approximate the probability of certain outcomes by running multiple trials using random variable simulations. It is based on a computerized mathematical technique that accounts for risk in quantitative analysis and decision-making.

**Table ES-7: Summary of Costs for Full Removal of all Four Facilities (2020 dollars)**

	Forecast Range		Most Probable <sup>1</sup>
	Minimum (Less than a 1% Chance the Actual Cost will be Below this Estimate)	Maximum (Less than a 1% Chance the Actual Cost will be Above this Estimate)	
Dam Facilities Removal			76,618,994
Reservoir Restoration			21,728,000
Recreational Facilities Removal			797,305
Yreka Water Supply Modifications			1,765,910
Mobilization and Contingencies <sup>2</sup>			50,728,393
Escalation to January 2020			36,461,398
<b>Subtotal (Field Costs)</b>	<b>157,600,000</b>	<b>301,200,000</b>	<b>188,100,000</b>
Engineering (20%) <sup>3</sup>			37,600,000
Mitigation (35%) <sup>4</sup>			65,900,000
<b>Total Construction Cost</b>	<b>238,000,000</b>	<b>493,100,000</b>	<b>291,600,000</b>

<sup>1</sup> The most probable costs were used in the economic analysis.

<sup>2</sup> Mobilization and contingencies includes the mobilization of construction equipment to the dam site, design and construction contingencies.

<sup>3</sup> Engineering costs include design data, engineering designs, permitting, procurement, construction management, and closeout activities.

<sup>4</sup> Mitigation includes environmental mitigation, monitoring, and cultural resources preservation.

**Table ES-8: Summary of Costs for Partial Removal of all Four Facilities (2020 dollars)**

	Forecast Range		Most Probable <sup>1</sup>
	Minimum (Less than a 1% Chance the Actual Cost will be Below this Estimate)	Maximum (Less than a 1% Chance the Actual Cost will be Above this Estimate)	
Dam Facilities Removal			52,096,172
Reservoir Restoration			21,728,000
Recreational Facilities Removal			797,305
Yreka Water Supply Modifications			1,765,910
Mobilization and Contingencies <sup>2</sup>			38,830,385
Escalation to January 2020			27,582,228
<b>Subtotal (Field Costs)</b>	<b>116,600,000</b>	<b>230,200,000</b>	<b>142,800,000</b>
Engineering (20%) <sup>3</sup>			28,400,000
Mitigation (45%) <sup>4</sup>			63,400,000
<b>Total Construction Cost</b>	<b>185,100,000</b>	<b>403,600,000</b>	<b>234,600,000</b>
<b>Total Life Cycle Cost</b>	<b>9,000,000</b>	<b>26,800,000</b>	<b>12,350,000</b>

<sup>1</sup> The most probable costs were used in the economic analysis.

<sup>2</sup> Mobilization and contingencies includes the mobilization of construction equipment to the dam site, design and construction contingencies.

<sup>3</sup> Engineering costs include design data, engineering designs, permitting, procurement, construction management, and closeout activities.

<sup>4</sup> Mitigation includes environmental mitigation, monitoring, and cultural resources preservation.

The States of Oregon and California collectively agreed to fund dam removal at a cost of up to \$450 million (2020 dollars) as defined in the KHSa. PacifiCorp customers in Oregon and California would pay \$200 million of this amount via a surcharge. The most probable cost estimates for full and partial facilities removal fall beneath this cost cap. The maximum projected cost for full facilities removal would exceed the cost cap by \$43 million (total \$493 million) (2020 dollars).

## **ES.4 WHAT ARE THE MAJOR POTENTIAL RISKS AND UNCERTAINTIES ASSOCIATED WITH DAM REMOVAL?**

Large dam removals involve inherent risks and uncertainties. Through the Detailed Plan and other studies, the TMT has identified four primary risks that could result in changes to the expected effects of dam removal or anticipated construction activities. Other project uncertainties, as described elsewhere in this Executive Summary, have been successfully quantified or studied to an extent that they are no longer categorized as risks. The four remaining dam removal risks are summarized below along with measures or plans to reduce the risk and uncertainty.

### **ES.4.1 Effects to Aquatic Species and Fisheries from Extended Downstream Sediment Transport**

Downstream sediment transport could result in risks to aquatic resources beyond those already anticipated (see ES 2.1) if mitigation, engineering and/or technical difficulties during dam removal extend the reservoir drawdown period. If the planned timeline for reservoir drawdown (January 1 through February 1) is not achieved, aquatic species would be exposed to high suspended sediment concentrations (SSCs) potentially extending into critical fish migratory periods. Extended exposure to SSCs could negatively affect fish in consecutive year classes and could have corresponding effects on commercial, tribal, and recreational fisheries.

Due to the uncertainty regarding the length of time over which high SSCs would occur if a problem arose during dam removal, the exact effects on aquatic resources and on basin fisheries is not known. To reduce this uncertainty, the Definite Plan for dam removal (to be developed if there was an Affirmative Secretarial Determination) would place an emphasis on provisions, planning, and extensive preparation to ensure high SSCs associated with reservoir drawdown would not extend past March 15. Aquatic species relocation mitigation measures (briefly described in Table ES-6) could be expanded or lengthened to remove fish from effects of high SSCs if they extend beyond March 15.

### **ES.4.2 Cost Exceedence to a Federal DRE**

The large and complex construction activities associated with removal of the Four Facilities have the potential to include unexpected changes or unforeseen events, which could result in project costs greater than those originally estimated. Also, project challenges could impede the dam removal process or extend the project timeline, and could result in the accrual of additional project costs.

Risk to a Federal DRE would occur during facilities removal if the DRE anticipated exceeding the state cost cap for dam removal but was unable to stop a portion of facilities removal due to safety considerations. Under these conditions, the Federal DRE could be incurring dam-removal expenses without a known source



of funding. As stated in the KHSa, the Federal government is not responsible for any dam removal costs. To reduce this potential risk, the DRE construction management team would utilize construction cost forecasting continuously during facilities removal to determine early whether cost overruns were likely and to give the Parties to the KHSa time to address funding issues in a timely manner.

### **ES.4.3 Short-term Flooding**

Small flooding risks during dam removal are associated with initial reservoir drawdown and dam excavation at either Iron Gate or J.C. Boyle dams stemming from (1) an overly rapid drawdown rate resulting in embankment instability and failure, or slumping of the exposed dam face; or (2) the possibility of flows from a large event exceeding the available water bypass capacity and overtopping the earthen dam embankment during dam removal.

To address this risk, the *Detailed Plan for Dam Removal - Klamath River Dams* specifies that the embankment sections at Iron Gate and J.C. Boyle dams be removed beginning June 1, 2020, with the full removal completed by September 15, 2020. This period corresponds to the lowest river flows and would allow for the construction of coffer diversion dams to route flows around the earthen embankments greatly reducing the risk of overtopping. The *Detailed Plan for Dam Removal- Klamath River Dams* also specifies the maximum reservoir drawdown rates to reduce the chance of embankment failure.

### **ES.4.4 Cultural and Historic Resources**

Dam removal and reservoir drawdown could affect five sites reported to be submerged in the reservoirs, as well as other unknown sites that may be submerged in the reservoirs, and any human remains associated with these sites. Culturally sensitive sites, artifacts, or human remains could be exposed when the reservoirs are drained as a result of (1) the river cutting a new channel, (2) decades of wind and wave action along the reservoirs' shores that caused localized scour, or (3) slumping of reservoir banks. Once exposed, these sites would need to be documented and protected from vandalism or looting. In addition, applicable Federal and state laws regarding cultural resources, historic preservation, and burials would be followed.

While every precaution would be taken to avoid disruption of these resources, in the case that they are discovered during dam removal and other construction activities, they pose a risk. Encountering traditional cultural properties or other culturally sensitive resources could affect the timeline and cost of dam removal.

## ***ES.5 IS FACILITIES REMOVAL IN THE PUBLIC INTEREST, WHICH INCLUDES, BUT IS NOT LIMITED TO, CONSIDERATION OF POTENTIAL EFFECTS ON LOCAL COMMUNITIES AND TRIBES?***

Dam removal and KBRA implementation would provide substantial social and economic benefits to the Klamath Basin. However, dam removal would also alter or change the availability or quality of some resources and would negatively affect specific recreational resources, jobs, and real estate values closely associated with the dams and reservoirs. Provided below is a summary of the potential effects of dam removal and KBRA implementation on national, regional, tribal, and local communities, including economic and non-economic effects.

### **ES.5.1 Summary of Effects to National Economic Development (NED)**

The National Economic Development (NED) account evaluates the net economic benefits of dam removal with implementation of the programs in KBRA. The period of analysis is 50 years, beginning in year 2012 with the first KBRA activity, and continuing through 2061. All benefits and costs were discounted back to year 2012 using the 2011 Federal water resources planning rate of 4.125 percent. Economic benefits were quantified for the following categories for the Dams In (current conditions without the KBRA) and Dams Out (dam removal with KBRA implementation) scenarios.

1. **Commercial fishing** – The Four Facilities affect stocks of SONCC coho salmon ESU and Klamath River fall- and spring-run Chinook salmon. Under dam removal, coho retention would likely continue to be prohibited in the California and Oregon troll fisheries south of Cape Falcon. Troll harvest of Klamath Chinook salmon is expected to increase by an average 43 percent (2012 to 2061 time period)<sup>2</sup> with dam removal. Annual net revenue associated with total Chinook salmon harvest (all stocks) would increase under dam removal. The difference in annual net revenue between the dams remain and dam removal scenarios would be an increase of \$7.296 million (2012 dollars) or a total of \$134.5 million for the 50-year period of analysis.
2. **In-river sport fishing** – The Four Facilities affect stocks for in-river recreational fisheries, including salmon, steelhead and redband trout, and the recreational sucker fishery, which has been closed since 1987. Dam removal would result in increased fish harvests, which would increase net economic values of in-river sport fishing. In-river recreational harvest of Klamath Chinook salmon is expected to increase by 8 percent (2012 to 2061 time period)<sup>2</sup>. The resulting average annual net economic value would

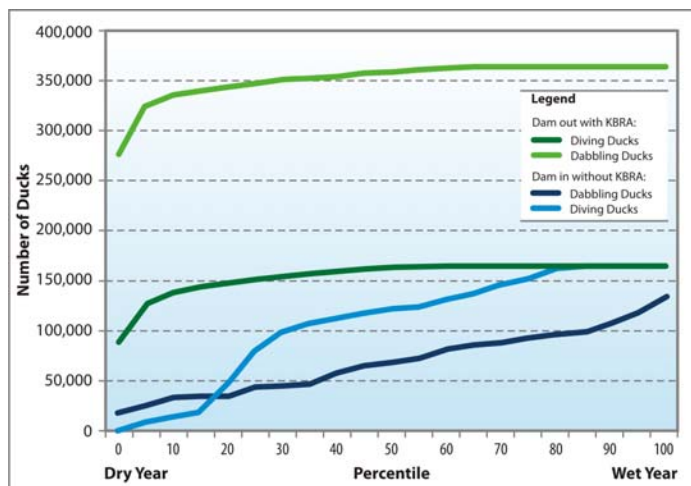
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<sup>2</sup> These values include on average the improvement to the fisheries that would occur from 2012 to 2020 prior to dam removal with the implementation of the KBRA measures. These averages would have been larger, as reflected in Section ES.2.2, if the 42-year period following dam removal was used.

increase \$126,000 per year (2012 dollars). The incremental river sport fishery benefits for dam removal equates to a discounted present value of \$1.75 million (2012 dollars) for the 50-year period of analysis. The prospects for restoration of the recreational sucker fishery appear limited for either a dams remain or dam removal scenario. The in-river sport fishing economic value does not include likely increases in steelhead and redband/rainbow trout fisheries, which was not quantified.

3. **Ocean sport fishing** - The ocean recreational harvest of Klamath Chinook salmon is expected to increase by 43 percent (2012 to 2061 time period)<sup>2</sup> under dam removal. Increased Klamath Chinook salmon availability would result in increased annual net economic values related to ocean sport fishing. Existing regulations for the recreational coho salmon fishery in California and Oregon are expected to continue in the future under both the dams remain and dam removal scenarios. The average annual increase in net economic value (for all areas combined) under a dam removal scenario is \$2.865 million (2012 dollars). The incremental ocean sport fishery benefits for dam removal equates to a discounted present value of \$52.9 million (2012 dollars) for the 50-year period of analysis.
4. **Irrigated agriculture** - Increased water supplies during dry and drought years under the dam removal and KBRA implementation would increase gross farm revenues from irrigated agriculture, which would result in economic benefits in about one out of every 10 years. The difference in net revenue between the dams remain and dam removal scenarios would be an increase of \$29.89 million (2012 dollars) over the 50-year period of analysis.

*Figure ES-18: On the Lower Klamath NWR, the fall carrying capacity for dabbling and diving ducks (migratory waterfowl) would be greater with dam removal and implementation of the KBRA in both wet and dry years although the difference is more pronounced in dry years.*



5. **Refuge recreation** - Dam removal and KBRA implementation are estimated to increase waterfowl abundance at refuges and hunting trips to the refuges (see Figure ES-18). Increased hunting trips would result in increased economic value related to waterfowl hunting activities. The difference in net revenue between the dams remain and dam removal scenarios would be an increase of \$4.3 million (2012 dollars) over the 50-year period of analysis.

6. **Nonuse values** - Nonuse values were estimated using a stated preference (SP) survey. The survey collected information from households in three strata: the 12-county Klamath area; the rest of Oregon and California; and the rest of the nation. Through their stated willingness to pay for specific scenarios for ecosystem restoration within the Klamath Basin, survey respondents indicated they placed significant value on the KBRA, the KHSR, and the restoration of Klamath Basin resources. Overall, the study results indicated that the majority of respondents in the Klamath 12-county area, in the two states, and throughout the rest of the nation, are concerned about declines of Chinook salmon and steelhead trout that return to the Klamath River, are concerned about the extinction of fish species in the Klamath Basin; and, they agree that restoration should be guided by an

action plan that includes Klamath dam removal, water sharing agreements, and basin restoration. Using a conservative methodology for determining the nonuse value associated with Klamath dam removal and restoration of Klamath Basin resources, the survey identified \$15.6 billion in nonuse benefits.

Table ES-9 summarizes estimated economic benefits for the above categories. Some economic benefits, including in-river steelhead fishing, redband trout fishing, and refuge wildlife viewing could not be readily quantified and monetized because sufficient data for an analysis was not available. Improved Klamath Basin fisheries would also provide benefits that cannot be quantified to tribes because of the expansive and integral value of fish to tribal members and tribal culture. Given the positive effects of dam removal on fishery resources and refuge recreation, it is expected that tribal benefits associated with these categories would also be positive. The NED analysis compares economic benefits and costs of the dam removal with KBRA Implementation scenario with dams remain without the KBRA (see Table ES-9). Costs include construction costs related to dam removal, site mitigation, and KBRA implementation. In addition to costs incurred from dam removal, there would be some costs savings related to lowered operation, maintenance and replacement (OM&R) costs of the Four Facilities following dam removal.

Dam removal would also result in some foregone benefits which occur when the dam removal scenario provides fewer benefits than the dams remain scenario. Foregone benefits occur in the following categories:

1. **Hydropower** – The Four Facilities would generate an average of 895,847 megawatt hours of electricity annually over the period 2012-2061 if the existing dams were left in place and planned efficiency upgrades were completed. Under the dam removal scenario, the Four Facilities would operate normally during 2012–2019 (8 years). After this time period, the production of electrical energy and capacity at the Four Facilities would be zero from January 1, 2020 through the end of 2061 (42-years). Under a dam removal scenario, the estimated mean present value of hydropower economic benefits was approximately \$289.2 million (2012 dollars), over the 50-year period of analysis. Relative to the dams remain scenario, this represents a mean reduction in economic benefits of approximately \$1.32 billion (2012 dollars).
2. **Whitewater boating** - With dam removal, whitewater boating activity on the upper Klamath River would decrease beginning in 2020 because of the dependence of water releases from the J.C. Boyle Dam to provide sufficient and predictable flows, primarily for whitewater boating in the heavily used Hell's Corner Reach. The average number of days with acceptable flows for whitewater boating on the Hell's Corner Reach would decline by 47 percent during the five month period from May through September. The total discounted loss in economic value associated with whitewater boating recreation with dam removal is estimated at \$6.1 million for the 50-year period of analysis.

3. **Reservoir recreation** - With dam removal, the use of reservoirs for flat-water boating, fishing and other uses would be lost. The dam removal scenario results in a loss of 2.03 million total recreation days. The total discounted loss in economic value associated reservoir recreation is \$35.4 million for the 50-year period of analysis.

**Table ES-9: Total Net Benefits and Costs Summary for Dam Removal and Implementation of the KBRA**

Benefit and Foregone Benefit Categories	Period of Analysis (2012-2061) Discounted Value – Difference between Dams Out and Dams In (\$ millions; 2012 dollars)
Commercial Fishing (Klamath Chinook Salmon Harvest)	134.5
In-River Sport Fishing (Chinook Salmon Fishery)	1.8
Ocean Sport Fishing	52.8
Irrigated Agriculture	29.9
Refuge Recreation	4.3
Hydropower (foregone)	-1,320.1
Whitewater Boating (foregone)	-6.1
Reservoir Recreation (foregone)	-35.4
<b>Nonuse Values<sup>1</sup></b>	
<u>12-county Klamath Area in OR and CA</u>	
Total Nonuse Value	67.0
Total Economic Value	217.0
<u>Rest of OR and CA</u>	
Total Nonuse Value	2,091.0
Total Economic Value	9,071.0
<u>Rest of the U.S.</u>	
Total Nonuse Value	13,487.0
Total Economic Value	74,983.0
<b>Unquantified Benefits</b>	
Tribal Commercial Fisheries	Insufficient data to quantify benefits.
Tribal Cultural Values (including ceremonial and subsistence uses)	Applying a traditional economic framework is not appropriate.
In-river Steelhead and Redband trout Sport Fishing	Insufficient data to quantify benefits
Refuge Wildlife Viewing	Insufficient data to quantify benefits
Cost Categories (Total Quantified Costs)	Period of Analysis (2012-2061) Discounted Value – Difference between Dams Out and Dams In (\$ millions; 2012 dollars)
KBRA Restoration	474.1
Facility Removal	129.1
Site Mitigation	37.7
OM&R (cost savings)	-188.9
<b>Unquantified Costs</b>	
Real Estate Values	Insufficient data to quantify costs
Hydropower Ancillary Services	Explicit consideration of ancillary services was outside the scope of this analysis.
Regional Powerplant Emissions	The hydropower analysis described in this document does not fully consider the effect, if any, of changing hydropower production levels on system-wide powerplant emissions or regional air quality.

The NED benefit cost analysis (BCA) indicates that the net economic benefits of Dam Removal and Implementation of the KBRA are strongly positive. For both partial and full facilities removal the NED BCA ranges from approximately nine to

one to forty-eight to one (see Table ES-10). This implies that dam removal and KBRA implementation (including the partial facilities removal option) is justified from an economic perspective.

**Table ES-10: Benefit Cost Analysis Summary for Dam Removal and Implementation of the KBRA<sup>1</sup>**

	Costs		Benefits		Net Economic Benefits		Benefit/Cost Ratio	
	Low	High	Low	High	Low	High	Low <sup>2</sup>	High <sup>2</sup>
<b>Full Facilities Removal</b>	1,772.1	1,813.6	15,868.3	84,435.4	14,054.7	82,663.3	8.7 to 1	47.6 to 1
<b>Partial Facilities Removal</b>	1,746.4	1,787.9	15,868.3	84,435.4	14,080.4	82,689.0	8.9 to 1	48.3 to 1

<sup>1</sup> The costs and benefits presented here represent quantifiable costs and benefits; there are also unquantifiable costs and benefits (as shown in Table ES-9) that are not possible to include in the calculation of total costs and benefits. The most probable dam removal costs as shown in Tables ES-7 and ES-8 were used in the economic analysis.

<sup>2</sup> Low estimate (Low Benefit Estimate divided by High Cost Estimate: these estimates are based on nonuse value including recreation use benefits and forgone recreation use values). High estimate (High Benefit Estimate divided by Low Cost Estimate: these estimates are based on total economic value adjusted by removing recreation use benefits and forgone recreation use values).

## ES.5.2 Summary of Effects to Regional Economics (RED)

Dam removal actions have short-term and long-term positive and negative effects on jobs in the regional economy. Construction activities associated with dam removal, mitigation actions, and implementation of KBRA programs would add jobs, labor income, and economic output to the region in the short-term (2012 -2026). For example, jobs associated with KBRA implementation spending would span 15 years, jobs associated with dam removal would likely span just a single year, and jobs associated with mitigation measures would span about 8 years. Over the longer term, dam removal and KBRA programs would result in the addition of jobs in the region related to irrigated agriculture, commercial fishing, in-river sport fishing, ocean sport-fishing, and refuge recreation. Added jobs in these areas would increase regional labor income and economic output; producing a long-term positive effect on regional economic development.

Dam removal would eliminate long-term jobs related to annual operation and maintenance (O&M) expenditures associated with the Four Facilities. In addition, changes to whitewater boating opportunities and loss of open-water and flat-water recreation activities at the Klamath Hydroelectric Project reservoirs would also result in lost regional jobs.

Implementation of the KHSA and KBRA would add regional short-term and long-term jobs and would increase labor income and regional economic output. Added jobs include full time, part time, and temporary positions. Table ES-11 summarizes the changes in jobs, labor income, and regional output for the specific region modeled (color coding is used to differentiate the regions) and the timeframe of the jobs. This regional economic analysis compares two scenarios: dam removal and implementation of the KBRA, and leaving the dams in place without implementation of the KBRA. Jobs, labor income, and regional output were generated using IMPLAN, which estimates regional impacts based on the makeup of the economy at the time of the underlying IMPLAN data

**Figure ES-19: Jobs and Regional Economic Output would increase in all of the five Commercial Fishing Management Areas with Dam Removal.**



(2009). It is important to note that regional impacts were analyzed by scenario specific definitions, periods of occurrence, and other factors; therefore, the potential impacts (such as jobs) should not be summed across a category or region.

The largest decrease in annual average jobs (estimated at 49) and average annual regional output (- \$5 million) associated with dam removal would occur because of reduced spending on Operation and Maintenance of the Four Facilities between 2020 and 2061 (Table ES-11). The largest increases in jobs and regional output would be associated with dam decommissioning, implementation of mitigation actions associated with dam decommissioning, implementing the KBRA programs, and the resultant improvements in agricultural (during drought years) and commercial fishing. Dam decommissioning would result in an estimated 1,400 regional jobs and a regional output of \$163 million; these would occur during the single year of dam decommissioning in 2020. Implementing mitigation measures would result in an estimated 217 short-term jobs and regional output of \$30.86 million between 2018 and 2025; annual jobs and annual regional output would vary year by year proportionate to actual regional spending. Implementation of KBRA programs would result in about 300 annual jobs (4,600 jobs over 15 years) and \$29.6 million in average annual regional output from 2012 through 2026. Jobs and regional output estimates would also vary year by year proportionate to actual KBRA regional spending. Through the KBRA Water Program, agriculture would not decrease as markedly during drought years (which occur about once every 10 years) and would result in an estimated 70 to 695 more jobs (depending on the severity of the drought) than would occur without KBRA. The corresponding range of the estimated increase in regional output would be \$9 to \$84 million. Implementation of the two agreements would improve commercial fishing in five management areas along the Oregon and California coastlines. The three largest average annual increases would be in the San Francisco Management Area (219 jobs and \$6.6 million), Central Oregon Management Area (136 jobs and \$4.07 million), and Fort Bragg Management Area (69 jobs and \$2.41 million) (Table ES-11).

**Table ES-11: Average Annual Change in Jobs (Full Time, Part Time, or Temporary), Regional Labor, Income, and Regional Output for Dam Removal and Implementation of the KBRA (by Region, Activity, and Timeframe)<sup>1</sup>**

Economic Region	Activities under Dams Out with KBRA Scenario	Regional Full Time, Part Time or Temporary Jobs - Dams Out with KBRA Scenario (Incremental Change in Jobs from Dams In Scenario)	Regional Labor Income (Incremental Change in Million \$; 2012 dollars)	Regional Output (Incremental Change in Million \$; 2012 dollars)	Timeframe <sup>2</sup>
Klamath County OR; Siskiyou County CA	Dam Decommissioning	1,400 <sup>3</sup>	60	163	2020
Klamath County OR; Siskiyou County CA	O&M	-49	-2.05	-5	2020 – 2061
Klamath County OR; Siskiyou County CA	Mitigation	217 <sup>4</sup> (total jobs 2018 to 2025)	10.01	30.86	2018 – 2025
San Francisco Management Area (San Mateo, San Francisco, Marin and Sonoma Counties CA)	Commercial Fishing	218	2.56	6.6	2012 – 2061
Fort Bragg Management Area (Mendocino County CA)	Commercial Fishing	69	1.05	2.41	2012 – 2061
KMZ-CA (Humboldt and Del Norte Counties CA)	Commercial Fishing	19	0.07	0.19	2012 – 2061
KMZ-OR (Curry County OR)	Commercial Fishing	11	0.06	0.13	2012 – 2061
Central Oregon Management Area (Coos, Douglas and Lane Counties OR)	Commercial Fishing	136	1.74	4.07	2012 – 2061
Klamath County OR; Siskiyou County CA	Reservoir Recreation	-4	-0.13	-0.31	2021 – 2061
Klamath County OR; Del Norte, Humboldt, and Siskiyou Counties CA	In River Sport Salmon Fishing	3	0.07	0.15	2012 – 2061
KMZ-CA (Humboldt and Del Norte Counties CA)	Ocean Sport Fishing	5.5	0.18	0.48	2012 – 2061
KMZ-OR (Curry County OR)	Ocean Sport Fishing	1.2	0.02	0.09	2012 – 2061
Klamath and Jackson counties OR; Humboldt and Siskiyou counties CA	Whitewater Boating	-14	-0.43	-0.89	2021 – 2061



**Table ES-11: Average Annual Change in Jobs (Full Time, Part Time, or Temporary) for Dam Removal and Implementation of the KBRA (by Region, Activity, and Timeframe)<sup>1</sup>**

Economic Region	Direct KBRA Activities	Regional Full Time, Part Time or Temporary Jobs - Dams Out with KBRA Scenario (Incremental Change in Jobs from Dams In Scenario)	Regional Labor Income (Incremental Change in Million \$; 2012 dollars)	Regional Output (Incremental Change in Million \$; 2012 dollars)	Timeframe <sup>3</sup>
Klamath County OR; Siskiyou and Modoc Counties CA	Irrigated Agriculture <sup>5</sup>	2027: 112 2043: 695 2045: 397 2051: 187 2059: 70	2027: 2 2043: 11 2045: 7 2051: 4 2059: 2	2027: 13 2043: 84 2045: 41 2051: 20 2059: 9	2027, 2043, 2045, 2051, 2059
Klamath County OR; Siskiyou County CA	Refuge Recreation	5	0.12	0.27	2012 – 2061
Klamath County OR; Siskiyou, Modoc, Humboldt, and Del Norte Counties CA	KBRA Fisheries Program	261	12.4	25	2012 – 2026
Klamath County OR; Siskiyou, Modoc, Humboldt, and Del Norte Counties CA	KBRA Water Resources Program	16	0.7	1.6	2012 – 2026
Klamath County OR; Siskiyou, Modoc, Humboldt, and Del Norte Counties CA	KBRA Regulatory Assurances	10	0.5	1	2012 – 2026
Klamath County OR; Siskiyou County CA	KBRA County Programs	Klamath County: \$3.2 million would increase jobs, labor income and output. Siskiyou County: \$20 million would increase jobs, labor income and output.			
Klamath County OR; Siskiyou, Modoc, Humboldt, and Del Norte Counties CA	KBRA Tribal Programs	Karuk: 8 Klamath: 8 Yurok: 10	Karuk: 0.35 Klamath: 0.39 Yurok: 0.45	Karuk: 0.55 Klamath: 0.64 Yurok: 0.81	2012 – 2026

<sup>1</sup> It is not appropriate to add jobs across years, as the job estimates provided represent average annual changes rather than annual changes that accumulate in each year of the study period. Jobs for the Direct KBRA Activities were averaged over the 15 year timeframe and could be higher or lower in any year.

<sup>2</sup> These employment impacts are anticipated to occur on the first day of the timeframe identified and persist over the period. For example, dam decommissioning is estimated to have an employment impact of 1,400 jobs. These jobs would start on January 1, 2020 and persist until December 31, 2020. Similarly, the loss of 49 operation and maintenance jobs would be anticipated to start on January 1, 2020.

<sup>3</sup> Jobs created during dam removal would occur for one year in 2020.

<sup>4</sup> Jobs reported related to mitigation spending are reported as a total over the mitigation period of 2018-2025.

<sup>5</sup> Regional economic impacts stemming from irrigated agriculture were estimated to be equal in all years except for the years in the hydrologic model that correspond with the drought years of 1975, 1992, 1994, 2001, and 2008. The values presented are annual totals for the modeled drought years.

LEGEND:	
	Klamath County OR; Siskiyou County CA
	San Francisco Management Area
	Fort Bragg Management Area
	KMZ-CA
	KMZ-OR
	Central Oregon Management Area
	Klamath County OR; Del Norte, Humboldt, and Siskiyou Counties CA
	Klamath and Jackson counties OR; Humboldt and Siskiyou counties CA
	Klamath County OR; Siskiyou and Modoc Counties CA
	Klamath County OR; Siskiyou, Modoc, Humboldt, and Del Norte Counties CA

### ES.5.3 Tribal

Dam removal and implementation of the KBRA would help protect tribal trust resources and address various social, economic, cultural, and health problems identified by the six federally recognized Klamath Basin tribes (Klamath, Karuk, Yurok, Resighini Rancheria, Quartz Valley, and Hoopa Valley) (See Table ES-12). Dam removal would have beneficial effects on water quality, fisheries, terrestrial resources, and traditional cultural practices. Primary among these are greater anadromous fish harvests for some tribes in the lower basin, a return of salmon and steelhead to the upper basin for the Klamath Tribes, and a restoration of Klamath Tribes sucker fisheries. In addition, dam removal would enhance downstream water quality and the ability of Indian tribes in the Klamath Basin to conduct traditional ceremonies and other traditional practices. Implementation of the KBRA would provide funds to the signatory tribes (Klamath, Yurok, and Karuk) for restoration and monitoring projects which would create jobs for tribal members.

*Figure ES-20: Dense summer and fall blue-green algae (Cyanobacteria) blooms in Iron Gate Reservoir produce toxic microcystin resulting in poor water quality for fish and public health posting by the State of California. Known and/or perceived concerns over health risks associated with seasonal algal toxins have resulted in the alteration of traditional cultural practices, such as gathering and preparation of basket materials and plants, fishing, ceremonial bathing, and ingestion of river water (Photo courtesy of Karuk Tribe.)*



**Table ES-12: Common Benefits to all Indian Tribes with Dam Removal and Implementation of the KBRA**

Major Water and Aquatic Resource Benefits of Dam Removal and KBRA Implementation	
Water Resources	
Hydrology	More natural river hydrology. Natural flushing flows would benefit aquatic species and riparian vegetation.
Water Quality	Natural temperature regime and improved water quality would benefit aquatic life.
Toxic Blue Green Algae	Free flowing river segments would deter conditions that lead to toxic algal blooms and reduce human health concerns.
Aesthetics	Improvements in water quality would improve aesthetics and ceremonial opportunities that require a healthy river.
Aquatic Resources	
Traditional Lifestyle	Greater fisheries abundance would bolster opportunities for transmitting traditional knowledge to successive generations, including the important practice of giving fish to elders. Improved social cohesion and function among Indian populations through strengthened sense of tribal identity.
Cultural and Religious Practices	Improved fish abundance would facilitate the tribes' ability to reinstate and continue to practice ceremonies in their historic, complete forms at the appropriate times of the year, thereby improving tribal identity.
Standard of Living	Increased fish abundance would contribute to greater food supply and food security for the Indian population, enhancing standard of living.
Health	Greater opportunity for healthy food consumption associated with increased subsistence fishing opportunities, which would improve overall health conditions.

### **ES.5.4 Previous PacifiCorp Analyses of Relicensing versus Removal of the Four Facilities and Public Utility Commission Rulings**

A prerequisite to the \$200 million (2020 dollars) customer surcharges necessary for KHSa implementation was concurrence from the California Public Utility Commission (CPUC) and the Oregon Public Utility Commission (OPUC) with PacifiCorp's conclusion that implementing the KHSa would be in the best interest of their customers and that the incremental increases were fair and reasonable. PacifiCorp's records and testimony before both commissions compared two scenarios: (1) customers' cost and risks under the KHSa dam removal, and (2) customers' cost and risks from relicensing the Four Facilities. (It is important to note that the TMT did not evaluate the potential costs or risks to PacifiCorp customers for relicensing the dams.)

PacifiCorp reported that relicensing would require implementing new mandatory flow conditions for the project (decreasing power generation by 20 percent and reducing peaking-power opportunities), constructing and operating fish passage at the dams, and addressing water-quality issues in and below the reservoirs. PacifiCorp estimated these actions would cost in excess of \$460 million (2010 dollars) in capital and operating expenses. PacifiCorp also reported that these are uncertain and uncapped costs and thus represent a substantial financial risk to its customers. For example, if fish passage measures installed at the Four Facilities were unsuccessful, upgraded facilities, altered operations, and/or dam decommissioning may be required, and these additional uncapped expenses would likely be borne by PacifiCorp customers.

In PacifiCorp's analysis of the financial impacts of dam removal, they assumed that customer costs associated with dam removal would be capped at \$172 million in 2010 dollars (or \$200 million in 2020 dollars). Implementing Interim Measures (as defined in KHSa Appendix C and D) would cost about \$79 million (2010 dollars); these costs would be largely capped and would carry only a small financial risk for its customers. In addition, PacifiCorp customers would also have to pay for replacement power after removal of the Four Facilities in 2020.

Table ES-13 provides a summary of PacifiCorp's analysis of the above two scenarios in terms of operational changes, costs, risks, and liabilities to their customers. PacifiCorp's analysis submitted to the CPUC and OPUC demonstrated that the KHSa resulted in less cost and less risk for its customers as compared to FERC relicensing, even with the inclusion of costs associated with replacement power. The CPUC concluded that if "the KHSa surcharge is not instituted....ratepayers would be exposed to an uncertain amount of costs" associated with relicensing. The OPUC concluded that the KHSa "mitigates the risks associated with decommissioning and removal of the [four] facilities for PacifiCorp, and is therefore the least risky alternative for customers compared to relicensing" (OPUC 2011). Based on PacifiCorp's analysis and testimony, both PUCs agreed with the company's analysis and approved collection of the customer surcharges necessary to fund the removal of the Four Facilities in 2020, as described in KHSa.

**Table ES-13: Operations, Costs, Risks, and Liabilities for FERC Relicensing and Removal of the Four Facilities, Based on PacifiCorp Analyses**

PacifiCorp's Future Hydroelectric Project Scenario	Operations at the Four Facilities	Operations, Risks, and Liabilities	
		PacifiCorp's Estimated Customer Costs	PacifiCorp Customer Risks and Liabilities
<b>FERC Relicensing</b>	Four Facilities continue to operate, but mandatory conditions would require construction and operation of fish passage facilities (screens and ladders), 20 percent loss of hydropower. Substantial loss of power peaking at J.C. Boyle, and requirements to remedy water temperature quality issues below Iron Gate Dam.	In excess of \$400 million in capital costs; in excess of \$60 million in O&M over a 40-year license term.	Uncapped financial liability. Costs could exceed \$460 million, particularly if fish passage proves ineffective or if water quality does not meet OR or CA state standards. FERC could require PacifiCorp to decommission the facilities if it's unable to issue a new license with costs borne by PacifiCorp customers.
<b>KHSA Removal of the Four Facilities</b>	Continue operation under annual FERC licenses through 2019. Power generation would cease in January 2020 with transfer of the Four Facilities to a DRE.  Interim Measures (Appendix C and D of KHSA) would be implemented between 2012 and 2020 to enhance flow variability, water quality, fish habitat/health, and fund specified research and monitoring.	\$172 million for dam removal (\$200 million in 2020 dollars). Funds would be collected with a 9-year, 2 percent (or less) surcharge on OR and CA customers.  Customers would be responsible for KHSA Interim Measures at \$9 million in capital costs and \$70 million in O&M; and the costs for replacement power.	Customer financial liability for dam removal is capped at \$172 million (\$200 million in 2020 dollars).  Costs for Interim Measures are largely capped at \$79 million (2010 dollars).

## ES.6 OTHER SOCIAL AND ENVIRONMENTAL EFFECTS FROM DAM REMOVAL

In addition to the effects of dam removal on fisheries, national and regional economic development, tribal resources, and PacifiCorp's customers, there are several other important social and environmental resource considerations addressed in the Overview Report that will inform a determination on whether implementation of the KHSA and KBRA is in the public interest. Table ES-14 summarizes these additional resource considerations and the effects of dam removal and KBRA implementation on each.

**Table ES-14: Summary of Other Social and Environmental Effects of Dam Removal and KBRA Implementation**

Issue	Effect of Dam Removal/KBRA
<p><b>Prehistoric and Historic Cultural Resources:</b></p> <p>Numerous Indian tribal and early settler development sites in the Klamath River Basin are potentially eligible for inclusion on the National Register of Historic Places. These sites are part of the cultural and historic heritage of the area. Specifically, the Klamath Hydroelectric Project dams and facilities are recommended for inclusion on the National Register.</p>	<p>Removal of dams and associated hydroelectric facilities would permanently remove these resources from eligibility to the National Register. Additionally, dam removal could affect other sites. Consultations under Section 106 of the National Historic Preservation Act (NHPA) are being conducted and would continue, as appropriate, throughout planning and implementation if dam removal were to proceed in order to identify and protect these resources.</p>
<p><b>Wild and Scenic River:</b></p> <p>The US Forest Service, BLM and the National Park Service are responsible for Klamath Wild and Scenic River (WSR) management and are required by the WSR Act to make a determination whether dam removal is consistent with its river-resource protection requirements on the two components of the Klamath WSR.</p>	<p>Federal projects such as the proposed removal of the Four Facilities are consistent with the WSR's Section 7(a) protections when they do not "invade", or intrude within, the WSR boundary, nor "unreasonably diminish" its scenery, recreation, fish and wildlife values as they existed at the date of WSR designation.</p> <p>The Oregon component of the WSR below J.C. Boyle Powerhouse would experience a loss in whitewater boating opportunities as a direct result of dam removal. Overall, dam removal would improve scenery, recreation, and fish and wildlife values associated with the Oregon and California components of the Klamath WSR.</p>
<p><b>Recreation:</b></p> <p>The Four Facilities' reservoirs (excluding Copco 2) provide recreational opportunities including whitewater boating below J.C. Boyle powerhouse, power boating, waterskiing, lake swimming, flat-water boat angling, sightseeing, camping, and wildlife viewing.</p>	<p>The removal of the Four Facilities would result in a change to recreation opportunities. Open water recreation and camping at J.C. Boyle, Copco 1, and Iron Gate reservoirs would be permanently lost following dam removal. These losses could be partially replaced by other regional recreation resources. Whitewater boating would be reduced in the popular Hell's Corner Reach. Flat-water fishing opportunities would be lost at the reservoirs, while habitat improvements and dam removal would likely increase in-river fishing opportunities for salmon, steelhead and redband trout basin-wide.</p>
<p><b>Real Estate:</b></p> <p>Private development around Copco 1 and Iron Gate reservoirs occurred largely as a result of proximity to the reservoirs and their recreational/scenic values. Dam removal would change this important value attached to property values.</p>	<p>Existing lake recreational opportunities and scenic quality would change following dam removal and some property owners around Copco 1 and Iron Gate reservoirs would lose their reservoir views and reservoir access. Public access to the newly created river channel would be provided, and recreational opportunities would be available on and along the river.</p> <p>Scenic, recreational, and accessibility changes following dam removal would decrease the value of privately-owned parcels around Iron Gate and Copco 1 reservoirs in the near term. This decrease in value could not be quantified; a supplemental analysis is underway to provide additional information on the potential effect of reservoir removal on these property values and will include evaluations with a date of value of 2004 and 2006.</p> <p>Dam removal has the potential to increase the value of property near and adjacent to the Klamath River downstream of Iron Gate Dam due to improved water quality and more robust runs of anadromous fish.</p>

**Table ES-14: Summary of Other Social and Environmental Effects of Dam Removal and KBRA Implementation**

Issue	Effect of Dam Removal/KBRA
<p><b>Refuges:</b></p> <p>The Lower Klamath National Wildlife Refuge does not have a water allocation and experiences water delivery uncertainty and shortages in the critical April through October time period, particularly in dry years, which reduces wildlife species diversity and abundance.</p>	<p>Dam removal and KBRA implementation would allow the refuges within Reclamation’s Klamath Project to have greater certainty about water allocations and flexibility in water deliveries. Full refuge needs would likely be met in 88 percent of years. Historically, full refuge water needs in the April through October period have only been met in less than 10 percent of the years. Dam removal with KBRA implementation would also define and maintain the habitat benefits of “walking wetlands” and provide the refuges revenues from lease lands. Additional water deliveries with increased predictability, would improve bird numbers.</p> <ul style="list-style-type: none"> <li>• Waterfowl carrying capacity of fall migrating ducks would increase by 147,000 to 336,000.</li> <li>• Estimated additional wetland habitat for more than 8,000 additional nongame waterbirds (shorebirds, gulls, terns, cranes, rails, herons, grebes, egrets, and ibis) in an average water year, and 20,000 in drier years.</li> <li>• Greater waterfowl numbers will provide a larger and more reliable food resource base for wintering bald eagles.</li> </ul>
<p><b>Chemicals in Reservoir Sediments:</b></p> <p>Reservoir sediments contain low levels of contaminants that needed to be evaluated to determine if they could be eroded and transported downstream without adverse impacts to humans or other biota. In addition, the impact of human exposure to sediments not eroded downstream needed to be evaluated.</p>	<p>Impounded sediments were generally found to contain low levels of contaminants and can be considered relatively clean. Contaminant levels do not preclude their downstream release during dam removal. A screening level evaluation found that long-term adverse effects in the downstream areas and new river channel are unlikely for humans and aquatic and terrestrial biota.</p>
<p><b>Algal Toxins:</b></p> <p>Large algal blooms occur in Copco 1 and Iron Gate reservoirs during the summer months and produce the algal toxin microcystin; these reservoirs have posted health advisories warning against recreational use (water contact), drinking, and fish consumption. These health advisories extend to the lower Klamath River and at times, into the Klamath Estuary.</p> <p>Algal toxins in the Klamath River have impaired the ability of the Klamath, Resighini Rancheria, Karuk, Hoopa, Quartz Valley and Yurok Indian tribes to use the river for cultural purposes.</p>	<p>Dam removal would eliminate large, seasonal blooms of nuisance toxic algae in Copco 1 and Iron Gate reservoirs and facilitate the use of the Klamath River for multiple human health related beneficial uses, including traditional Indian cultural practices, recreation, agriculture, shellfish harvesting, and commercial, tribal, and sport fishing.</p>
<p><b>Green House Gasses:</b></p> <p>Dam removal would require power replacement in 2020 that would result in a net increase of greenhouse gas (GHG) emissions.</p>	<p>The Four Facilities would generate on average 909,835 MWh annually in 2020 through 2061 that would need to be replaced by other power sources if dams are removed. If PacifiCorp meets its California’s Renewable Portfolio Standard (RPS) goal in 2020 of 33% renewable, the metric tons of carbon dioxide equivalent (MTCO<sub>2</sub>e) emitted from replacement power, is approximately 451,000 MTCO<sub>2</sub>e per year. Removal of the reservoirs would reduce these emissions by approximately 4,000 to 14,000 MTCO<sub>2</sub>e per year (less than 1 percent) based on the reduction of methane gas emitted from reservoir bottom sediments.</p>

**Table ES-14: Summary of Other Social and Environmental Effects of Dam Removal and KBRA Implementation**

Issue	Effect of Dam Removal/KBRA
<p><b>Societal views on dam removal and the KBRA:</b></p> <p>Klamath dam removal and basin restoration (KBRA) could only move forward with fiscal resources from PacifiCorp customers, California taxpayers, and US taxpayers. What value do individuals and households place on Klamath Basin fisheries recovery and restoration?</p>	<p><u>Local Ballot Measures</u></p> <p>Local voting (November 2, 2010) results in Klamath County and Siskiyou County appear to be mixed, with a slight majority of Klamath County supporting participation in KBRA (52 %) and a large majority of Siskiyou County not supporting dam removal (79%).</p> <p><u>Non-use Value Survey Responses</u></p> <p>Responses to the nonuse value survey questions indicate a majority of respondents place a relatively high level of importance on improving the fisheries in the Klamath River Basin. This importance was indicated at the 12-county Klamath area level, statewide for Oregon and California, and for the rest of the nation.</p> <p>In response to a question inquiring about the level of concern with declines in the number of Chinook salmon and steelhead trout that return to the Klamath River each year, the majority of respondents expressed concern.</p> <ul style="list-style-type: none"> <li>• From the 12-county Klamath area, 73.8% expressed concern.</li> <li>• For the rest of Oregon and California, 82.5% expressed concern.</li> <li>• For the rest of the United States, 78.8% expressed concern.</li> </ul> <p>Respondents surveyed indicated that an action plan to remove the dams and restore the basin was preferred to no-action. No-action was defined as not implementing an agreement that includes dam removal, fish restoration, and a water sharing agreement.</p> <ul style="list-style-type: none"> <li>• From the 12 county Klamath area, 54.7% favored an action plan</li> <li>• For the rest of Oregon and California, 71.3% favored an action plan</li> <li>• For the rest of the United States, 66.3% favored an action plan</li> </ul>

## **Appendix C: Klamath Hydroelectric Settlement Agreement Implementation Progress Report**

**February 22, 2012**

### **General Settlement Implementation**

**Dam Removal Surcharge Approval** – On March 18, 2010, PacifiCorp filed applications with the California and Oregon public utility commissions requesting authorization to begin collecting dam removal surcharges from customers in those states. Regulatory orders from both the California and Oregon public utility commissions approving the collection of dam removal surcharges have since been issued, consistent with the framework for the Customer Contribution towards dam removal costs established in Section 4.1.1 of the Klamath Hydroelectric Settlement Agreement (KHSA). The OPUC order is available at <http://apps.puc.state.or.us/orders/2010ords/10-364.pdf>. The Oregon customer surcharges, with accrued interest, are designed to provide approximately \$184 million in funding for dam removal in 2020. The CPUC's final decision is available at: [http://docs.cpuc.ca.gov/PUBLISHED/FINAL\\_DECISION/134812.htm](http://docs.cpuc.ca.gov/PUBLISHED/FINAL_DECISION/134812.htm). The California customer surcharges, with accrued interest, are designed to provide approximately \$16 million in funding for dam removal in 2020. The surcharges on Oregon customers have been collected since March 18, 2010 while the surcharges on California customers began in January 2012. As of the end of January 2012, the combined balance of the Oregon and California dam removal trust accounts was \$28,336,773.78.

**401 Abeyance** - On March 19, 2010, PacifiCorp requested, pursuant to Section 6.5 of the KHSA and on behalf of the Parties except ODEQ, to the California State Water Resources Control Board (SWRCB) and the Oregon Department of Environmental Quality (DEQ) that permitting and environmental review for PacifiCorp's licensing activities be held in abeyance during the Interim Period. This request was subsequently granted by DEQ on March 29, 2010 and the SWRCB passed a resolution granting the abeyance, with conditions, on May 18, 2010.

**Keno Transfer** - Pursuant to KHSA Section 7.5.2, PacifiCorp and the Bureau of Reclamation (Reclamation) have developed an agreement in principle related to the potential transfer of the Keno development and expect to execute the agreement shortly.

### **Interim Conservation Plan Interim Measures and Endangered Species Act Regulatory Process**

PacifiCorp has applied to the U.S. Fish and Wildlife Service (FWS) and the National Marine Fisheries Service (NMFS) for ESA Section 10 permits to address potential take of listed species that could occur during the interim period prior to project removal under the KHSA. Since 2009, PacifiCorp has worked closely with NMFS and FWS to develop applications for ESA Section 10 permits consistent with agency regulations. In February 2011, PacifiCorp filed an application for an ESA Section 10 permit with NMFS relating



to a Habitat Conservation Plan for Coho Salmon. NMFS has taken public comment on the application and is in the process of completing its review of the application. Similarly, in August 2011, PacifiCorp filed an application for an ESA Section 10 permit with FWS to address potential take of sucker species that could potentially occur during the interim period, prior to Project removal. The application and related Habitat Conservation Plan identifies a protocol for implementing a Sucker Conservation Fund, and contemplates operational changes to the East Side/West Side development that will avoid take of listed suckers. After considering public comments on the application, FWS will similarly determine whether to issue an Incidental Take Permit that would authorize potential take associated with Project operations during the interim period prior to potential project removal.

### **Interim Measure 2: California Klamath Restoration Fund / Coho Enhancement Fund**

PacifiCorp has provided funding of \$2,040,000 into the Coho Enhancement Fund since the Interim Conservation Plan was released in November, 2008. Since 2009, NMFS and CDFG have selected 11 fund recipients to implement 25 projects to benefit coho salmon. PacifiCorp has developed a partnership with the National Fish and Wildlife Foundation (NFWF) to administer the fund. This partnership allows Coho Enhancement Fund grant recipients to be eligible for additional funding through other grant programs, further enhancing the conservation benefit of the fund. The recipients of Coho Enhancement Fund grants thus far are:

- Karuk Tribe: Seiad Creek Channel Restoration, Phase I, preliminary designs and stakeholder identification to realign Seiad Creek to a natural course to enable coho salmon potential year round habitat access.
- Karuk Tribe: Seiad Creek Channel Restoration, Phase II, final design and permitting.
- Mid Klamath Watershed Council: Seiad Creek Off-Channel Pond Habitat Construction.
- Siskiyou County Resource Conservation District: Fish Passage Improvement in the Scott River.
- Siskiyou County Resource Conservation District: Denny Ditch Fish Screen.
- Emmerson Investments: Shasta River Coho Habitat Project that will conserve and enhance more than 6 miles of Shasta river habitat with fencing as well as providing livestock stock water lanes.
- Gary Black, Grenada Irrigation District: Huseman Ditch point of diversion fish passage improvements allowing for 4.7 miles of stream to retain cold water.
- Scott River Water Trust: Scott River water acquisition program enabling critical coho streams to remain connected to the Scott River.
- Mid Klamath Watershed Council: Coho Rearing Habitat Enhancement with creation and restoration of more than 10 cold water refugia areas at their confluence with the middle Klamath.
- Mid Klamath Watershed Council: Middle Klamath Restoration Prioritization Project identify coho projects that will provide the greatest species benefit.

- Mid Klamath Watershed Council: Mid Klamath Tributary Fish Passage Improvement Project.
- Mid Klamath Watershed Council Seiad/West Grider Creek Winter Rearing Habitat Project.
- Yurok Tribe - Lower Klamath Coho Habitat Enhancement.
- Mid Klamath Watershed Council - Mid Klamath Coho Rearing Habitat Enhancement-II.
- Karuk Tribe: Seiad Creek Phase II, Final Design/Permitting and Construction Planning.

### **Interim Measure 3: Iron Gate Turbine Venting**

Following the installation of a new turbine venting blower system in early 2010, PacifiCorp conducted monitoring of the new system in later summer/fall 2010 to test its effectiveness. When turbine venting, in combination with the blower were used, dissolved oxygen (DO) saturation rose by 14.9 percentage points (a 29 percent increase) and the average DO concentration rose by 1.81 mg/L (a 33 percent increase) compared to ambient conditions. The increases in DO from turbine venting were seen throughout the study area which covered approximately 6 miles below the Iron Gate powerhouse.

### **Interim Measure 4: Hatchery and Genetics Management Plan**

On September 16, 2010 a Hatchery and Genetic Management Plan (HGMP) developed by CDFG and PacifiCorp for the Iron Gate Hatchery Coho Salmon Program was submitted to NMFS, and is currently under review. The HGMP program will operate in support of the Klamath River basin's coho salmon recovery efforts by conserving a fullrange of the existing genetic, phenotypic, behavioral and ecological diversity of the coho salmon run. The program's conservation measures, including genetic analysis, broodstock management, and rearing and release techniques, will maximize fitness and reduce straying of hatchery fish to natural spawning areas. Active broodstock management, based on real-time genetic analysis, will reduce the rate of inbreeding that has occurred in the hatchery population over time. Additionally, the increased proportion of natural-origin fish in the total hatchery spawning population will increase population diversity and fitness. Hatchery culture practices under the HGMP program will increase egg-to-smolt survival rates by increasing survival during egg incubation and covering raceways with netting to reduce bird predation.

### **Interim Measure 5: Iron Gate Flow Variability**

Consistent with Term and Condition 2A of NMFS's March 2010 Biological Opinion on the operation of Reclamation's Klamath Project, a technical group including NMFS, Reclamation, PacifiCorp, USFWS, states, and tribes have recommended changes to flows during the winter 2011/2012 time period and the delivery of variable flows at Iron Gate Dam. In response to recommendations from the technical workgroup, PacifiCorp has cooperated with Reclamation in delivering variable flow releases below Iron Gate dam

including a 5,000 cfs pulse flow event in February 2011 and various smaller pulse flow events during the winter of 2011/2012.

### **Interim Measure 6: Fish Disease Relationship and Control Studies**

Humboldt State University, Oregon State University, and the Karuk and Yurok Tribes are collaborating on a research project to examine how management actions could be focused to reduce the incidence of ceratomyxosis. Specific studies as part of the project include:

- Determine combinations of water hydraulics and sediment compositions that produce mortality in polychaetes;
- Measure the response of selected polychaete populations in the Klamath River to any experimental control actions over appropriate temporal and spatial scales; and
- Determine the relative contribution of species-specific genotypes of *Ceratomyxa shasta* from tributary and mainstem sources and determine seasonal myxospore abundance

PacifiCorp and NMFS have appropriated money from the Fish Disease Research Fund to implement these studies. This work is currently underway and results will be presented at the Annual Fish Disease Meeting in Klamath Falls, OR on March 27, 2012.

### **Interim Measure 7: J.C. Boyle Gravel Placement and/or Habitat Enhancement**

On October 3, 2011, the BLM issued a Finding of No Significant Impact (FONSI) for the proposed actions considered under Interim Measure 7 and Interim Measure 8 (discussed below). Between November 14 and 16, 2011, gravel was placed at two locations in the J.C. Boyle peaking reach of the Klamath River. Both locations are near campgrounds on the Klamath River. A conveyor truck was used to “shoot” approximately 250 cubic yards of gravel from the bank out into the Klamath River at each location.



## **Interim Measure 10: Water Quality Conference**

PacifiCorp provided the \$100,000 payment for the water quality conference to the California Coastal Conservancy in December 2011. The NCRWCB has taken the lead on the steering committee that will oversee the workshop development and has been active in securing additional funds to support workshop activities. The California Coastal Conservancy has matched PacifiCorp's funding and a consultant has been hired to assist with the workshop development.

## **Interim Measure 11: Interim Water Quality Improvements**

PacifiCorp and the Interim Measures Implementation Committee (IMIC) selected a series of studies and pilot projects to develop necessary information to inform the selection of water quality improvement projects to be implemented under the interim measure. These studies include:

**Evaluation of Treatment by Wetlands.** This study includes the following tasks: 1) use of wetland design tools to provide estimates of wetland size requirements to achieve nutrient load reductions at various assumed levels (including levels required in the TMDL); 2) an assessment of pretreatment methods options to enhance the effectiveness of a constructed treatment wetland; and 3) identification of logical next steps to more specifically ascertain the types, sizes, configurations, and locations of potential treatment wetlands. An interim progress report was presented to the IMIC at the August 2011 meeting in Sacramento, CA. The draft report will be reviewed by the IMIC in April 2012.

**Evaluation of Organic Matter Removal for Keno Reservoir.** This study includes an assessment of the potential use of hydrodynamic separation and/or screening to remove phytoplankton and larger particulate matter from the water as a means to reduce nutrient and organic matter loading in the Klamath River. A mechanical particle separator, designed as stormwater treatment technology, was adapted for use and tested on 2 separate occasions in the summer of 2011. A report will be issued to the IMIC once the final laboratory results are received.

**Evaluation of J.C. Boyle Reservoir Dissolved Oxygen Improvement.** The purpose of this study is to conduct planning for, and testing of, technologies for improving DO conditions in J.C. Boyle reservoir. Information is being gathered on commercially-available technologies for improving DO in the reservoir, including oxygenation, air injection, and mechanical mixing. Elements of this study also include DO testing and pilot projects of applicable technologies.

During September 26-30, 2011, BlueInGreen® LLC conducted a pilot test of their patented and patents pending Supersaturated Dissolved Oxygen Injection system (SDOX®) technology at the J.C. Boyle Reservoir on the Klamath River in south-central Oregon. The technology involves withdrawing a small stream of water from the body of water to be treated, bringing that stream up to a supersaturated dissolved oxygen concentration in the SDOX® system, and re-injecting that stream back into the main

water body, thereby increasing the dissolved oxygen concentration in the receiving water. The pilot demonstration showed formation of a dissolved oxygen plume mainly along the southern portion of the reservoir downstream of the injection point, and a rise in dissolved oxygen levels within the plume area. Data from this pilot project along with the information collected above will be part of the final study report that is still being developed.

**Testing of Intake Cover for Water Quality Control in Iron Gate Reservoir.** This activity involves the evaluation of a cover or barrier in the vicinity of the Iron Gate dam intake for water quality control, particularly algal blooms. In August 2011, a 12-foot high metal barrier was placed in front of the Iron Gate powerhouse intake and tested to see if it could be safely lowered and raised along the intake trashrack. The barrier was successfully deployed, and monitoring performed during this 2-day testing included velocity profiles, water quality and algae speciation data. After the laboratory results are completed, it is anticipated that a final report will be issued to the IMIC in June 2012.



**Test Treatment of Environmentally-Safe Algaecides in Copco Reservoir.** The purpose of this study is to conduct selective localized treatments of the environmentally-safe algaecides using water from Copco reservoir in isolated containers. In September 2011, lab studies were performed using water from Copco reservoir using various dosages of an algaecide. Pending the completion of laboratory reporting, it is anticipated that a final report will be distributed to the IMIC by June 2012.

**Klamath Tracking and Accounting Program.** PacifiCorp continues to work with the NCRWQCB, ODEQ, and USEPA Regions 9 and 10 to develop a Klamath basin water quality improvement tracking and accounting program. A final Protocol document has been developed and work is continuing on determining appropriate trade ratios for nutrient reductions within the Klamath basin.

## **Interim Measure 12: J.C. Boyle Bypass Reach and Spencer Creek Gaging**

PacifiCorp completed installation of the J.C. Boyle bypass reach gage in 2010 and the gage is functional and logging data. Gaging data for the Spencer Creek and J.C. Boyle bypass reach gages are available at the following web addresses:

[http://apps2.wrd.state.or.us/apps/sw/hydro\\_near\\_real\\_time/display\\_hydro\\_graph.aspx?station\\_nbr=11510000](http://apps2.wrd.state.or.us/apps/sw/hydro_near_real_time/display_hydro_graph.aspx?station_nbr=11510000)

<http://www.pacificorp.com/es/hydro/hl/wr/kr/jbbf.html>

## **Interim Measure 15: Water Quality Monitoring**

PacifiCorp is now in the fourth year (2012) of funding baseline water quality monitoring consistent with this interim measure, which was begun under the Klamath Agreement in Principle. Annual planning, coordination and monitoring for Interim Measure 15 is completed collaboratively with PacifiCorp, ODEQ, NCRWQCB, EPA Region 9, the Karuk and Yurok Tribes, and Reclamation. The baseline monitoring program occurs over approximately 250 miles of river and reservoirs waters from Link dam near Klamath Falls to the Klamath River estuary near Klamath, CA throughout most of the year.

Parameters measured include basic water quality (temperature, dissolved oxygen, pH, and conductivity) and a suite of nutrients. The public health monitoring component is intended to provide timely information that can be used to inform public health agencies if cyanobacteria are present, generating toxins of concern; and to determine the need to post warning notices and issue advisories for the reservoirs and/or areas of the river. The public health monitoring is performed on a more frequent basis (e.g. weekly) at public access points along Copco and Iron Gate reservoirs and the Klamath River. Water samples are rushed for analysis and results are immediately forwarded to public health entities. Bi-weekly public health memos that summarize all the public health data are provided by each monitoring entity to California's Klamath Basin Monitoring Program (KBMP) website (<http://www.kbmp.net/blue-green-algae-tracker>).

Interim Measure 15 water quality monitoring is coordinated to ensure appropriate quality assurance protocols and standard operating procedures, with transparency a key element of the program. Study plans, laboratory comparison memos, annual summary reports and data are available on the KBMP website (<http://www.kbmp.net>).

## **Interim Measure 19: Hatchery Production Continuity**

PacifiCorp has begun the study to evaluate hatchery production options that do not rely on the current Iron Gate Hatchery water supply. PacifiCorp has developed some preliminary alternatives for continued hatchery operations through discussions with the California Department of Fish and Game that will be evaluated with further engineering and economic study and is evaluating past work conducted during the relicensing process that evaluated hatchery operations.



## **Interim Measure 21: BLM Land Management Provisions**

The BLM Klamath Falls Resource Area (KFRA) provided PacifiCorp a final work plan for cultural resources, road maintenance, and invasive weed management on April 20, 2011 and funding of \$35,000 was provided to the BLM KFRA on May 2, 2011. The actions in the work plan include the following:

- **Cultural Resources:** Perform detailed monitoring of five cultural sites identified in the interim measure.
- **Road Maintenance:** Approximately 4 .72 miles of road along the J.C. Boyle canal will be improved and maintained. Improvements include: the extension of four culverts; cleaning eleven culverts, and installation of one new culvert. There will be annual maintenance for ditch cleaning to ensure the upgrades perform as required.
- **Invasive Weed Management:** The KFRA has outlined a ten year plan for addressing invasive weed management in the defined corridor including surveying weed populations and determining methods for eradication.

A report on these activities is anticipated in March 2012 and a work plan for 2012 activities is under development.