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Klamath Basin Restoration Agreement Revised Cost Estimates

Recommendations prepared by the Klamath Cost Estimate Review Workgroup and adopted by the Klamath Basin Coordinating Council

June 17, 2011

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1. Summary

This document provides an overview of the cost estimates for the Klamath Basin Restoration Agreement. It describes recent updates to the original costs estimates and the basis for those changes.

The Klamath Agreements

The Klamath Basin Restoration Agreement (KBRA) and the Klamath Hydroelectric Settlement Agreement (KHSA) (collectively "The Klamath Agreements") address myriad issues and actions planned to restore one of most economically important rivers of the West Coast. The Klamath River provides for a significant farm economy in southern Oregon and northern California, and makes the United States' west coast commercial salmon industry viable. The Klamath River basin has significant potential for aquatic habitat restoration and improvements for salmonid fisheries. Together, The Klamath Agreements address the aquatic habitat and fisheries issues over time and provide more immediate certainty and predictability for water deliveries to the Klamath Reclamation Project and other farmers and ranchers. In addition:

- The Klamath Agreements provide for the resolution of decades-old conflicts over water allocation, restoration of the fisheries in the Klamath River and Upper Klamath Lake, improvement of water quality, a reliable water supply for irrigators and communities, economic stability, and restoration of Tribal economies and resources.

- With the execution of The Klamath Agreements on February 18, 2010, the representatives of over 40 organizations including the States of Oregon and California, counties, three Tribes, Basin irrigators, and conservation groups agreed to this comprehensive solution, to stop fighting, and to solve water crises in the Klamath Basin through future collaboration and cooperation.

- The Klamath Agreements will guide the parties' cooperative efforts to restore the basin, its fishery, and secure its economic future.

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 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 diversions of water from the Klamath River. 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.

The Non-Federal Parties to the KBRA 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.

Summary of Changes to KBRA Appendix C-2 (the cost estimates):

As of June 2011, the KBRA Non-Federal Parties have revised the estimated costs for these activities that were originally set forth in the 2010 KBRA. The revised total cost estimate for implementing the KBRA 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.

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). 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. These non-federally funded activities are in addition to the cost estimates for Federal funding of the KBRA.

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.

The KBCC is the Klamath Basin Coordinating Council, formed by the parties to guide KBRA implementation. 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 workgroup prepared the detailed analysis in Sections 2, 3, and 4 to support and document its work. 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 KBRA, but only Federal funding through the Federal entities that would be Parties to the agreement if 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. This change does not, for example, change the state funding commitments to Counties that other parties will support. Similarly, items currently fully funded by Non-Party Federal agencies (such as 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 have been 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; however, it is possible that some emergency costs may be incurred during the implementation.

Guide to this report

Tables 1 and 2 follow this summary section.

Section 2 of this document provides a comparison of the current costs in the Klamath Basin with the costs for implementing the Klamath Basin Restoration Agreement.

Section 3 provides the goals, objectives, and metrics for the Klamath Basin Restoration Agreement.

Section 4 describes the need, activities, benefits, and cost assumptions for each line in the Revised Appendix C-2 of the Klamath Basin Restoration Agreement. It includes an expanded Table 1 that provides the detailed cost estimates for each line item.

Table 1: Revised Appendix C-2 Cost Estimates for Federal Funding to Implement the Klamath Basin Restoration Agreement
Summary by Program
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
TOTAL KBRA COSTS*	**$ 24.2**	**$ 62.1**	**$ 60.4**	**$ 57.4**	**$ 61.8**	**$ 61.8**	**$ 77.7**	**$ 104.4**	**$ 93.9**	**$ 43.5**	**$ 34.2**	**$ 31.9**	**$ 30.4**	**$ 28.4**	**$ 26.5**	**$ 798.5**

***This is not a Federal budget product, it was developed by the states, agency represenatives, tribes, and other non-federal parties to 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
TOTAL	**$ 39.4**	**$ 33.5**	**$ 33.8**	**$ 34.1**	**$ 33.3**	**$ 33.6**	**$ 33.3**	**$ 32.9**	**$ 252.6**	**$ -**	**$ -**	**$ -**	**$ -**	**$ -**	**$ -**	**$ 549.6**

*** 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 captial 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**

2. Comparison of Current Klamath Basin Costs and Implementation of the Klamath Restoration Agreement

Introduction

The quality, quantity and reliability of water in the Klamath Basin are inadequate. This has caused conflicts and recurrent crises over the last few decades. These problems are costing tens of millions a year in federal management and compliance programs, the loss of agricultural productivity in the Klamath Basin, the loss or decline of tribal trust fishery and water resources, the devastation of the West Coast commercial salmon fishery, and an increasingly perilous status of a number of species in decline or in danger of extinction.

Non-Federal funding for the KBRA and KHSA from California and Oregon, ratepayers, and PacifiCorp totals $550 million and average $61 million per year through 2020.

The Federal Cost

At present, the base funding costs of federal agencies in the basin are focused substantially upon the maintenance of habitat and management of the watershed to prevent the further decline of the fisheries in the mainstem of the Klamath River as well as Upper Klamath Lake and its tributaries. Resources are also expended to acquire water for instream use by annual purchases of water from irrigators. Without an agreement among the principle water users within the basin, these costs are predicted to steadily increase with no resolution of the underlying problems.

Base federal agency costs total approximately $17 million in the Administration's FY 2012 budget.

Costs to the Fishing Industry

The cost of the declining water resources situation in the Klamath Basin has been devastating to commerce costing hundreds of millions of dollars to state economies and bankrupting fishermen. In 2006 alone the precipitous decline of Fall Chinook led the National Marine Fishery Service to declare a "Fishery Resource Disaster" closing the fishery. Seasonal salmon fishing revenues in the States or Oregon and California dropped up to 75%, as much as a quarter of private vessels were lost to bankruptcy and the real costs to federal taxpayers under the Magnuson-Steven Act in compensation to fishermen was over $60 million dollars in a single year. This is the largest payout from the fund since Hurricane Katrina.

Cost to Agriculture

Farming and ranching in the Upper Klamath Basin generate over $600 million per year in revenue and support 4,500 jobs. Uncertain water supplies threaten this important part of the economy in the Klamath Basin.

In 2001, water users in the century-old Klamath Project were shut off to protect species listed under the Endangered Species Act; causing devastating impacts to farmers and the local economy. The constant threat of water reductions to the agricultural community combined with the recurrent funding of fallowing programs is costing millions of dollars a year in average to low water years: In 2010 alone, over 10 million dollars was appropriated for idling land or substituting water supplies[1].

Cost to Tribes

For the Klamath, Yurok, and Karuk, the loss of fisheries transcends economics. The greater tragedy is the loss of cultural identity. Klamath River tribes rely on the fishery not only for jobs and subsistence but fisheries form the center of religious and ceremonial practices as well.

Costs to States

The jobs and economic activity described above are important to the states of California and Oregon. Failure to implement a comprehensive solution in the basin puts those economies at risk.

California is committed to providing $250 million from California Water Bond revenue for removal of the four dams on the Klamath River if approved under the KHSA; the California Legislature has proposed a bill for voter approval that includes this funding. In addition, the California Public Utilities Commission has approved the collection of an additional $16 million from rate payers to fund dam removal. The proposed California Water Bond also provides $20 million for Siskiyou County. The California Department of Fish and Game funds various activities which support fisheries and protect fisheries habitat in the Klamath Basin. Average annual expenditures over the past eleven years include fisheries habitat restoration projects at $2.2 million/year, environmental review and regulatory actions at $400 thousand/year, fisheries monitoring, research and habitat assessment at $390 thousand/year, construction, operation and maintenance of fish screens at $150 thousand/year, hatchery operations at $120 thousand/year and enforcement of environmental laws at $440 thousand/year. Cumulatively this amounts to $3.7 million/year.

The state of Oregon contributes to implementation of the KBRA and KHSA through four avenues. First, Oregon has approved the collection of $184 million from Oregon ratepayers to fund the removal of the four dams on the Klamath River. Second, Oregon

[1] HR4899

will fund the regulatory review for implementing the two agreements estimated at $4.5 million and the economic mitigation studies and funding for Klamath County, totaling $3.2 million. Third, would likely be on–the-ground project funding through Oregon Watershed Enhancement Board (OWEB). OWEB typically funds habitat and watershed restoration projects through a competitive selection process. The potential amount of funds that may be allocated specifically to the Klamath are uncertain at this time. And fourth, there is on-going participation of staff from three different agencies (Oregon Department of Fish and Wildlife, Oregon Water Resources, and Oregon Department of Environmental Quality). Total FTE's and monetary costs of this in-kind participation vary among years but is likely conservatively equivalent to a sum total of 2.0 FTE's for a total of $250,000/yr in staff costs and $10,000/year in travel and other related expenses. In addition, Oregon has identified funding and tax credits for the renewable energy projects in the KBRA that are estimated at approximately $14 million.

3. Summary of the Klamath Basin Restoration Agreement Goals, Objectives, and Metrics

3.1 Goals of the Klamath Basin Restoration Agreement

The Agreement is intended to result in effective and durable solutions which: (i) restore and sustain natural production and provide for Full Participation in Harvest Opportunities of Fish Species throughout the Klamath Basin; (ii) establish reliable water and power supplies which sustain agricultural uses and communities and National Wildlife Refuges; (iii) contribute to the public welfare and the sustainability of all Klamath Basin communities (KBRA Section 1.3).

3.2 Objectives, Strategies, and Metrics

1. Restore and sustain natural production and provide for Full Participation in Harvest Opportunities of Fish Species throughout the Klamath Basin.

    1.1. Fisheries Program

        1.1.1. Goals: the goals of the Fisheries Program are to (i) restore and maintain ecological functionality and connectivity of historic Fish habitats; (ii) re-establish and maintain naturally sustainable and viable populations of Fish to the full capacity of restored habitats; and (iii) provide for Full Participation in Harvest Opportunities for Fish Species (Section 9.2.6).

        1.1.2. Prepare and implement a Fisheries Restoration and Monitoring Plan: based on best available science, Phase I of the Fisheries Restoration Plan will establish restoration priorities and criteria for restoration project selection for the ten years following the Effective Date. Specific elements will include, but may not be limited to, restoration and permanent protection

of riparian vegetation, water quality improvements, restoration of stream channel functions, measures to prevent and control excessive sediment inputs, remediation of Fish passage problems, and prevention of entrainment into diversions in areas upstream of Upper Klamath Lake (Section 10). This plan will develop metrics and measurable objectives for the Fisheries Restoration Program.

1.1.3. Prepare and implement a Fisheries Reintroduction Plan: re-establish 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. (Section 11).

1.1.3.1. Strategies will include conservation hatcheries, acclimation facilities, and habitat restoration and will be detailed in the Restoration Plan.

1.1.3.2. Specific metrics will be included in the Reintroduction Plan.

1.1.4. Prepare and implement a Monitoring Plan: The Fisheries Monitoring Plan will include status and trends monitoring; water quality and quantity monitoring; effectiveness monitoring related to the performance of restoration actions; limiting factors monitoring to inform later work and assess scientific uncertainties; and data management to ensure that the data management approaches remain current. The monitoring priorities and measureable criteria will be developed for project selection for a 10-year period and enable development of an Annual Program of Work for funding implementation of prioritized actions each year to ensure the greatest return on expenditures. Under Section 12 of the KBRA, a Monitoring Plan is designed to facilitate the most efficient adaptive management linkages between monitoring data and restoration actions. The Plan will consider and integrate existing studies and ongoing activities by local watershed groups, agencies, and tribes. After 10 years, a Phase II Restoration and Monitoring Plan will be developed to cover the remaining terms of the KBRA.(Section 12).

2. Establish reliable water and power supplies which sustain agricultural uses and communities and National Wildlife Refuges: The Parties have negotiated this Agreement to achieve peace on the river and end conflict that has persisted related to the Klamath Reclamation Project. (Section 15).

2.1. On-Project Program: The purpose of the On-Project Plan for the Klamath Reclamation Project is to align water supply and demand for the areas that rely in whole or part on water diverted from the Settlement Points of Diversion identified in Appendix E-1 (points on Upper Klamath Lake and Klamath River).

2.1.1. Develop and implement On-Project Plan.

2.1.1.1. Section 15.3.1 of the KBRA would establish limitations on diversion for the Klamath Reclamation Project. Implementing the On Project Plan based on those limits will reduce irrigation demand to the Klamath system by up to 100,000 acre-feet of water in the low-water years, leaving the water available for instream and environmental use.

2.1.1.2. The KBRA will also provide firm allocation to the National Wildlife Refuges. The Refuge Allocation for Lower Klamath NWR ranges from 48,000 to 60,000 acre-feet of water in the summer period and 35,000 acre-feet in the winter period. Tulelake NWR will also receive deliveries through the Project.

2.1.1.3. Water rights assurances: the KBRA describes the process to implement mutual assurances by the party Klamath Basin tribes, the United States as trustee for Basin tribes, and Project irrigators regarding the diversion limits in the KBRA and water rights of the Party tribes and United States as trustee for Basin tribes.

2.2. Upper Basin Program: 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 Section 16.2.2, provide for increased stream flow and inflow into Upper Klamath Lake through voluntary retirement of 30,000 acre-feet of water uses as agreed to by the OPWAS Parties, or the UBT consistent with Section 16.2.2, to improve Fisheries habitat and also to provide for stability of irrigation water deliveries in the Off-Project Water Program. (Section 16)

2.2.1. Off-Project Water Settlement

2.2.1.1. Complete by OPWAS within two-years of receiving funding.

2.2.1.2. Implement voluntary water use retirement program to permanently increase the inflow to Upper Klamath Lake by 30,000 acre-feet on an average annual basis.

2.2.2. Fisheries Habitat Improvement Program: to improve fisheries habitat above Upper Klamath Lake in the geographic area delineated in Section 16.2.2.C to provide federal regulatory Assurances to landowners in the affected areas, and to do so in a manner that seeks to maintain landowner economic stability.

2.3. Power for Water Management Program: The purposes of this program are to provide affordable electricity 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 as part of the implementation and administration of the On-Project Plan; (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. This program includes measures and commitments based on a delivered power cost target that will be at or below the average cost for similarly situated Reclamation irrigation and drainage projects in the surrounding area, for eligible power users (Section 17).

2.3.1. Interim Power Program: The purpose of the Interim Power Program element stated in the KBRA is to maintain the power cost target for the eligible power users as while the remaining program elements are implemented.

2.3.2. Federal Power: The purpose of the Federal power element is to obtain and provide for the cost-effective transmission and delivery of Federal preference power to serve all eligible On-Project Power Users and Off-Project Power Users meters as authorized by Applicable Law. With respect to irrigation water use in Oregon, Reclamation will enter into a power sales contract with the Bonneville Power Administration to purchase power at the tariff rate for public utilities and Federal agencies.

2.3.3. Renewable Power Program: The purpose of the Renewable Power Program element is to: (i) increase power efficiency of the On-Project Power Users and Off-Project Power Users; and (ii) generate renewable energy to directly or indirectly reduce net power costs for eligible Power Users. These actions will be designed to maintain the power cost target for eligible On Project and Off-Project Power Users.

2.3.3.1. The Klamath Basin Power Alliance will develop a technical and economic plan.

2.3.3.2. The KBPA will implement the plan within the guidelines of Section 17.7 of the KBRA.

2.4. Additional Water Conservation and Storage (Section 18)

2.4.1. Restore Upper Klamath Lake water storage and reconnect historic lake bed.

2.4.1.1. Williamson River Delta: restore approximately 28,800 acre-feet (gross) of lake storage capacity when Upper Klamath Lake elevations are between 4143.3 and 4136.0 feet. This project has been completed.

2.4.1.2. Agency Lake Ranch and Barnes Ranch: investigate and seek to secure additional water storage in the Upper Klamath Basin, including reconnecting the land to Agency Lake to provide approximately 63,770

acre-feet (gross) of restored storage between elevations 4143.3 and 4136.0.

2.4.1.3. Wood River Wetland Restoration Project: BLM, in collaboration with the KBAC and TAT will complete 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 by providing an additional water volume of approximately 16,000 acre-feet of gross storage between elevations 4143.3 and 4136.0 feet.

2.4.2. Future Storage: Pursuant to the Klamath Basin Water Supply Enhancement Act of 2000 (P.L. 106-498), and given sufficient appropriations, Reclamation shall work diligently to complete appropriate studies for off-stream storage projects.

2.5. Drought, Climate Change, and Emergency: The Parties intend that the obligations and the bargained-for benefits of this Agreement are fulfilled and realized in all circumstances, including Drought and Extreme Drought, Emergency circumstances, or long-term climatic conditions which cannot now be foreseen. (Section 19)

2.5.1. Develop and implement a Drought Plan: To the maximum extent feasible, the Drought Plan will protect Klamath Basin communities, and provide sufficient quantities of water to meet the biologically essential River flows and lake elevations in periods of Drought or Extreme Drought.

2.5.2. Emergency Plan: The Parties will support funding to address future emergencies to address damage to dikes that may cause flooding or affect storage of water in the KBRA.

2.5.3. Climate Change: determine how long-term climate change may affect the fisheries and communities of the Klamath Basin

2.6. Environmental Water: The Secretary shall make management decisions regarding Managed Environmental Water, so as to maximize benefits for the Klamath Basin's fish and wildlife and to achieve the water management goals of the KBRA. The TAT shall provide recommendations to the Secretary on how best to distribute and use this Managed Environmental Water for this purpose.

2.6.1. Implement the Interim Flow and Lake Level Program in KBRA Section 20.4: 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 Species.

2.6.2. Once the water and storage programs in the KBRA are implemented, the Secretary will manage the water to maximize the benefits for the Klamath Basin's fish and wildlife and to achieve the water management goals of the KBRA.

2.7. Regulatory Assurances: Upper Basin irrigation communities were instrumental in realizing settlement terms that will result in habitation by fish species in areas that may be affected by irrigation operations. To avoid adverse impacts to those communities funding would be provided for:

2.7.1. installation of fish screens in the Klamath Reclamation Project area, and

2.7.2. Development of habitat conservation plans and/or general conservation plans to provide regulatory protections.

3. Contribute to the public welfare and the sustainability of all Klamath Basin communities.

3.1. Counties Program: The purposes of the program are to avoid or mitigate certain impacts the Counties and their residents may incur as a result of Facilities Removal and to allow the Counties to address impacts, promote economic development and provide additional opportunities within each county for the benefit of their residents.

3.1.1. Klamath County shall develop and adopt a Klamath County Program and a written plan to implement the Program by June 30, 2012.

3.1.2. The Non-Federal Parties shall support authorizations and appropriations for Oregon funds, in the amount shown in Appendix C-2, to compensate Klamath County for the loss of property tax revenues associated with: (i) reduced agricultural land values in the Klamath Reclamation Project due to a reduction of water deliveries; and, (ii) reduced agricultural land values in the areas above Upper Klamath Lake due to the surrender of significant water rights.

3.1.3. Any funds remaining from the $250 million California Bond after (i) Facilities Removal, including mitigation for CEQA impacts, and (ii) any actions required to assure the City of Yreka water supply, may be used, jointly by California, through the CDFG, and Humboldt County, consistent with the Fisheries Restoration Plan, to plan and implement additional fisheries restoration projects in Humboldt County.

3.2. Tribal Program: The Parties support the goals of each Tribe to achieve the revitalization of tribal subsistence and related economies during the period immediately following the KBRA. 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 such that full participation in harvest opportunities are achieved.

3.2.1. Provide funding to assist the Tribes in developing the capacity to participate as grantees and in the collaborative management of the Fisheries Program described in Sections 9 through 13 of the KBRA.

3.2.2. The KBRA parties support efforts by the Tribes to secure economic revitalization programs and funds such that the Tribes may achieve long-term economic self-sufficiency.

3.2.3. The KBRA parties support funding for acquisition of the Mazama Forest Project in Klamath County, Oregon.

4. Klamath Basin Restoration Agreement Budget Narratives

4.1 Introduction to Budget Narratives

This section includes the draft revised cost estimates in Appendix C-2 from the KBRA; they were developed by the Klamath settlement parties in 2011. Revised Appendix C-2 estimates the amounts of funding necessary for the implementation of each of the programs of the KBRA from 2012 to 2026. The narratives, prepared largely by parties with expertise in individual programs, provide the estimated costs for the seven years between 2012 and 2018 and the total 15 year costs for each line item (the 15-year total costs include the first seven years of costs).

Many of the activities in the KBRA start with the development of plans that will guide the detailed implementation of activities, for example, Fish Managers will develop the Fisheries Restoration and Monitoring Plan for the Klamath Basin that will establish detailed goals, objectives, and actions and prioritize activities. Similarly, the Klamath Reclamation Project irrigators will develop the On-Project Plan to guide actions to reduce diversions in low-water years. The timing of some actions in the KBRA are also related to the determination of the Secretary of the Interior on whether removal of the four Klamath River dams should be removed. Under the KHSA, that determination is scheduled for March, 2012.

Unless otherwise provided, these amounts are stated in 2007 dollars; the cost estimate review process used 2007 dollars so the Parties could compare the changes to the original cost estimates. During implementation of the KBRA, these costs will need to be adjusted using federal Office of Management and Budget guidelines to account for the effects of inflation. Under the KBRA, the Non-Federal Parties support authorizations and appropriations of Federal and state funds, as well as securing of non-public funds to cover this revised budget.

Comparison to other Basins

It may be helpful to compare the costs estimates in the KBRA to efforts in other basins. The draft revised costs of KBRA fisheries restoration, reintroduction, and monitoring program average $7 million per year during the first seven years and $18 million per year over the full 15 year budget estimate. The interim measures paid by PacifiCorp average $2.8 million between 2010 and 2020. The Klamath Basin drains 15,600 square miles.

In the Columbia River Basin, which drains 260,000 square miles, average Bonneville Power Administration costs are $362 million per year for fish and wildlife capital and fixed expenses. BPA reports that the cost of replacement power purchases and foregone power revenues to improve river flows and passage at dams total an additional $745 million per year.

Guide to this Section

This section provides the revised cost estimates for implementing the KBRA in Table 1 below. Table 1 in this section also shows the detailed costs, by year, for each of the line items in the original Appendix C-2 of the KBRA.

This section also provides a description of each program listed by the lines in Revised Appendix C-2. Each narrative describes the need for the program, the activities, the expected products and benefits, and the basis for the cost estimates. A summary of the KBRA is attached as Appendix A. For a full copy of the KBRA and KHSA please go to the following website: www.Klamathcouncil.org.

Table 1: Revised Appendix C-2 Cost Estimates for Federal Funding to Implement the Klamath Basin Restoration Agreement
Summary by Program
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
TOTAL KBRA COSTS*	**$ 24.2**	**$ 62.1**	**$ 60.4**	**$ 57.4**	**$ 61.8**	**$ 61.8**	**$ 77.7**	**$ 104.4**	**$ 93.9**	**$ 43.5**	**$ 34.2**	**$ 31.9**	**$ 30.4**	**$ 28.4**	**$ 26.5**	**$ 798.5**

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

Table 1: Detailed Cost Estimates for the Klamath Basin Settlement Agreement

($2007 Thousands)

#	Project	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	SUM
1	Coordination and Oversight	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	1,500
2	Planning & Impl. -- Ph. I and Ph. II Restoration Plans	700	200	-	-	-	-	-	-	1,000	600	-	-	-	-	-	2,500
3	Williamson R. aquatic habitat restoration	-	223	336	358	459	330	402	443	390	425	419	155	155	155	23	4,272
4	Sprague R. aquatic habitat restoration	108	1,347	3,302	3,494	3,947	2,965	3,465	4,636	4,912	5,204	5,436	5,063	3,127	1,628	466	49,099
5	Wood R. Valley aquatic habitat restoration	27	182	369	433	681	936	3,021	2,112	761	1,564	1,411	431	415	314	27	12,684
6	Williamson Sprague Wood Screening Diversion (n=~100)	-	209	209	209	209	209	209	209	209	209	209	209	209	209	211	2,933
7	Williamson & Sprague USFS uplands	-	500	500	800	800	800	800	800	800	800	800	800	800	1,000	1,000	11,000
8	Upper Klamath Lake aquatic habitat restoration	-	29	48	48	298	519	1,125	4,999	4,999	625	-	-	-	-	-	12,692
9	Screening of UKL pumps (underway)	-	35	35	35	35	35	35	35	35	35	35	35	35	35	35	489
10	UKL watershed USFS uplands	-					-	220	1,000	1,000	1,000						3,220
11	UKL and Keno nutrient reduction	-	1,132	1,132	1,132	1,132	2,253	2,253	17,574	17,574	901	901	901	901	901	901	49,589
12	Keno Res. wetlands restoration	-	-	-	-	-	125	125	2,248	2,498	-	-	-	-	-	-	4,995
13	Keno to Iron Gate upland private & BLM	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
14	Keno to Iron Gate upland USFS (Goosenest)	-	100	100	100	100	100	100	100	100	100	100	100	100	100	100	1,400
15	Keno to Iron Gate mainstem restoration	-	100	100	100	100	100	150	200	200	200						1,250
16	Keno to Iron Gate tributaries - diversions & riparian	-	-	-	-	500	500	500	-	-	-						1,500
17	Shasta River aquatic habitat restoration	100	200	200	500	500	900	1,000	1,000	1,200	1,200	1,200	1,200	1,200	1,000	1,000	12,400
18	Shasta R. USFS uplands	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
19	Scott River aquatic habitat restoration	-	100	500	750	900	900	900	900	-	-	-	-	-	-	-	4,950
20	Scott R. USFS uplands	-	100	250	300	100	150	150	200	200	180	-	-	-	-	-	1,630
21	Scott R. private uplands	-	-	125	200	250	-	-	-	-	-	-	-	-	-	-	575
22	Mid-Klamath & tribs aquatic habitat restoration	-	200	200	250	350	350	400	400	400	400	400	400	400	400	400	4,950
23	Mid Klamath tribs USFS upland	-	600	600	600	600	600	600	600	700	750	750	750	750	750	750	9,400
24	Mid Klamath tribs private upland	-	600	600	600	600	600	600	600	700	700	-	-	-	-	-	5,600
25	Lower Klamath aquatic habitat restoration	-	500	500	900	1,200	1,900	2,000	2,500	2,500	3,000	-	-	-	-	-	15,000
26	Lower Klamath private/tribal uplands	-	1,000	1,000	1,000	1,000	1,500	3,000	3,000	3,000	3,000	3,000	3,000	3,000	3,000	3,000	32,500
27	Salmon River aquatic hab restoration	-	200	200	300	300	400	400	400	400	400	320	-	-	-	-	3,320
28	Salmon R. USFS upland	-	300	400	400	400	400	400	400	400	400	400	400	400	400	400	5,500
29	Reintroduction Plan	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	1,500
30	Collection Facility	-	-	-	-	-	-	-	988	4,238	500	238	238	238	238	238	6,916
31	Production Facility	-	-	-	-	-	750	4,000	285	285	285	285	285	285	285	285	7,030
32	Acclimation Facility	-	-	-	-	-	850	2,285	285	285	285	285	285	285	285	285	5,415
33	Transport	-	-	-	-	-	-	-	95	95	95	95	95	95	95	95	760
34	Monitoring and Evaluation - Oregon	190	1,000	1,500	2,000	2,200	2,200	2,200	2,400	2,400	2,400	2,400	2,400	2,400	2,400	2,400	30,490
35	Monitoring and Evaluation - California	95	190	190	190	190	190	190	190	190	190	190	190	190	190	190	2,755
36	New Hatchery (IGD or Fall Creek)	-	-	143	143	143	143	5,083	950	950	950	-	-	-	-	-	8,503
37	Adult Salmonids	-	607	607	607	607	607	607	607	1,607	1,685	1,685	1,685	1,685	1,685	1,685	15,963
38	Juvenile Salmonids	-	471	471	471	471	471	971	1,116	1,471	1,471	1,971	1,971	1,971	1,971	1,971	17,240
39	Genetics Ololith	-	80	80	80	80	80	100	100	100	100	100	100	100	200	200	1,500
40	Hatchery Tagging (PacifiCorp paying costs under KHSA)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
41	Disease	-	519	519	519	519	519	519	519	519	519	519	519	519	519	519	7,268
42	Green Sturgeon	-	161	161	161	161	161	161	161	161	161	161	161	161	161	161	2,256
43	Lamprey	-	153	153	153	153	153	153	153	153	153	153	153	153	153	153	2,138
44	Geomorphology	-	-	-	-	-	300	300	300	300	300	300	300	300	300	-	2,700

Table 1: Detailed Cost Estimates for the Klamath Basin Settlement Agreement

($2007 Thousands)

#	Project	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	SUM
45	Habitat Monitoring	-	193	193	193	193	193	193	193	193	193	193	193	193	193	193	2,700
46	Water Quality	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	1,500
47	UKL continuous water quality, hydrodynamic model	-	100	100	100	100	100	100	100	100	100	100	100	100	100	100	1,400
48	UKL nutrients/algae/zooplankton	-	405	405	405	405	405	405	405	405	405	405	405	405	405	405	5,670
49	UKL internal load/bloom dynamics	-	200	200	200	200	200	200	200	200	200	200	200	200	200	200	2,800
50	UKL external nutrient loading	-	259	259	259	259	259	259	259	259	259	259	259	259	259	259	3,626
51	UKL analysis of long-term data sets	-	-	200	-	-	-	-	200	-	-	-	-	200	-	-	600
52	UKL listed suckers	-	875	875	875	875	875	875	875	875	875	875	875	875	875	875	12,250
53	Tributaries water quality/nutrients/temperature	-	310	310	310	310	310	310	310	310	310	310	310	310	310	310	4,340
54	Tributaries geomorphology/riparian vegetation	-	239	239	239	239	239	239	239	239	239	239	239	239	239	239	3,346
55	Tributaries physical habitat	-	213	213	213	213	213	213	213	213	213	213	213	213	213	213	2,982
56	Tributaries listed suckers	-	375	375	375	375	375	375	375	375	375	375	375	375	375	375	5,250
57	Keno Reservoir water quality/algae/nutrients	-	402	402	402	402	402	402	402	402	402	402	402	402	402	402	5,628
58	Keno Reservoir to Tributaries: (weather stations)	-	200	200	200	200	200	200	200	200	200	200	200	200	200	200	2,800
59	Remote Sensing acquisition and analysis	-	-	250	-	-	-	-	250	-	-	-	-	250	-	-	750
60	Keno Dam fish passage	-	-	-	-	-	-	-	-	1,500	2,000	-	-	-	-	-	3,500
61	Data Analysis and evaluation for provision to TAT	-	100	8	8	8	8	8	5	5	5	-	-	-	-	-	155
62	Development of predictive techniques	-	200	20	20	20	20	20	20	20	20	-	-	-	-	-	360
63	Klamath Basin Wildlife Refuges: North and P Canals	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
64	Klamath Basin Wildlife Refuges: Walking Wetland Construction	210	215	215	215	215	215	215	100	100	100	100	100	100	100	100	2,300
65	Klamath Basin Wildlife Refuges: Big Pond Dike	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
66	On Project water plan	1,200	4,300	8,000	9,000	15,000	15,000	15,000	15,000	10,000	-	-	-	-	-	-	92,500
67	Groundwater Technical Investigation	111	285	245	-	-	-	-	-	-	-	-	-	-	-	-	641
68	Costs Associated with Remedy for Adverse Impact	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
69	D Pumping Plant	170	170	170	170	170	170	170	170	170	170	170	170	170	170	170	2,550
70	Water Use Retirement Plan	200	400	200	100	100	-	-	-	-	-	-	-	-	-	-	1,000
71	Off Project Plan and Program: Use of 30K ac ft above UKL	-	2,000	6,000	7,000	7,000	8,000	8,000	7,000	-	-	-	-	-	-	-	45,000
72	Interim Power Sustainability	1,730	2,241	3,719	-	-	-	-	-	-	-	-	-	-	-	-	7,690
73	Federal Power	500	500	-	-	-	-	-	-	-	-	-	-	-	-	-	1,000
74	Energy Efficiency and Renewable Resources	-	13,886	12,378	9,368	4,866	-	-	-	-	-	-	-	-	-	-	40,498
75	Renewable Power Program Financial and Engineering Plan	500	500	-	-	-	-	-	-	-	-	-	-	-	-	-	1,000
76	UKL Weltands Restoration: Agency/Barnes	-	-	-	-	56	167	333	2,083	139	-	-	-	-	-	-	2,777
77	UKL Wetlands Restoration: Wood River	-	-	-	-	-	56	167	333	2,083	139	-	-	-	-	-	2,777
78	Drought Plan Development	-	-	-	-	-	-	-	-	-	-	-					-
79	Drought Plan Restoration Agreement Fund	-	-	-	-	-	-	-	-	-	1,000	1,000	1,000	1,000	1,000	1,000	6,000
80	Emergency Response Plan	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
81	Emergency Response Fund	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
82	Technical Assessment of Climate Change	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
83	Off-Project Reliance Program	-	-	-	-	-	-	-	12000*	-	-	-	-	-	-	-	12000*
84	Real Time Water Management	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
85	Real Time Water Management: Water Flow Monitoring and Gauges	200	250	250	200	200	200	200	185	185	185	185	185	185	185	185	2,980
86	Added Snowpack Gauges	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
87	Adaptive Management: Science and Analysis	100	100	100	100	100	100	100	100	100	100	-	-	-	-	-	1,000
88	Real Time Management: Calibration and improvements to KLAMSIM or other modeling and predictions	-	50	-	-	-	-	-	50	-	-	-	-	-	-	-	100

Table 1: Detailed Cost Estimates for the Klamath Basin Settlement Agreement

($2007 Thousands)

#	Project	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	SUM
89	Interim Flow and Lake Level Program	5,500	5,500	5,500	5,500	5,500	5,500	5,500	5,500	-	-	-					44,000
90	Keno Reservoir KIP Screening	-	-	-	-	-	151	151	11,021	13,839	-	-	-	-	-	-	25,162
91	Federal GCP/HCP	-	-	-	350	1,000	650	800	1,350	450	450	450	-	-	-	-	5,500
92	California Laws	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
93	Oregon Laws	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
94	Klamath County Study	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
95	Klamath County (Oregon funding)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
96	Siskiyou County	-	-	-	-	-	-		-	-	-	-	-	-	-	-	-
97	Humboldt County	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
98	Del Norte County	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
99	Fisheries Management HVT**	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
100	Fisheries Management Karuk	500	1,000	1,000	1,000	1,000	1,000	1,000	1,000	1,000	1,000	1,000	1,000	1,000	1,000	1,000	14,500
101	Fisheries Management Klamath	500	1,000	1,000	1,000	1,000	1,000	1,000	1,000	1,000	1,000	1,000	1,000	1,000	1,000	1,000	14,500
102	Fisheries Management Yurok	500	1,000	1,000	1,000	1,000	1,000	1,000	1,000	1,000	1,000	1,000	1,000	1,000	1,000	1,000	14,500
103	Conservation Management HVT**	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
104	Conservation Management Karuk	250	500	500	500	500	500	500	500	500	500	500	500	500	500	500	7,250
105	Conservation Management Klamath	250	500	500	500	500	500	500	500	500	500	500	500	500	500	500	7,250
106	Conservation Management Yurok	250	500	500	500	500	500	500	500	500	500	500	500	500	500	500	7,250
107	Economic Development Study HVT**	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
108	Economic Development Study Karuk	-	250	-	-	-	-	-	-	-	-	-	-	-	-	-	250
109	Economic Development Study Klamath	-	250	-	-	-	-	-	-	-	-	-	-	-	-	-	250
110	Economic Development Study Yurok	-	250	-	-	-	-	-	-	-	-	-	-	-	-	-	250
111	Klamath Tribes: Mazama Forest Project	10,000	11,000	-	-	-	-	-	-	-	-	-	-	-	-	-	21,000
112	Fishing Sites	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

* Recognizes there is further discussion of additional funding potentially available, including reallocated funds and provisions of KBRA Section 19.5.2.

** Upon becoming a Party to the KBRA in accordance with Section 38, the Hoopa Valley Tribe will be eligible for funding in categories and amounts for each of the other tribes in line items 99 through 110.

4.2 Coordination and Oversight (Line 1). Seven year: $0.7 million; 15 year total $1.5 million

Need: Implementation of the KBRA will require sustained coordination and oversight by the Parties to the Agreement. The Klamath Basin Coordinating Council (KBCC), the Klamath Basin Advisory Council (KBAC), and the Technical Advisory Team (TAT) are the three primary entities created by the KBRA to coordinate and oversee the implementation of the Agreement; their roles and responsibilities are described in detail in Appendix D of the Agreement. Public involvement and transparency are key elements of the KBRA and the mechanism to increase local control over resource decisions in the Klamath Basin.

Description of Activity: Funding is for facilitation services, creation and maintenance of websites and other public information and involvement costs for the KBCC, KBAC, and TAT and other sub-teams as needed.

Products and Benefits: Products include monitoring of the status of KBRA activities and regular reports to the Parties, preparation for and facilitation of bi-monthly public meetings of the Parties throughout the Basin to coordinate and oversee activities and inform and involve the public, preparation of annual reports on implementing the KBRA, and development of revised schedules and cost estimates. Coordination and oversight will promote implementation of the KBRA and facilitate adjustments to programs and costs based on new information. Public information and involvement is an important benefit of these activities.

Basis for Cost Estimates: Costs are based on current level of activity facilitating public meeting, monitoring implementation, and preparing materials.

4.3 Fisheries Restoration Program (Seven years: $84 million; 15 year total $253 million)

Introduction: The Fisheries Restoration and Monitoring Plan is fundamental to the KBRA; this ecosystem restoration work directly addresses problems associated with degraded aquatic ecosystems, listed fish species, declining tribal and commercial fisheries, and their related economies. Successfully restoring aquatic ecosystem integrity is an indispensable ingredient for reducing or eliminating severe, decades-long conflicts among Klamath Basin communities. Restoring and maintaining functional aquatic ecosystems in the Klamath River Basin is essential to recovery of ESA-listed fish species, preventing future listings, enhancing existing salmon and steelhead populations, and successfully restoring salmon and steelhead to their historic ranges throughout the Upper Klamath Basin.

A needed precursor in the successful implementation of the KBRA will be the development of Restoration and Monitoring Plans, as stipulated in Section 10 of the

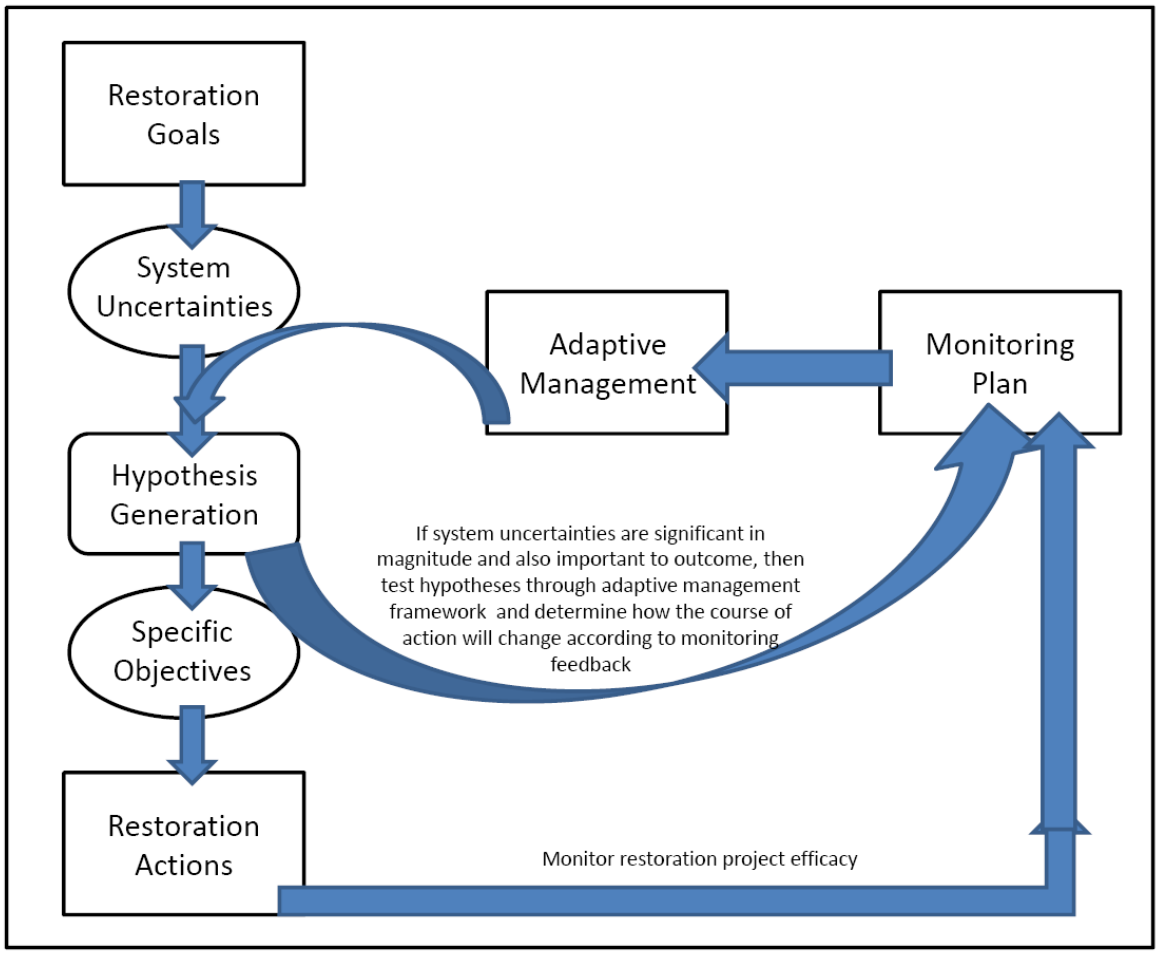
Agreement. In simple terms, the purpose of these plans (or combined plan as currently being proposed by fish managers) will be to answer the questions: 1) are key biological and physical components of aquatic and riparian communities being protected, improved, or restored within geographical extent of the KBRA, and; 2) how are the observed changes being influenced by restoration and management actions.

A combined Restoration/Monitoring Plan for the Klamath Basin will focus on addressing ten basic elements, which are consistent with the Oregon Department of Water Quality (ODEQ) "Guidance For Developing Water Quality Management Plans that will Function as TDMLs For Non-point Sources" (1997). These elements include:

- Identify goals
- Develop matrix of key physical and biological metrics and desired condition for each
- Assessment of current condition- compare to desired condition to identify problems
- Timeline for implementing monitoring/restoration action
- Identify of responsible participants
- Assurance of successful implementation
- Monitoring and evaluation (including a Reporting Scorecard)
- Public involvement
- Direction and maintenance of effort over time – i.e. adaptive management
- Quantify costs and identify and secure funding

Prioritization of the many actions necessary to successfully implement the Fisheries Restoration and Monitoring Program will be collaboratively established. This ongoing process will reflect strategic consideration of actions in regard to location, timing, sequence, technique, and available funding to best achieve the Program objectives. Priorities will be informed by monitoring and assessment, and re-evaluated periodically using a predefined adaptive management feedback approach (figure below). Short-term priorities will focus on restoration actions intended to immediately enhance fish reproduction and survival, and to begin long-term ecosystem recovery (e.g., removing migration barriers, screening water diversions, enhancing physical habitats). Long-term priorities will include the suite of restoration actions necessary for the extended recovery of ecological function (e.g., riparian planting, improve water temperature and shade conditions, reduce risk of fine sediment delivery, increase coarse sediment recruitment, manage upland fuels conditions, improve flows). Spatial scale of necessary actions, their geographic locations, and their timing and sequence will be important drivers of strategic priorities among both short- and long-term actions.

While this document provides detail sufficient to clarify and justify the monitoring and restoration tasks in Appendix C-2 of the KBRA, the adaptive and detailed nature of this complex Program cannot be fully outlined within this abbreviated budget planning document. Phase I and II Restoration Plans will fully describe and guide the restoration actions to be taken under the KBRA.



<u>Planning & Implementation – Phase I and Phase II Restoration and Monitoring Plans (Line 2)</u>. Seven years: $0.9 million; 15-year total: $2.5 million.

Need: Develop a comprehensive Fisheries Restoration and Monitoring Plan for the entire Basin, excluding the Trinity River; the original target date for the Phase I Plan was February 18, 2011; however, funding was not available to meet this date. A Phase II Plan is scheduled to be developed seven years after the Phase I Plan and will guide activities after 2022.

Description of Activity: The Restoration and Monitoring Plan will consider and integrate existing studies and ongoing activities including all available monitoring results for and evaluations of the effectiveness of past activities. After 10 years, a Phase II Restoration and Monitoring Plan will be developed to cover the remaining term of the KBRA. The budget estimates will support the Fish Managers' early development of the Phase I Restoration Plan and Monitoring Plan, including meeting facilitation, drafting of the Plans, preparation of any Federal or state environmental compliance documentation,

public outreach, and publication. Within 7 years of finalizing the Phase I Plan, the budget estimates also includes development of the Phase II Restoration Plan.

Products and Benefits: The Fisheries Restoration and Monitoring Plan will coordinate and prioritize all fishery activities in the Klamath Basin. The adaptive management provisions will ensure that the programs are revised to incorporate the results on monitoring and new information to improve their effectiveness. Restoring Klamath Basin fish populations will greatly benefit tribal, commercial, and sports fisheries. The KBRA Non-Federal Parties estimate that in years when the stocks do not collapse, the Klamath's salmon fisheries produce approximately $20 million per year in direct revenues and an additional $130 million in secondary economic benefit in Oregon and California. These salmon, which migrate extensively along the Pacific Coast, support thousands of jobs from Monterey, California, north to nearly the Columbia River. Fisheries experts estimate that implementing the KBRA and KHSA would recover aquatic ecosystem integrity in the Klamath, putting its fisheries back on positive trajectories, along with the communities and economies that rely on those fisheries.

Klamath fall Chinook salmon and some races of Steelhead are the only species and races of fish that are currently relatively abundant in the Klamath Basin. Coho, Spring Chinook, Lamprey, Sturgeon, Eulachon and summer steelhead are in serious decline and not available to any interest for meaningful harvest opportunities. Activities identified below will benefit all species in the Basin.

Basis for Cost Estimates: The cost of developing the plan is based on development of similar plans in other basins. For example, the Trinity Restoration Plan cost $2 million to date. The National Park Service spent $6.2 million for planning and NEPA analysis of the Elwha River Restoration Project; this was a negotiated legal settlement that required extensive mitigation for existing infrastructure and incorporated 43 separate but related actions.

4.3.1. Upper Klamath Basin above Keno Dam

Introduction: Home to the endangered suckers and ground-zero for salmon and steelhead reintroduction efforts, the Upper Klamath Basin is a focal point for KBRA ecosystem restoration actions. Activities above Keno Dam will improve habitat and water quality conditions that regulate fish production, survival, and recovery in valley-floor rivers and streams, and in Upper Klamath Lake and Keno Reservoir. Private lands provide the most opportunity for projects and collaborative, voluntary arrangements with landowners will be used. In some cases federal or state lands may be involved.

Resulting improvements in habitat and water quality will benefit fish currently residing in the Upper Basin, especially endangered suckers and redband trout. Resident redband trout are expected to resume anadromy following dam removal, thereby restoring steelhead runs to the Upper Basin. Planned efforts to reduce nutrient and organic loads emanating from the Upper Basin will also improve water quality conditions for many miles downstream in the Klamath River, and will move the system towards compliance

with applicable water quality standards. Finally, the planned improvements will prepare the Upper Basin for use by reintroduced salmon and steelhead.

Restoration activities and associated costs listed in this document represent the consolidated knowledge and opinions of many Klamath Basin professionals. Users of this information should consider that Section 10 of the KBRA calls for the preparation of Phase I and Phase II Fisheries Restoration Plans to prioritize restoration activities within the funds that are available. As such, the nature, scope, and priority of restoration actions will likely change as scientific understanding and experience with restoration measures reveal more effective or efficient approaches. Costs were estimated based on recent experience with implementing similar activities. This includes implementation costs, which have ranged from 4-30% for various types of restoration activities, necessary for providing the staff, environmental compliance, permitting, fiscal management, contract management, etc. that must be done if the work is to be accomplished.

In developing the cost estimates, the fishery managers analyzed the amount of habitat that needed to be treated (typically by the number of acres or stream miles), the costs for specific habitat actions based on experience with similar projects, and other implementation costs (for example, costs for detailed design, permitting environmental compliance, and construction management) based on the experience in other habitat restoration programs.

Habitat Restoration in the Williamson, Sprague, and Wood Rivers (Lines 3-5). Seven years: $26 million; 15-year total: $66 million.

Need: Restoring and maintaining functional aquatic ecosystems in the tributaries to Upper Klamath Lake is essential to recovery of resident listed fish and to successfully reintroducing salmon and steelhead.

Description of Activity: This ecosystem restoration work will encompass over 187 miles of mainstem river and 126 miles of tributary habitats in the three major watersheds above Upper Klamath Lake.

Products and Benefits: Results include improving and maintaining restored riparian corridors and floodplains, improving instream fish habitat, managing grazing, managing native and invasive vegetation, removing fish migration barriers, and restoring ecologically appropriate stream channel characteristics. These actions will improve survival for listed suckers and redband trout, and provide habitat to salmon and steelhead when passage is restored. They will also improve fish survival in Upper Klamath Lake by improving water quality and in-lake habitats.

Basis for Cost Estimates: Fish managers prepared estimates of the restoration costs based on experience with similar work in the Klamath and other basins.

Screening Diversions to Prevent Fish Entrainment in the Williamson, Sprague, and Wood Rivers, and in Upper Klamath Lake (Lines 6 and 9). Seven years: $1.5 million; 15-year total: $3.4 million.

Need: Many unscreened diversions exist in Upper Klamath Lake and its tributaries, causing problems both for the fish that are entrained and for the landowners who operate these diversions. Screening diversions will improve survival of listed suckers and resident trout; it is particularly important to screen these diversion before beginning reintroduction efforts for salmon and steelhead.

Description of Activity: Through collaboration with landowners, fish screens can be installed as per Oregon Department of Fish and Wildlife standards on approximately 120 diversions in the Williamson, Sprague, and Wood River watersheds.

Products and Benefits: Installing fish screens will prevent fish from entering diversion canals where they become stranded and die. As a result, more fish produced by other measures will return successfully to spawn and rebuild populations.

Basis for Cost Estimates: Fish managers prepared estimates of the costs to install fish screens based on experience with similar work in the Klamath and other basins.

Williamson and Sprague USFS Uplands (Line 7). Seven years: $4.2 million; 15-year total: $11 million.

Need: Restore riparian and adjacent forested uplands. Many riparian forests are over-stocked due to conifer encroachment. This condition, coupled with adjacent over-stocked upland forests, poses a high risk of catastrophic wildfire that would impair fish production. Reduce road-related fine sediment inputs and migratory impediments that degrade fish habitat and interfere with migration and feeding. Legacy roads that are no longer needed, or are in poor condition, are a major source of fine sediment inputs into tributaries. Restoring upland drainage processes will provide favorable environmental conditions to rebuild fish populations.

Description of Activity: Reduce hazardous fuels buildup in most USFS-owned watersheds by removing encroaching conifers from riparian and adjacent upland forests. Repair or decommission upland dirt roads and road crossings to reduce sediment inputs to streams and eliminate migratory impediments that impact spawning and rearing habitats, and interfere with fish feeding and migration. Restore riparian habitat to provide shade and reduce excessive water runoff during storms. Specific projects include: 1) passage projects at Cold Creek (2), NF Sprague (1), FS road 28 (1). Sixteen culverts on Dixon, Boulder, Leonard, Brownsworth, Fivemile, Camp and Corral Creeks; 3) in-stream and bank stabilization on Rock Creek (15), Rock Creek (lower Sprague 1 mile), Copperfield (3), Trout Creek (Ray Ranch 2 mi), NF Sprague (3), and Fishhole Creek (5)..

Products and Benefits: Reducing input to streams, eliminating impediments to migration, improving riparian conditions, and reducing risk of catastrophic wildfire will maintain and improve in-stream habitat quality and fish survival.

Basis for Cost Estimates: The costs were based on the number of acres that need to be treated and costs of projects.

Upper Klamath Lake Aquatic Habitat Restoration (Line 8). Seven years: $2 million; 15-year total: $12.7 million.

Need: Over 30,000 acres of historic wetlands around Upper Klamath Lake were diked, drained, and converted to agricultural uses. Of these areas, only the Williamson River Delta has been fully reconnected to the lake by removing dikes. The KBRA parties intend that Agency Lake Ranch, Barnes Ranch, and the Wood River Wetland be reconnected as well, although such reconnection requires further study and environmental compliance prior to implementation.

Description of Activity: Work will entail removing and repositioning ten miles of levee material, forming small islands and other features designed to expand and diversify wetland fringe habitats. In addition, the project will be coordinated and integrated with reconstructing the Sevenmile Creek and Fourmile Creek channels and deltas where they will enter Agency Lake following dike removal. Cost estimates are based on similar activities at the Williamson River Delta, which was completed in 2009.

Products and Benefits: Such reconnection will provide some storage benefit, but its main value accrues from providing habitat for endangered suckers and for salmon and steelhead fry. Measures to increase water storage in Upper Klamath Lake by approximately 108,500 acre feet include the breaching of levees in the Williamson River Delta that reconnected approximately 28,800 acre feet of storage (this project was completed in 2008); 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.

Basis for Cost Estimates: Fish managers prepared estimates of the removing dikes and restoring wetlands based on experience with similar work in the Klamath and other basins.

Upper Klamath Lake USFS Uplands (Line 10). Seven years: $0.2 million; 15-year total: $3.2 million.

Need: Restore riparian and adjacent forested uplands. Many riparian forests are over-stocked due to conifer encroachment. This condition, coupled with adjacent over-stocked upland forests, poses a high risk of catastrophic wildfire that would impair fish

production. Reduce road-related fine sediment inputs and migratory impediments that degrade fish habitat and interfere with migration and feeding. Legacy roads that are no longer needed, or are in poor condition, are a major source of fine sediment inputs into tributaries.

Description of Activity: Reduce hazardous fuels buildup in most USFS-owned watersheds by removing encroaching conifers from riparian and adjacent upland forests. Repair or decommission dirt roads and road crossings to reduce sediment inputs to streams and eliminate migratory impediments that impact spawning and rearing habitat and interfere with fish feeding and migration. Restore riparian habitat to provide shade and reduce excessive water runoff during storms.

Products and Benefits: Restoring upland drainage processes, reducing sediment input to streams, eliminating impediments to migration, improving riparian conditions, and reducing risk of catastrophic wildfire will maintain and improve in-stream habitat quality and fish survival.

Basis for Cost Estimates: Fish managers prepared estimates based on experience with similar work in the Klamath and other basins.

Upper Klamath Lake and Keno Reservoir Nutrient Reduction, and Keno Reservoir Wetlands Restoration (Lines 11 and 12). Seven years: $9. 2 million; 15-year total: $55 million.

Need: Excessive amounts of nutrients and organic material flowing out of Upper Klamath Lake into Keno Reservoir and hence into the Klamath River is one of the core environmental problems in the Klamath River Basin. Resulting ecological issues include massive algal blooms, fish die-offs, fish disease, and poor water quality, accompanied by economic hardship and conflict stemming from problems with fisheries as well as from recent imposition of Clean Water Act remediation requirements. Therefore, water quality and nutrient reduction efforts in and above Keno Reservoir are critical components of the KBRA.

Description of Activity: A combination of treatment wetlands, engineered water treatment facilities, physical removal of particulate organics, treatments to immobilize nutrients, or other measures will be evaluated. Feasibility of various alternative treatment methods and facilities must be studied prior to implementing specific actions. Ultimately, the most effective measure(s) to reduce concentrations of nutrients and organic matter in Upper Klamath Lake and the Keno Reservoir will be implemented. Interim Measures 10 and 11 of the Klamath Hydroelectric Settlement Agreement (KHSA) are closely related to these actions; indeed, Interim Measure 10 is explicitly intended to provide direction for this activity.

Products and Benefits: These measures will result in significant reductions in nutrients and organic material that will reduce algal blooms, fish die-offs and disease, and improve water quality.

Basis for Cost Estimates: Cost estimates include $5 million for feasibility and design studies flowing from recommendations emerging from the Water Quality Conference under Interim Measure 10 of the KHSA, $5 million for wetland restoration, and $50 million for implementing results of feasibility and design studies. Costs are certain to be high, and may be higher than identified in this budget. More precise estimates must follow detailed feasibility analyses.

4.3.2. Upper Klamath Basin Below Keno to Iron Gate

Introduction: Restoration activities below Keno Reservoir to Iron Gate Dam described below primarily address factors that improve the overall habitat value for existing fish resources and prepare habitats for future use by anadromous fish. These instream, riparian, and upland habitat projects will provide for erosion control and enhance streambed conditions by removing migration barriers and improving reproduction and juvenile rearing conditions. Both private lands and federal lands can support projects, and any work related to private lands will be based on voluntary, collaborative approaches. If Secretary of the Interior determines that the hydroelectric dams will be removed, work in this reach before removal will focus on preparing tributary habitat for reintroduction of anadromous fish. Restoration within the geomorphic influence of Project reservoir would be minimized until dams are removed. After dam removal, efforts would focus on restoring mainstem habitat and its connection to tributaries within the reservoir reach.

Integrated knowledge and opinions from representatives of the USFWS, USFS and BLM identified the majority of the targeted restoration activities and associated costs in this area. Users of this information should consider that the future Phase I Restoration Plan, developed under Section 10 of the KBRA, will ensure appropriate prioritization of the restoration activities described below. Moreover, the scope and priority of restoration actions will likely change as scientific understanding and experience with restoration actions reveal more effective or efficient approaches through adaptive management. These budget estimates were based on recent experience with implementing similar activities. Costs also include an "Implementation Staffing Cost" to provide necessary support (staff, environmental compliance, permitting, fiscal management, contract management, etc.), without which the necessary work cannot be accomplished.

Keno to Iron Gate Upland Private and BLM (Line 13). Seven years: no funding; 15-year total: no funding.

The KBRA Parties are recommending that these activities be delayed. These activities may be implemented after fifteen years if necessary to meet the rebuilding goals. If these

activities are needed, they would restore upland habitat to reduce road-related fine sediment that degrades fish habitat and interferes with migration and feeding.

Keno to Iron Gate Upland USFS (Line14). Seven years: $0.6 million; 15-year total: $1.4 million.

Need: Restore upland habitat to reduce risk of catastrophic wildfire and road-related fine sediment inputs and migratory impediments that degrade fish habitat and interfere with migration and feeding. Legacy roads that are no longer needed, or are in poor condition, are a source of sediment inputs into tributaries. Over-stocked riparian and adjacent forests pose a high risk of catastrophic wildfire that would impair fish production..

Description of Activity: Restoration activities include a series of actions to reduce or prevent sediment inputs from roads including stormproofing, road decommissioning, and reconstruction of road crossings on nearby private and federal lands. Activities also include reducing hazardous fuels in priority at-risk watersheds on USFS lands. Specific USFS projects include: 1) decommissioning 5 miles of unauthorized roads in Shovel Creek and Bogus Creek watersheds; 2) upgrade and repair 16 crossings on the "3 Road" in Bogus Creek watershed, 8 crossings on 47N13 in Bogus Creek watershed, and 5 crossings in Deer-Snackenburg watershed. The cost estimates also include some riparian fencing; 3) implement upslope fuel reduction in two projects: (1) Black Rock Late Successional Reserve (LSR) fuels reduction ($350,000, 679 ac), includes fending to protect aspen areas, NEPA is complete. (2) Butte Mountain LSR project ($150,000, 1,792 ac of Rx burn and 100 ac thinning = 1892 ac), NEPA is in progress and will be completed by the USFS.

Products and Benefits: Restoring upland drainage processes, reducing and preventing sediment inputs to streams, eliminating impediments to migration, improving riparian conditions, and reducing risk of catastrophic wildfire will maintain and improve in-stream habitat quality and fish survival.

Basis for Cost Estimates: The Forest Service prepared estimates based on experience with similar work in the Klamath and other basins. Costs for projects on USFS lands are for implementation only since the planning costs were covered by the USFS.

Keno to Iron Gate Mainstem Restoration & Tributaries – Diversions and Riparian (Lines 15 and16). Seven years: $2.55 million; 15-year total: $3.15 million.

Need: Tributaries to this reach of the Klamath River will be extremely important habitats for reintroduced salmon and steelhead, and therefore are high priority areas for restoration work. If the hydroelectric dams are removed, the mainstem river will undergo significant changes after dam removal, and riparian, instream and floodplain habitat will need to be rebuilt to provide suitable migration and rearing habitat.

Description of Activity: Activities will include improving and protecting riparian corridors, restoring floodplain function, improving instream fish habitat, grazing management, vegetation management, removing fish migration barriers, gravel augmentation, and restoring functional stream channel characteristics. Pre-dam removal work will focus on restoring tributary habitat, and mainstem restoration activities will be incorporated after dams are removed.

Products and Benefits: These mainstem and tributary restoration measures in the Klamath River will provide important spawning and rearing habitat for salmon and steelhead that are reintroduced to this reach.

Basis for Cost Estimates: Fish managers prepared estimates of the mainstem and tributary restoration costs based on experience with similar work in the Klamath and other basins.

4.3.3. Lower Klamath River Basin Between Iron Gate and Mouth

Introduction: Restoration activities below Iron Gate Dam to the mouth of the Klamath River, described below, primarily address key limiting factors and threats to anadromous fish restoration and recovery by improving the overall habitat value so that the viability of anadromous fish populations significantly improves. Projects include instream, riparian, and upland habitat projects to provide erosion control, enhance instream flow and streambed conditions, and improve water quality and quantity in key watersheds. Removing barriers to fish passage due to poorly designed culverts which prevent anadromous fish from reaching healthy spawning habitat, interrupt their migration, and inhibit completion of their life cycles, will be a focus area for reconnecting habitats and improving conditions in tributaries below Iron Gate Dam. Estuarine and wetland restoration projects near the mouth of the Klamath River will protect and improve habitat that is important for anadromous fish migration and rearing, and transition into the ocean environment. The series of restoration activities identified below Iron Gate Dam emphasize the restoration of properly functioning instream conditions over the 10-year period to improve the viability of anadromous fish resources and significantly improve their status so that fish populations are resilient enough to withstand dam removal activities as well as abundant enough to serve as a source for reintroduction efforts. Restoration projects that might be destroyed during dam removal will not be implemented prior to Facilities Removal.

Because the majority of the restoration actions occur near the valley-floor in the mainstem Klamath River and tributaries below Iron Gate Dam, excluding the Trinity River, focus areas are dominated (85%) by private and tribal lands. Capacities must be built to implement collaborative, incentive-based programs with private and tribal landowners willing to improve water quality and quantity and land use practices in key watersheds. The remaining areas target activities associated with erosion control measures in upland areas on federal lands and include road decommissioning and hazardous fuels reduction.

Restoration activities and associated costs identified below represent the integrated knowledge and professional opinions of restoration specialists including: NMFS, USFWS, USFS, CDFG, and tribes while also utilizing existing watershed and restoration reports. Users of this information should consider that the future Phase I Restoration Plan, developed under Section 10 of the KBRA, will ensure appropriate prioritization of the restoration activities described below. Moreover, the scope and priority of restoration actions will likely change as scientific understanding and experience with restoration actions reveal more effective or efficient approaches through adaptive management. The budget estimates were based on recent experience with implementing similar activities below Iron Gate Dam in the recent past. Cost estimates also integrated necessary support (staff, environmental compliance, permitting, contract management, etc.) into the "unit cost" for each type of restoration action.

Shasta River Aquatic Habitat Restoration (Line 17). Seven years: $3.4 million; 15-year total: $12.4 million.

Need: Improving fisheries will require reducing water temperatures, improving summer instream water flow, and restoring riparian and instream habitat for anadromous fish in critical areas within the Shasta River and its tributaries. The Shasta River coho population is identified in the NMFS Draft SONCC Coho Salmon Recovery Plan as a "core" population. Key limiting factors for coho in the Shasta River have been identified as sufficient instream flows, especially during summer months, water quality and maintaining connectivity to key refugial areas for over-summering salmonids. Glacial melting from Mt. Shasta and precipitation provide the principle source of recharge in the Shasta River supporting year-round "spring-fed" tributaries in some areas of the watershed (*e.g.*, Big Springs). Historically, these low-gradient cool-water tributaries formed unique summer refugia areas for juvenile salmon and steelhead and provided important spawning habitats. While some isolated locations still contain these unique habitats, most of the mainstem Shasta River is unsuitable for summer rearing due to insufficient instream flows, high water temperatures and poor water quality resulting from land use practices, such as major water diversions, riparian grazing and dams. Warm tail water runoff from flood irrigation near the river further aggravates this situation by adding to high water temperatures that reduce water quality. These impacts reduce available rearing habitat and limit the restoration of salmon and steelhead populations.

Description of Activity: A primary challenge in the Shasta River is balancing the water management needs of agriculture in the basin with the water quality and quantity requirements of anadromous fish. Because over 70 percent of the Shasta River watershed is in private much of this work will need the support of landowners; capacities to build partnerships with private land owners is key to successful restoration. Priority restoration activities will be based upon an understanding of the water quality and quantity needs of anadromous fish and the actions necessary to address these needs. Actions include: 1) instream flow studies to evaluate minimum flows that restore and maintain salmon in key rearing habitats 2) development of a water balance model to guide and prioritize water conservation and restoration projects while optimizing water use for landowners, 3)

within 5 years, implementation of on-the ground projects to improve water quantity and quality in the Shasta River and its tributaries. This could include a water trust, conservation easements, land purchase and on-farm water conservation activities. Due to the large area and complex infrastructure involved in current water withdrawals and distribution throughout the watershed, improving instream flows will likely require significant engineering, and changes in infrastructure of many diversion facilities. Addressing instream flows to increase available rearing habitat will be the first priority restoration activity in the Shasta River. If projects are not ready to implement after 5 years, funds will be reprogrammed to other high priority restoration activities in the lower Klamath basin. Once there is adequate flow, and thus rearing habitat at key locations, future restoration actions will focus on the improving habitat complexity and restoration of properly functioning conditions which will include: measures to rehabilitate the floodplain, installation of engineered log jams , identify, prioritize and remove fish passage barriers, and exclude cattle from riparian areas.

Products and Benefits: 1) Improve water quality and quantity, increase summer and winter rearing habitat; 2) improve connections between the channel and the floodplain to create and maintain off-channel habitats to improve winter juvenile rearing habitat; and 3) provide access to historically available spawning habitat and provide access for juvenile rearing.

Basis for Cost Estimates: Fish managers prepared estimates of the habitat restoration costs based on experience with similar work in the Klamath and other basins. The high priority of increasing instream flows is likely to involve significant changes in infrastructure and land management practices.

Shasta, Scott, Mid-Klamath and Salmon River USFS Uplands (Lines 18, 20, 23, 28). Seven years: $7 million; 15-year total: $16.5 million.

Need: Improving habitat for salmon requires reducing or preventing sediment inputs from roads. Sediment degrades salmonid spawning and rearing habitat by smothering eggs and reducing aquatic insect productivity. In addition, sediment suspended in the water column interferes with fish migration and feeding. Legacy roads that are no longer needed, or were improperly constructed in the past, contribute a significant amount of sediment into tributary streams and, eventually into the mainstem Klamath River. Road maintenance practices have improved recently, but many poorly constructed roads remain that can either be decommissioned or repaired using newly developed maintenance practices. Fire suppression has prevented natural thinning of forest fuels, resulting in dense forest under stories. These areas have a high risk of catastrophic wildfires that could cause mass wasting of hillsides and high water temperatures due to decreased shading.

Description of Activity: Restoration activities include a series of actions associated with reducing or preventing sediment inputs from roads including storm-proofing, road decommissioning of over 450 miles of roads, treating over 80 miles of roads, and reconstruction of road crossings on nearby private and federal lands to increase spawning

success and habitat values for winter and summer salmon rearing. Decommissioning activities will involve the use of large heavy equipment to completely remove all road fill at stream crossings, up sloping and ripping the road surface, and re-planting the decommissioned site to prevent erosion from the construction activities. Road upgrade involves the use of heavy equipment to re-shape the road surface and install proper road drainage structures, such as ditch relief culverts and rolling dips, to alleviate erosion and properly distribute road related runoff. Activities also include reducing hazardous fuels on USFS lands through prescribed fire on 80,000 acres and over 1500 acres of thinning in strategically selected watersheds to mimic, and to the extent practicable, restore the historic anthropogenic influences to the fire regime, so that the risk of catastrophic wildfires is reduced and protection of salmon migration, spawning and rearing habitats is provided.

Products and Benefits: These actions will reduce or prevent sediment from chocking spawning gravel and rearing habitat for salmon and steelhead and will restore properly functioning habitat to rebuild salmon populations.

Basis for Cost Estimates: Fish managers prepared estimates of the habitat restoration costs based on experience with similar work in the Klamath and other basins. The significantly larger cost for this restoration action is related to the heavy equipment time required to complete this task.

Scott River Aquatic Habitat Restoration (Line 19). Seven years: $4 million; 15-year total: $5 million.

Need: To restore water flows and aquatic habitat in critical areas within the Scott River and its tributaries. The Scott River is identified in the NMFS draft SONCC Coho Salmon Recovery Plan as a core population. Key limiting factors for anadromous fish in the Scott River have been identified as sufficient instream flows, especially during summer months, and maintaining connectivity to key refugial areas for oversummering. A significant source of flow for this watershed is snowmelt from mountains that surround the Scott Valley. The land along the mainstem and lower tributaries of the Scott River is used for agricultural production and water is diverted throughout the valley through large scale canals and other water management systems. Water use associated with agricultural operations along the mainstem Scott River and lower tributaries has resulted in limited instream flow, impacted floodplain habitat and reduced riparian shading. This condition interferes with access to spawning areas due to lack of flow during fish migration, reduced availability and connectivity of summer rearing habitat and an absence of winter refugia. Diversions and lack of habitat complexity in the tributaries interfere with summer rearing.

Description of Activity: A primary challenge in the Scott River is balancing the water needs of agriculture in the basin with the water quality and quantity requirements of anadromous fish. An additional challenge is that adequate tools/models regarding groundwater, surface water, and groundwater/surface water interactions are not available to guide restoration activities. Instream flow studies that can guide development of

minimum instream flow needs for anadromous fish both during critical periods and locations do not exist for the Scott River. For these reasons, the activities will focus on the development of models to improve our understanding of minimum instream flows for anadromous fish survival and recovery as well as development of water balance models to guide water management so that limited water supplies can be optimized for both protection of anadromous fish habitats and irrigation purposes

Priority restoration activities will include development of such models, and associated water flow monitoring, and using these tools to guide restoration activities so that water quantity and quality needs of anadromous fish are met. Due to the large amount of land in private ownership in the Scott Valley, conducting studies will require cooperation from private landowners. Restoration activities will include: 1) Conducting instream flow studies to identify limiting reaches of stream, and 2) create water balance models that help inform and prioritize water flow project sites. Future restoration efforts will include investments efforts that will improve water quantity and quality improvements through water conservation easements, water trust and water leasing and key land purchases. In addition, other future efforts will include improving habitat complexity in key reaches that lack floodplain connectivity and excluding cattle from riparian areas. If the studies identified above are not are not underway within 5 years, funds will be reprogrammed to other high priority restoration efforts in the Klamath basin.

Products and Benefits: Restoration activities will result in improving our understanding of the instream flow needs of anadromous fish and how to optimize water management approaches to provide adequate habitat conditions while also providing water for agricultural purposes. These models will guide development of a collaborative, incentive-based program for willing landowners to comprehensively improve juvenile rearing conditions; 4) improved water quality and quantity in the Scott River; and 5) re-vegetation and reestablishment of riparian forest in specific areas and improved salmon spawning success.

Basis for Cost Estimates: Fish managers prepared estimates of the habitat restoration costs based on experience with similar work in the Klamath and other basins.

Scott River, Mid Klamath, Lower Klamath, and Salmon River Private Uplands (Lines 21 and 24). Seven years: 3.6 million; 15-year total: 5.6 million.

Need: Improve salmon habitat in the Scott River, Mid Klamath, and Salmon River Private Uplands. Sediment degrades salmonid spawning and rearing habitat by smothering eggs and reducing aquatic insect productivity. In addition, sediment suspended in the water column interferes with fish migration and feeding. Legacy roads that are no longer needed, or were improperly constructed in the past, contribute a significant amount of sediment into tributary streams and, eventually into the mainstem Klamath River. Road maintenance practices have improved recently, but many poorly constructed private roads remain that can either be decommissioned or repaired using the newly developed maintenance practices. Fire suppression has prevented natural thinning of forest fuels, resulting in dense forest under stories. These areas have a high risk of

catastrophic wildfires that could cause mass wasting of hillsides and high water temperatures due to decreased shading.

Description of Activity: Restoration activities include a series of actions associated with reducing or preventing sediment inputs from roads including storm-proofing over 1,400 miles of road, decommissioning over 500 miles, and reconstruction of road crossings on private uplands. Decommissioning activities will involve the use of large heavy equipment to completely remove all road fill at stream crossings, outslope and rip the road surface and re-plant the decommissioned site to prevent erosion from the construction activities. Road upgrade activities involves the use of heavy equipment to re-shape the road surface and install proper road drainage structures, such as ditch relief culverts and rolling dips, to alleviate erosion and properly distribute road related runoff. Restoration activities also include reducing hazardous fuels on 15,000 acres of private lands through prescribed fire and thinning in strategically selected watersheds to mimic some of the functions and characteristics historically provided by a natural fire regime. These restoration activities will require significant coordination and participation with private landowners

Products and Benefits: 1) increase spawning success and instream habitat values for winter and summer salmon rearing; 2) reduce the risk of catastrophic wildfires and protect salmon migration, spawning and rearing habitats.

Basis for Cost Estimates: Fish managers prepared estimates of the habitat restoration costs based on experience with similar work in the Klamath and other basins. The significantly larger cost for this restoration action is related to the heavy equipment time required to complete this task.

Mid Klamath River & Tributaries (Iron Gate to Weitchpec) Aquatic Restoration (Line 22). Seven years: $1.8 million; 15-year total: $5 million.

Need: Provide aquatic habitat restoration in critical areas between Iron Gate Dam and Weitchpec and tributaries. Access to tributary habitat is currently limited by buildup of sediment and gravels at tributary mouths as a result of past land management practices that caused mass erosion and reduced natural flow. Eight (8) Highway 96-related barriers in this reach block access to over 15 miles of tributary spawning and rearing habitat. The mainstem Klamath in this reach lacks channel complexity, off-channel floodplain habitat, and winter refugia important for migration and rearing, and experiences fish mortality due to disease. It is important to work on highway-related barrier removal and tributary mouth access projects in this reach before removal of any hydroelectric dams to improve the status and viability of anadromous fish resources so that fish populations are resilient enough to withstand dam removal activities as well as abundant enough to serve as a source for reintroduction efforts. Assuming dams are removed, restoration efforts will focus on improving channel complexity in the mainstem below Iron Gate dam. Restoration efforts will be strategic in this reach so that expensive restoration projects that might be destroyed during dam removal will be avoided over the ten-year pre-removal period in the mainstem Klamath.

Description of Activity: These efforts include low-cost community-based removal of alluvial deposits that reduce access at 60 tributary mouths, replacing 4 Caltrans culverts on Highway 96 to improve fish passage from the mainstem into tributaries, adding large woody debris structures in 14 miles of the mainstem and 15 confluence pools. While it is important to improve resiliency and survivorship of anadromous fish in this reach, investments will be strategic so that efforts will be most effective. Efforts prior to removal of any hydroelectric dams will focus on developing access to, and restoring tributary habitat. After dams are removed and mainstem geomorphic adjustments have occurred, restoration in this reach will focus on rehabilitating 1.0 miles of floodplain to improve connections between the channel and the floodplain through installation of channel complexity, riparian planting and spawning gravel. Caltrans will play a key partnership role in the replacement of fish passage barriers on Highway 96.

Products and Benefits: 1) create and maintain off-channel habitats to improve winter juvenile rearing; 2) alter alluvial deposits and steep gradients at tributary outlets to allow for upstream and downstream passage of fish; 3) improve fish passage at Highway 96 crossings: 4) improve habitat complexity; and 5) activate the floodplain;.

Basis for Cost Estimates: Fish managers prepared estimates of the habitat restoration costs based on experience with similar work in the Klamath and other basins.

Lower Klamath River & Tributaries (Weitchpec to Mouth) Aquatic Habitat Restoration (Line 25). Seven years: $7 million; 15-year total: $15 million.

Need: Provide aquatic habitat restoration in critical areas in the Lower Klamath River between Weitchpec and the mouth. The Lower Klamath River, estuary, and tributaries, are important migration, spawning, and rearing areas for anadromous fish. There is currently a lack of habitat complexity that fish need for winter and summer rearing in the Lower Klamath River estuary and its tributaries. Much of the Lower Klamath and estuary are in Private ownership. Anadromous fish from throughout the entire Klamath Basin use mainstem and off-channel habitats of the Lower Klamath River, the estuary, and tributaries for non-natal rearing. These non-natal rearing areas, once restored, will provide abundant food and favorable overwintering conditions that will likely result in rapid growth rates of juveniles, and thus, increasing ocean survival. Due to historic and ongoing land use practices, off-channel rearing habitat in the Klamath River estuary and the tributaries is limited. The Klamath River estuary is an important transition area between fresh and salt water environments. Improving habitat complexity in the estuary is critical to the survival and reproductive success of all anadromous fish in the Klamath Basin since they must pass through this part of the watershed at least twice during their life-cycle, and non-natal rearing in this area is so important to ocean survival and subsequent return of the fish to spawn. Much of this restoration will involve collaboration with the Yurok Tribe to design, implement, and monitor the work.

Description of Activity: restore geomorphic processes within the estuary, mainstem, and tributary habitats of the Lower Klamath River Sub-basin; methods include channel reconfiguration, creation or enhancement of off-channel habitat features, construction of

complex wood structures and/or engineered log jams (ELJs), and rehabilitation of riparian forests in the mainstem, estuary, and tributaries. Channel configuration activities are proposed for the mainstem and estuary (0.8 miles) and in two priority tributaries (Blue Creek – 1.5 miles; Ah Pah Creek – 1.0 miles). Construction of complex wood structures and ELJs will be implemented along 68 miles within the Lower Klamath River Sub-basin. Channel reconfiguration and wood loading efforts will be coupled with re-vegetation efforts to promote recovery of riparian forests.

In addition, 20 miles of fencing will be installed to exclude livestock and feral cattle from riparian areas in the lower mainstem and estuary, while providing incentives for landowners to eliminate grazing in sensitive coastal habitats. 75 miles of riparian habitat will be planted to restore stream shading and complexity, and to facilitate long-term wood recruitment of wood to aquatic habitat. Much of this restoration will involve collaboration with the Yurok tribe to design and implement the work

Products and Benefits: 1) improve connections between the channel and the floodplain and to create and maintain off-channel habitats to increase the quality and quantity of juvenile rearing habitat; 2) use of natural materials to restore the geomorphic processes that facilitate formation and long-term maintenance of complex instream habitats (e.g. deep pools, well sorted spawning gravels, 3) removing feral cattle from the Lower Klamath River and working with small-scale ranchers to eliminate grazing in sensitive coastal habitats (includes 20 miles of exclusionary fencing); and 4)) improve riparian productivity and resiliency by planting riparian habitat to facilitate long-term recruitment of wood to fluvial habitats and increase forest resiliency. Much of this restoration will involve collaboration with the Yurok Tribe to design, implement, and monitor the work.

Basis for Cost Estimates: Fish managers prepared estimates of the habitat restoration costs based on experience with similar work in the Klamath and other basins.

<u>Lower Klamath Tribal and Private Uplands (Line 26)</u>. Seven years: 8.5 million; 15-year total: 32.5 million.

Need: Improve salmon spawning and rearing habitat in the Lower Klamath River and its tributaries by reducing sediment impacts to aquatic habitats and rehabilitating forests. Excessive sediment delivery to stream habitats degrades salmonid spawning and rearing habitat by reducing the quality of spawning gravels resulting in decreased spawning success and limits aquatic insect productivity (*e.g*. food supply). In addition, sediment suspended in the water column can inhibit fish migration and feeding. Legacy roads that are no longer needed, or were improperly constructed in the past, contribute a significant amount of sediment into tributary streams and, eventually into the mainstem Klamath River. These sediment sources can also deposit into newly restored off-channel habitats in the Lower Klamath River areas which diminishes the proper functioning of these critical areas. Road maintenance practices have improved recently; however, many poorly constructed private roads remain that can either be decommissioned or repaired using the newly developed maintenance practices.

Description of Activity: Restoration activities include conducting road assessments, decommissioning and/or reconstruction of roads and stream crossings, and conducting comprehensive forest rehabilitation on private and tribal lands in the Lower Klamath River Sub-Basin. Activities also include a series of actions associated with reducing or preventing sediment inputs from roads on private and tribal lands in the Lower Klamath. Restoration specialists have identified the need to storm-proofing over 100 miles of road, decommission over 90 miles of road, and reconstruct road crossings on private and tribal uplands. Decommissioning activities will involve the use of heavy equipment and skilled operators to completely remove all road fill at stream crossings, outslope and rip the road surface and re-plant the decommissioned site to prevent erosion from the construction activities. Road upgrade and stormproofing involves the use of heavy equipment to re-shape the road surface and install proper road drainage structures, such as ditch relief culverts and rolling dips, to alleviate erosion and properly distribute road related runoff. Over the 15-year period, upslope restoration activities will require significant coordination with, and participation of private landowners and the Yurok Tribe to prioritize efforts and maximize investments.

Products and Benefits: 1) increase spawning success and instream habitat values for winter and summer salmon rearing; 2) reduce the risk of catastrophic wildfires and protect salmon migration, spawning and rearing habitats; and 3) rehabilitating forests, including sensitive riparian areas, through improved resource management (e.g. forest thinning, prescribed fire) and active restoration (e.g. tree planting, bioengineering).

Basis for Cost Estimates: Fish managers prepared estimates of the habitat restoration costs based on experience with similar work in the Klamath and other basins. Due to the the massive heavy equipment effort required to decommission and upgrade roads, and the skill required to complete the work, the costs for upland restoration are higher than other types of aquatic restoration in the basin.

<u>Salmon River Aquatic Habitat Restoration (Line 27)</u>. Seven years: $1.8 million; 15-year total: $3.3 million.

Need: Provide aquatic habitat restoration in critical areas in the Salmon River and its tributaries.

Description of Activity: These restoration efforts include adding large woody debris structures, including engineered log jams, in 38 miles of the Salmon River and tributaries, and 1.1 miles of channel reconfiguration. Also, improve riparian zones through plantings in 150 acres and removal of non-native competitors on 420 acres of tributary watersheds.

Products and Benefits: 1) improve connections between the channel and the floodplain and to create and maintain off-channel habitats to improve juvenile rearing; 2) improve riparian zones to increase survival of salmon.

Basis for Cost Estimates: Fish managers prepared estimates of the habitat restoration costs based on experience with similar work in the Klamath and other basins.

4.4 Fisheries Reintroduction Program (Seven years: $27 million; 15 year total $63 million)

Introduction: The complete absence of anadromous fish above Iron Gate Dam has been a fundamental driver for much conflict in the Klamath Basin, and rectifying this condition is therefore a central element of the KBRA. This section describes activities for the Reintroduction portion of the Fish Program (Section 11) as identified in Appendix C of the KBRA. The goal of this program is to re-establish anadromous fish into historically occupied areas currently blocked by the hydroelectric dams on the Klamath River. The Klamath Hydroelectric Settlement Agreement establishes a process for potential removal of the dams that currently block passage.

Reintroduction will begin with development of a Reintroduction Plan (line 29) detailing the facilities and programs necessary for success. Costs of the facilities and programs identified here are based on the experience of past and on-going reintroduction efforts undertaken by the Oregon Department of Fish and Wildlife (ODFW) and others in the Hood River and Deschutes River basins, Oregon. Refinements in the facilities and programs that will be made after the plan is completed may include but are not limited to: specific location of collection facilities (line 30); specific needs for modification of existing production versus construction of a new conservation hatchery facility (line 31); fish transportation needs (line 33); specific location of acclimation facilities (line 32); and development of the monitoring and evaluation program (line 34) study components and related needs. Also identified here are the latest dates that each of the measures could be undertaken and still meet the goal of re-introduced adult anadromous fish arriving at the dam sites if the dams are removed.

Reintroduction Plan (Line 29). **Seven years: $0.7 million; 15-year total: $1.5 million.**

Need: Prepare the Reintroduction Plan to develop the detailed schedule and workplan for this program.

Description of Activity: This is funding for a staff planner to lead the development and write an implementation plan for the reintroduction of anadromous fish into the upper Klamath Basin.

Products and Benefits: Preparation of the Reintroduction Plan is an essential first step to ensure an effective program. The plan is likely to result in refinements in the specific location of collection facilities; specific needs for modification of existing production versus construction of a new conservation hatchery facility; fish transportation needs; specific location of acclimation facilities; and development of the monitoring and evaluation program study components and related needs.

Basis for Cost Estimates: The 2007 budget estimate was $150,000 per year. Under current funding proposals, in order to accomplish this task we would combine Personnel Services budgets for the planning (line 29; $100,000) and the Monitoring and Evaluation (line 34; $190,000) for 2012. This work can begin earlier if funding is made available.

Collection Facility (Line 30). Seven years: no costs; 15-year total: $6.9 million.

Need: Reintroduction of salmon above the current locations of the hydroelectric dams will require a facility to collect and transport salmon at either Keno or Link River dams.

Description of Activity: Build a fish collection facility at either Keno Dam or Link River Dam.

Products and Benefits: The collection facility will allow fish managers to collect and, when necessary, transport returning salmon to spawning and rearing habitat areas above the dams that are not under consideration for removal. This will open hundreds of miles of salmon habitat and increase fish populations.

Basis for Cost Estimates: The collection facility funding estimate is based on the Hood River collection facility built on the Powerdale Dam fish ladder. The facility at Powerdale took advantage of the dam and ladder to "funnel" adult fish through a facility where they were sorted, marked for evaluation, and released into the upper basin either through physical transportation or volitionally. The initial year costs ($1,000,000) are for engineering and design of the facility and site investigations. The second year costs are the estimated construction costs ($4,265,000). Initially the O&M ($500,000) for this facility is built into the out years of line item 30 but will eventually be absorbed by the monitoring and evaluation program (line 34). To have this facility online and operating in time to handle the first returning adults, the initial year of implementation of this measure must be no later than 2018.

Production Facility (Line 31). Seven years: $4.8 million; 15-year total: $7 million.

Need: Provide juvenile salmon for the reintroduction to areas that have been blocked by hydroelectric dams.

Description of Activity: Build a conservation production facility to provide juvenile fish for the reintroduction. Based on both the Hood and Deschutes programs, production facilities are important for the first phases of reintroduction in order to both collect gametes and to rear the juveniles to the appropriate stage for release. This line item envisions either modifying an existing facility (ODFW's Klamath Hatchery in the upper basin) or constructing a new facility for these needs.

Products and Benefits: Based on experience in other basins, a successful reintroduction program will require a jump start by producing and out-planting juvenile salmon in

tributaries that have been blocked by the hydroelectric dams. Once self-sustaining populations have been reintroduced this facility will be phased out.

Basis for Cost Estimates: The first year costs ($750,000) are engineering and design and site prep costs. The second year costs ($2,285,000) are capital construction cost estimates. Annual costs ($285,000) following the capital construction are for O&M of the conservation production hatchery. This hatchery is not intended to function as a production facility akin to Irongate Hatchery and will no longer be necessary once self-sustaining populations are reestablished in the upper basin. To have this facility online and operating in time to release juvenile fish that would return the first year following hydroelectric dam removal, assuming an affirmative determination by the Secretary of the Interior under the Klamath Hydroelectric Settlement Agreement in 2012, the first year of implementation of this measure would need to be no later than 2016.

Transportation and Acclimation Facilities (Lines 32 and 33). Seven years: $3.1 million; 15-year total: $6.2 million.

Need: Acclimation facilities are remotely located late-term rearing facilities intended to imprint juvenile fish on specific water-bodies. Typically they are small ponds with water control features to facilitate filling and draining. These facilities and the associated equipment to transport fish are needed to successfully out-plant juvenile salmon from the production facility above into the tributaries.

Description of Activity: Line item 32 is to fund approximately three acclimation facilities (one each on the Williamson, Sprague, and Wood rivers) in the upper basin above Upper Klamath Lake. Line item 33 is to fund the physical transportation of adult fish and potentially juvenile fish around Keno Reservoir and potentially Upper Klamath Lake during the early phase of the reintroduction. It is anticipated that this need will eventually phase-out as the re-introduced fish become more sustainable and water quality improves seasonally during key migration periods in Keno Reservoir and Upper Klamath Lake. To have this program online and operating in time to handle the first returning adults, the initial year of implementing this measure must be no later than 2018.

Products and Benefits: Acclimation of juvenile salmon so they can survive in tributaries that have been blocked by the dams and accelerate the growth of salmon populations returning to these tributaries.

Basis for Cost Estimates: The first year of expenditure ($850,000) involves facilities siting and preliminary engineering work. The second year of expenditures ($2,285,000) is the property acquisition costs and capital construction. Costs in subsequent years ($285,000) are for O&M of the facilities. To have these facilities online and operating in time to release juvenile fish that would return the first year following dam removal, the first year of implementation of this measure would need to be no later than 2016.

4.5 Fisheries Monitoring (Seven years: $37 million; 15 year total $105 million)

Introduction: Under Section 12 of the KBRA, the Fisheries Monitoring Plan is scheduled to be finalized by March 31, 2012 and is intended to develop implementing monitoring actions for each of the four primary monitoring foci (e.g., status and trends, environmental water, restoration effectiveness, and limiting factors for recovery and restoration of fish populations) during the Phase I period. Monitoring actions and priorities will include compilation and consideration of completed and ongoing Klamath Basin monitoring efforts. As stated earlier and in order to facilitate the most efficient adaptive management linkages between monitoring data and restoration actions, it is currently recommended that the Phase I Restoration Plan and Monitoring Plan be combined into a Phase I Restoration and Monitoring Plan, which will then be revised and followed by a Phase II Fisheries Restoration and Monitoring Plan by March 31, 2022. The Fisheries Managers have prepared an initial outline of the Restoration and Monitoring Plan, which identifies the following main components related to monitoring:

1. ***Status and Trends Monitoring***: At the time of plan implementation, dams will be in place and reservoirs will be included within the geographic bounds of this effort. If the Secretary of the Interior determines to proceed with dam removal as proposed under the Klamath Hydropower Settlement Agreement (KHSA), the character of the Basin will change significantly; monitoring targets and associated methodologies will need to adapt to reflect this change.
2. ***Data Related to Environmental Water***: Monitoring of water quality and quantity can also be reasonably expected to change following dam removal and full implementation of the KBRA and KHSA.
3. ***Effectiveness Monitoring***: Effectiveness monitoring is intended to assess the performance of restoration actions. This section will be directly linked to the restoration plan component and would need revision with the implementation of a new Phase II Restoration Plan.
4. ***Limiting Factors***: Results of earlier limiting factors analysis will likely inform later work, and this element should be subject to periodic review to assess scientific uncertainties; the need for periodic review is consistent with the timing of the Phase II Restoration Plan.
5. ***Data System***: Data management technology can undergo rapid evolution, and periodic review would help ensure that the data management approach remains the best available.

The monitoring priorities and measureable criteria will be developed for project selection for a 10-year period and enable development of an Annual Program of Work for funding implementation of prioritized actions each year to ensure the greatest return on expenditures. Under Section 12 of the KBRA, a Monitoring Plan is designed to facilitate the most efficient adaptive management linkages between monitoring data and restoration

actions. The Plan will consider and integrate existing studies and ongoing activities by local watershed groups. After 10 years, a Phase II Restoration and Monitoring Plan will be developed to cover the remaining terms of the KBRA. The budget estimates will support the Fish Managers' early development of the Phase I Restoration and Monitoring Plan, including meeting facilitation, drafting of the Plan elements, preparation of any Federal or state environmental compliance documentation, public outreach, and publication. Within 7 years of finalizing the Phase I Plan, the budget estimates also includes development of the Phase II Restoration Plan.

Monitoring and Evaluation for Reintroduction Program (Lines 34 and 35). Seven years: $12.5 million; 15-year total: $33.2 million.

Need: Investigate anadromous fish life histories in the upper Klamath Basin that will inform the overall reintroduction strategies and provide information to allow adaptive management adjustments to the implementation.

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Description of Activity: This program and its associated activities have two general phases. The first phase will involve the necessary investigations of anadromous fish life histories in the upper Klamath Basin that will inform the overall reintroduction strategies for the upper basin. It is anticipated that the reintroduction of anadromous fish in the upper basin (above Spencer Creek) will initially require active movement and intervention to achieve sustainable populations in as short a time frame as possible. Anticipated investigations include preliminary stock selections, evaluation of different life histories and stocks of fish, experimental releases and monitoring of juvenile fish movement through Upper Klamath Lake, endemic disease surveys, baseline inventory and assessments of existing resident populations, and other studies necessary to address specific objectives that will be developed in the reintroduction plan. The second phase will provide information to allow adaptive management adjustments to the implementation. During this phase, the program will measure and determine success of the strategies that yield self-sustaining populations, determine if volitional reintroduction occurred in Spencer Creek and other reaches below Keno Dam, determine effects of re-introduced fish on resident fish population, and gather information consistent with the lower basin anadromous fish monitoring and evaluation in order to best manage future fisheries. The annual costs for this work includes personnel services costs, office space acquisition, contractual services for pathology and genetics work, and equipment (boats, fish traps, computers, data loggers, etc.) necessary to conduct the monitoring and evaluations. This program needs to start 2012 in order to meet return time goals of 2021.

Products and Benefits: These studies will ensure that the best adapted types of salmon will be used to reintroduce salmon populations into the areas that have been blocked by the dams. These studies will also monitor and evaluate the effectiveness of the program to allow fish managers to make adjustments based on new information to ensure the maximum effectiveness of the program.

Basis for Cost Estimates: Costs identified here are based on the experience of past and on-going reintroduction efforts undertaken by ODFW and others in the Hood River and Deschutes River basins, Oregon.

New Hatchery at Iron Gate Dam or Fall Creek (Line 36). Seven years: $5.7 million; 15-year total: $8.5 million.

Need: Replace hatchery production to support rebuilding of salmon populations.

Description of Activity: If Iron Gate Dam is removed pursuant to the KHSA, the reservoir which has supplied water for Iron Gate Hatchery will be gone. Therefore, significant changes in hatchery infrastructure and operations will be required to produce appropriate numbers of Chinook, steelhead, and coho salmon. Such changes may take the form of modifications to existing infrastructure at Iron Gate Hatchery, or moving the hatchery operation to another location such as Fall Creek, where old hatchery facilities exist. Detailed study of alternatives is underway pursuant to Interim Measure 19 of the KHSA.

Products and Benefits: Continued hatchery production to rebuild salmon populations and increase tribal, commercial and sports harvest opportunities.

Basis for Cost Estimates: Fish managers prepared estimates of the hatchery costs based on experience with similar work in the Klamath and other basins.

4.5.1 Lower Basin Monitoring Program

Introduction: Under Section 12 of the KBRA, a Fisheries Monitoring Plan is scheduled to be finalized by March 31, 2012. The Monitoring tasks described below are designed to facilitate the most efficient adaptive management linkages between monitoring data and fisheries restoration actions of the KBRA. This diverse array of monitoring activities will provide essential data and information to evaluate the KBRA's Fisheries Program Goals (Section 9.2.6), implementation of the KBRA's Water Resources Program (Part IV of the KBRA), coordinate with the Fisheries Reintroduction and Management Plan (Section 11 of the KBRA) and assess the performance of restoration projects identified in Section 10 of the KBRA. Integrated knowledge and professional opinions from representatives of the USFWS, NMFS, CDFG, ODFW, and tribes, identified the majority of the monitoring efforts described below and the budget estimates were based on recent experience with implementing similar monitoring activities. Users of this information should consider that the future Fisheries Monitoring Plan, developed under Section 12 of the KBRA, will ensure appropriate prioritization of the monitoring activities described below.

Adult Salmonids (Line 37). Seven years: $3.6 million; 15-year total: $16 million.

Need: Monitoring and evaluation of adult salmon populations to determine how many adult salmon are returning. These activities are important so Fish Managers will know how effective the fishery restoration measures have been and to make adjustments to improve the effectiveness. Adult Chinook return information (escapement) is vital for harvest management within the Klamath Basin.

Description of Activity: Conduct annual assessment of adult salmon and steelhead natural escapement to the mainstem Klamath River and significant tributaries to determine long-term population abundance and distribution. Data collected for fall run Chinook is vital for assessing population dynamics for harvest management purposes. Activities for all species include monitoring using video weirs, spawning ground surveys, creel surveys, and other methods of direct observation of spawning fish. Tasks also include collection of fish scales genetic tissue and otoliths as well as other biological data, including hatchery marks for determining hatchery/natural fish composition on spawning grounds, and determination of fall Chinook age composition annually.

Products and Benefits: 1) track and quantify long-term population abundance and distribution; 2) assess population dynamics; 3) provide information for harvest management and for annual analyses used to determine in-river tribal and non-tribal fishing regulations, as well as ocean fishing regulations for Chinook salmon off the California and Oregon coasts;

Basis for Cost Estimates: Fish managers prepared estimates of these monitoring costs based on experience with similar work in the Klamath and other basins.

<u>Juvenile Salmonids (Line 38)</u>. Seven years: $3.3 million; 15-year total: $17.2 million.

Need: Monitoring and evaluation of juvenile salmon populations to determine how many juveniles are surviving during the fresh water portion of their lifecycle, and how juvenile survival relates to subsequent return of adults. These activities are important so Fish Managers will know how effective the fishery restoration measures have been and to make adjustments to improve the effectiveness.

Description of Activity: Conduct annual assessments of the juvenile salmon, steelhead, and other anadromous fish movement patterns and seaward migration from the mainstem Klamath River and tributaries. This work will annually monitor juvenile fish production, habitat use by life history stage, dynamics and patterns of juvenile life history strategies, and out-migration patterns. Mark-recapture techniques will be used to quantify abundance and rates of survival, migration, growth, and other biologically important variables. By relating this biological information to environmental measurements like water temperature, flow, disease prevalence, etc., factors limiting production of various species and races of anadromous fish can be identified in specific geographic areas. These limiting factors can then be addressed through restoration actions, which will result in more robust populations of anadromous fish.

Products and Benefits: 1) information on migration and rearing habitat use, out-migration timing, and measurement of overall reproductive success of anadromous fish; 2) assess life history diversity, use of various habitats by life stage throughout the Klamath Basin, and evaluate factors affecting survival; 3) identify factors limiting production of various anadromous fish populations on a watershed by watershed basis to guide restoration and fishery management efforts; 4) track success (or failure) of restoration actions intended to improve anadromous fish production; and 5) provide data and analyses for the calibration of the SALMOD salmon production model for guiding habitat restoration efforts.

Basis for Cost Estimates: Fish managers prepared estimates of monitoring costs that are based on experience with similar work in the Klamath River and other basins.

Genetics/Otololith (Line 39). Seven years: $0.5 million; 15-year total: $1.5 million.

Need: Managing anadromous fish populations is very challenging because of the complexity of their life cycles, and their extensive ocean migrations. Development and use of techniques that will allow managers to identify the origin of adult fish captured in various fisheries is enormously important. Such techniques are also important tools for understanding dynamics of the juvenile life stage. Without tools and techniques involving genetics and otoliths, fisheries managers lack important information that forces them to manage fisheries with undesirably high levels of uncertainty regarding effects of various management strategies on specific stocks of fish.

Description of Activity: Genetics work will include a Basin-wide Stock Identification Program using the most appropriate methods, such as DNA microsatellite and SNP analyses. Otolith-based work will provide more detailed understanding of in-Basin, tributary-specific structuring of fish populations, including stock identification, life history characteristics using otolith (fish ear bones) patterns, and micro-chemical analysis.

Products and Benefits: Tools and techniques involving genetics and otoliths will enable managers to implement management strategies targeting specific stocks of fish, reducing uncertainties that have been problematic for many years. This work will enable stock identification of adults within various fisheries, stock identification of juveniles to determine temporal/spatial distribution, and development of potential captive breeding programs for stocks that may be nearing extirpation.

Basis for Cost Estimates: Fish managers prepared estimates of monitoring costs that are based on experience with similar work in the Klamath and other basins.

Hatchery Tagging (Line 40). Funding for these activities is being paid by PacifiCorp as part of interim measure 18 of the KHSA; they were removed from the KBRA.

Disease (Line 41). Seven years: $3.1 million; 15-year total: $7.3 million.

Need: Fish diseases have been a major problem for anadromous salmonids in the Klamath River. Efforts have been ongoing to better understand the life cycle and ecology of the disease organisms and their intermediate hosts, and to develop management techniques that reduce the impacts of diseases on anadromous fish populations. It is important to continue the ongoing work on fish disease ecology and management, both before and after removal of the hydroelectric dams (if it occurs), to identify and correct problems so fish populations can rebuild.

Description of Activity: This work will include: 1) baseline disease monitoring, including QPCR (i.e. genetics) analysis of water samples to track actinospore and myxospore concentrations, and deploying networks of sentinel fish to monitor the distribution and intensity of infection rates; 2) understanding the life history and ecology of the disease organisms and their intermediate host, a polycheate worm that lives in the river-bed; and, 3) develop, implement, and monitor the effectiveness of management actions intended to reduce disease impacts – at present, potential management actions include providing flows that scour the river-bed, improving sediment transport in sediment-starved reaches below dams, and salmon carcass removal to remove a source of myxospores.

Products and Benefits: Salmon mortalities attributed to infection and disease can be substantial in the Klamath River. These efforts focus on baseline infection rates, life history and environmental requirements of the pathogens and hosts, and the development of treatment actions focused on specific life history phases.

Basis for Cost Estimates: Fish managers prepared estimates of monitoring costs that are based on experience with similar work in the Klamath and other basins.

Green Sturgeon (Line 42). Seven years: $1 million; 15-year total: $2.3 million.

Need: General research on green sturgeon biology and population metrics are needed to guide restoration efforts to benefit Klamath River green sturgeon.

Description of Activity: This project will assess up-stream migration of adult green sturgeon, assess green sturgeon in-river adult abundance (potentially using sonar counting stations such as DIDSON), and monitor the downstream migration of juvenile green sturgeon. It will monitor migration of both adults and juveniles. It also includes acoustic tagging, in conjunction with an existing array of sonic receivers along the West Coast.

Products and Benefits: Research results will include information on: 1) up-stream migration, adult abundance, and downstream migration of juveniles; and 2) the physical, chemical and biological characteristics of holding, spawning, and rearing habitats used by adult, larval, and juvenile green sturgeon in the Klamath River, as well as temporal use of

various habitat types. This information will allow assessment of the size and trend of green sturgeon populations, factors affecting survival, ocean migrations, use of coastal environments, and length of time between spawning migrations.

Basis for Cost Estimates: Fish managers prepared estimates of monitoring costs that are based on experience with similar work in the Klamath and other basins.

Lamprey (Line 43). Seven years: $0.9 million; 15-year total: $2.1 million.

Need: Monitor juvenile and adult lamprey abundance, migration, distribution, and habitat requirements in the Klamath River and tributaries, as well as conduct field work necessary to assess life history strategies and habitat requirements of various life stages of lamprey.

Description of Activity: Research will include radio tracking studies to assess habitats used throughout the Basin as well as the amount of time adults spend in freshwater prior to spawning. A Limiting Factor Analysis will be conducted by individual sub-basin, to identify factors that are limiting lamprey survival and to identify information gaps regarding life history strategies of this species.

Products and Benefits: Information gained will be used to develop appropriate management and restoration actions necessary to conserve and enhance lamprey populations.

Basis for Cost Estimates: Fish managers prepared estimates of monitoring costs that are based on experience with similar work in the Klamath and other basins.

Geomorphology (Line 44). Seven years: $0.6 million; 15-year total: $2.7 million.

Need: Develop information on the movement of sediments as part of fisheries restoration and potential removal of dams. Monitor sediment movement post-dam removal to evaluate effects to habitat and channel morphology.

Description of Activity: This work will conduct sediment transport studies and develop sediment budgets in the mainstem Klamath River and significant tributaries.

Products and Benefits: This research will develop an understanding of the dynamic alluvial processes and baseline conditions pre and post hydroelectric dam removal. This work will determine flow requirements necessary to flush and transport bed load at specific locations on the Klamath River, determine sediment sources and equilibrium states of bed load, and evaluate sediment augmentation potential below hydroelectric dams including quantity, size distribution, and locations for the purpose of enhancing habitat conditions.

Basis for Cost Estimates: Fish managers prepared estimates of monitoring costs that are based on experience with similar work in the Klamath and other basins.

Habitat Monitoring (Line 45). Seven years: $1.2 million; 15-year total: $2.7 million.

Need: Monitor and evaluate the habitat restoration actions under the Fisheries Restoration and Monitoring Plan to provide the information needed to set and adjust priorities, assess progress and benefits, and adaptively manage this effort.

Description of Activity: Develop habitat and flow models for the mainstem Klamath River, the estuary, and significant tributaries to support flow management and restoration actions. Assessing habitat conditions before and after restoration projects are implemented as part of the Adaptive Management Process.

Products and Benefits: This work will assess the habitat requirements (physical, chemical, and biological) of priority species and life history stages, and analyze the effects of stream channel alterations and flow management on habitat availability and quality for the Klamath River and significant tributaries.

Basis for Cost Estimates: Fish managers prepared estimates of monitoring costs that are based on experience with similar work in the Klamath and other basins.

Water Quality (Line 46). Seven years: $6.9 million; 15-year total: $9.2 million.

Need: Continue and expand monitoring and evaluation of water quality in the Klamath Basin.

Description of Activity: This work will continue and expand inter-agency water quality improvement efforts to monitor and assess water quality conditions in the Klamath basin. It will provide real-time water quality data (dissolved oxygen, pH, conductivity, temperature, flow, ammonia, and turbidity), collect nutrient grab and periphyton samples to assess nutrient dynamics over varying hydrological and meteorological conditions, and conduct biological and chemical contaminant analyses to determine baseline conditions and potential restoration and management actions.

Products and Benefits: This information is needed to monitor compliance with water quality standards and assess the progress of water quality programs. Improving water quality is essential to rebuilding healthy fish populations and protecting human health.

Basis for Cost Estimates: Fish managers prepared estimates of monitoring costs that are based on experience with similar work in the Klamath and other basins. The budget assumes that current levels of water quality monitoring funding from the EPA will continue; the EPA provides approximately 50% of the monitoring costs in the Basin, Other funding comes from PacifiCorp and mitigation funding under the KHSA if the four

dams are removed. If this funding changes the Parties will review the funding needs for this important activity.

Upper Klamath Lake Water Quality, Phytoplankton, Zooplankton, Internal Load, and Bloom Dynamics (Lines 47, 48, and 49). Seven years: $4.2 million; 15-year total: $9.9 million.

Need: Upper Klamath Lake is hypereutrophic, meaning that it has abundant nutrients that cause intense algae blooms each summer that cause problems for in-lake fisheries and for fisheries downstream in Keno Reservoir and the Klamath River. The KBRA calls for extensive restoration action upstream of Upper Klamath Lake to improve tributary habitats and water quality for fish, which will also reduce the loading of nutrients from tributaries into the Lake (called the external load). Further, the legacy of many decades of high external loading has resulted in a large pool of nutrients in the bottom sediments of the Lake (called the internal load), which mobilizes from the sediments each summer and supports the huge algae blooms. Thus, effective restoration of the Lake involves controlling both external and internal nutrient loads, and monitoring how water quality, algae and zooplankton communities, and internal loading dynamics respond to restorative actions.

Description of Activity: Continue the existing long-term monitoring, ongoing since 1989, consisting of twice-monthly nutrient, chlorophyll, algae and zooplankton sampling at 10 standard sites in Upper Klamath and Agency lakes. Re-initiate weekly sampling at standard and additional sites to relate water quality conditions to habitat use and survival of radio-tagged endangered suckers and anadromous salmonids (as part of reintroduction work). Includes ongoing (since 2002) deployment of continuous water quality instrumentation during the summer months to collect dissolved oxygen, pH, temperature, and other data needed to understand patterns of fish distribution, habitat use, and survival. Also includes tracking the dynamics of nutrient chemistry of the internal load, especially the mobility and biological availability of phosphorous and nitrogen in the Lake sediments in relation to water quality, algal dynamics, and restoration actions. Finally, it is important to maintain and update the hydrodynamic model, which enhances understanding of how wind-driven, in-lake currents influence the three dimensional distribution of algae and dissolved and particulate nutrients in the Lake, how these currents influence water quality dynamics where fish reside, and how the currents influence the behavior of migratory life stages of suckers and anadromous fish.

Products and Benefits: Products of this work will include quantifying and tracking: a) the chemistry and storage of nutrients in lake-bottom sediments; b) the seasonal and spatial patterns and magnitudes of the biological availability of nutrients to algae blooms; c) changes in the amount and form of nutrients and organic material flowing out of Upper Klamath Lake into Keno Reservoir; d) the seasonal and spatial patterns and magnitudes of water quality conditions. Results will allow managers to: a) guide the design of in-lake nutrient removal measures, and subsequently evaluate their effectiveness; b) evaluate the effects of controlling internal and external nutrient loading on algae blooms

and down-river loading of nutrients and organic matter; c) relate patterns in water quality to movements and survival of endangered suckers and re-introduced anadromous salmonids. Finally, continuing the long-term monitoring dataset for Upper Klamath Lake is essential for statistical testing and assessing trends, relating trends to implementation of KBRA programs, and formulating changes in approach should they be necessary.

Basis for Cost Estimates: Fish managers prepared estimates of monitoring costs that are based on experience with similar work in the Klamath and other basins.

Upper Klamath Lake External Nutrient Loading (Line 50). Seven years: $1.6 million; 15-year total: $3.6 million.

Need: Monitor and evaluate external nutrient loading into Upper Klamath Lake, one of the major causative factors for the hypereutrophication of the Lake. KBRA restoration actions are expected to reduce and control external loading; monitoring is necessary to track effectiveness of restorative measures, and make adjustments when necessary.

Description of Activity: Continue the existing long-term monitoring program (1991-present) quantifying inflow of nutrients into Upper Klamath Lake from major tributaries.

Products and Benefits: It is critically important to reduce and control the external loading of nutrients to the Lake. If such efforts are not successful, it could nullify efforts to control internal nutrient loads. By producing seasonal and annual quantifications of nutrient inputs into the Lake, results will allow managers to track the responses of entire sub-basins to restoration efforts designed to reduce nutrient loading to the Lake. The information will allow for adjustments in tributary restoration efforts, as well as changes in approach to managing internal nutrient loads.

Basis for Cost Estimates: Fish managers prepared estimates of monitoring costs that are based on experience with similar work in the Klamath and other basins.

Upper Klamath Lake Analysis of Long Term Data Sets (Line 51). Seven years: $0.2 million; 15-year total: $0.6 million.

Need: Analyze long term data sets in and above Upper Klamath Lake to assess conditions and trends as part of fish restoration, fish reintroduction, and water quality programs.

Description of Activity: Periodically conduct rigorous analysis of long term data sets in and above Upper Klamath Lake

Products and Benefits: Track trends in water quality, zooplankton and phytoplankton communities, and fish success in response to climate, external and internal nutrient loading, lake management, and restoration actions. Such syntheses of multiple

monitoring efforts will be extremely useful to managers in guiding restoration and management programs.

Basis for Cost Estimates: Fish managers prepared estimates of monitoring costs that are based on experience with similar work in the Klamath and other basins.

Upper Klamath Lake Listed Suckers (Line 52). Seven years: $5.3 million; 15-year total: $12.3 million.

Need: Continue to monitor and evaluate status and trends of Lost River and shortnose suckers in Upper Klamath Lake, both of which are listed as endangered under the Endangered Species Act. The combined effect of the size of the Lake, and the long life spans and complex life histories of these species, makes effective monitoring difficult. A highly effective monitoring program is ongoing, and because of the statistical requirements of the mark-recapture techniques being employed, the program must be continuous on an annual basis. Without this program, status and trends of these species cannot be tracked, and delisting criteria dictated by the Recovery Plan cannot be measured. Finally, measurement of the response of these species to restorative measures is essential to implementing and effective long-term restoration program.

Description of Activity: Monitoring for listed suckers in Upper Klamath Lake has been ongoing since 1999; it has focused on adults and juveniles. Adult monitoring includes using sophisticated mark-recapture techniques to quantify survival and other measurements of population status and trend for adult suckers, with focal efforts at in-lake springs and at a weir on the Lower Williamson River. Juvenile and larval monitoring includes tracking habitat use and year class development in relation to habitat quality and availability, and water quality and algal dynamics. Work will also include expanded efforts to quantify the effects of algal toxins on juvenile and adult suckers, monitoring to support re-establishing extinct spawning runs in Upper Klamath Lake springs and tributaries, and monitoring use of re-connected areas to the Lake (Williamson River Delta, Agency Lake/Barnes Ranches, and the Wood River Wetland).

Products and Benefits: Products of this work include: 1) status and trends in adult sucker demographics and population dynamics; 2) quantifying and tracking age-one sucker demographics and year class formation in relation to environmental conditions; 3) quantifying and tracking success of juvenile and larval suckers in areas re-connected to the Lake; and, 4) increased understanding of larval and juvenile ecology in Upper Klamath Lake, particularly in relation to algal dynamics, algal toxins, water quality, and habitat quality and availability. Results will allow managers to track progress towards recovery, establish whether formal de-listing criteria are met, and evaluate effectiveness of restoration measures.

Basis for Cost Estimates: Costs based on recent levels of monitoring.

Tributaries Water Quality / Nutrients / Temperature (Line 53). Seven years: $1.9 million; 15-year total: $4.3 million.

Need: Tributaries to Upper Klamath Lake contribute external loads of nutrients to the Lake, and also provide the primary riverine habitats for endangered suckers and re-introduced anadromous fish. Much of the restoration work slated for the upper basin targets these tributaries, which reflects their importance to achieving the fisheries goals of the KBRA. The Sprague River is the largest sub-basin, the greatest source of nutrients, and the most in need of restorative action. Ongoing long-term monitoring of Sprague River water quality, nutrients, sediment, and temperature needs to be continued and expanded to provide sufficient information for tracking and adapting restoration measures. Similar, smaller efforts are needed in the Wood, Williamson, and Sycan rivers.

Description of Activity: Maintain the current monitoring program (ongoing since 2001) at 5 sample sites in the Sprague River valley and establish sample sites elsewhere in the Sprague River drainage network, as well as in the Sycan, Williamson, and Wood River systems. Measurements include flow, nutrients, water quality, and suspended. Also, maintain the current water temperature monitoring program, with continuous water temperature loggers deployed at 25+ sites.

Products and Benefits: Results will allow managers to track responses of water quality, nutrients, and water temperature to restoration measures, and relate these responses to fish habitats and populations. Benefits will accrue to recovery efforts for endangered suckers, and re-introduction of anadromous salmonids.

Basis for Cost Estimates: Costs extrapolated from current levels effort.

Tributaries Geomorphology / Riparian Vegetation (Line 54). Seven years: $1.4 million; 15-year total: $3.3 million.

Need: Monitor and evaluate stream channel morphology, sediments, spawning gravel and riparian plant communities in tributaries to Upper Klamath Lake to support fish restoration, fish reintroduction, and water quality programs.

Description of Activity: In the major tributaries to Upper Klamath Lake, maintain and expand monitoring of changes in riparian vegetation and stream geomorphology in response to restoration-related management changes.

Products and Benefits: Results will allow managers to evaluate how effectively restoration measures provide and maintain the properly functioning riverine ecosystems necessary to support robust fisheries.

Basis for Cost Estimates: Fish managers prepared estimates of monitoring costs that are based on experience with similar work in the Klamath and other basins.

<u>Tributaries Physical Habitat (Line 55)</u>. Seven years: $1.3 million; 15-year total: $3 million.

Need: Monitor and evaluate habitat in tributaries to Upper Klamath Lake to provide information for implementation of fish restoration, fish reintroduction, and water quality programs.

Description of Activity: Quantify the current physical habitat conditions for salmon and steelhead in the tributary network above Upper Klamath Lake, and track subsequent changes over time.

Products and Benefits: Results will provide managers with an important guide to reintroduction and habitat restoration efforts, and will help them interpret the tributary-specific success of reintroduction efforts.

Basis for Cost Estimates: Fish managers prepared estimates of monitoring costs that are based on experience with similar work in the Klamath and other basins.

<u>Tributaries Listed Suckers (Line 56)</u>. Seven years: $2.3 million; 15-year total: $5.3 million.

Need: Monitor and evaluate status and trends of endangered Lost River and shortnose suckers in tributaries to Upper Klamath Lake. Listed suckers historically had populations in the Lake and its tributaries. The restoration work is designed to improve habitat in tributaries. This work would monitor effectiveness of the actions as part of the adaptive management program.

Description of Activity: In the major tributaries to Upper Klamath Lake, quantify the response of listed suckers to habitat restoration and recovery measures. Work will involve use of mark-recapture, radio-telemetry, and other techniques to track movement patterns, habitat use, distribution, and demographics relative to habitat quality and availability as the restoration program proceeds.

Products and Benefits: Metrics provided by monitoring will include: 1) changes in migration behavior and distribution of spawners; 2) changes in patterns and magnitude of larval and juvenile emigration to Upper Klamath Lake; and 3) habitat use and distribution relative to restoration measures. Results will allow managers to evaluate effectiveness of restoration measures.

Basis for Cost Estimates: Fish managers prepared estimates of monitoring costs that are based on experience with similar work in the Klamath and other basins.

Keno Reservoir Water Quality / Algae / Nutrients (Line 57). Seven years: $2.4 million; 15-year total: $5.6 million.

Need: Keno Reservoir receives nutrient-rich water from Upper Klamath Lake, and experiences seasonally severe water quality conditions. Nutrient reduction measures in the KBRA will target Upper Klamath Lake, Keno Reservoir, or both. In all cases, quantifying algal community response, water quality, and both influent and effluent nutrient and organic loads in Keno Reservoir will be important for guiding and evaluating restoration actions.

Description of Activity: Establishing baseline conditions and tracking changes resulting from nutrient reduction measures resulting from KBRA projects. Actions include quantifying status and trends of algal communities, water quality, nutrients, oxygen demand, and organic material at a network of sites that will track influent conditions from the Lake and various inflows, transformations moving through the reservoir, and effluent conditions at Keno Dam.

Products and Benefits: Monitoring results are important to adaptively manage efforts to remove sufficient nutrients from the Klamath River to enhance in-reservoir fisheries and those downstream. It will also provide important information to the anadromous salmonid re-introduction program.

Basis for Cost Estimates: Fish managers prepared estimates of monitoring costs that are based on experience with similar work in the Klamath and other basins.

Keno Reservoir to Tributaries: Meteorology (Weather Stations) (Line 58). Seven years: $1.2 million; 15-year total: $2.8 million.

Need: Climate and weather exert influences on water quality and water temperatures, and at times have direct effects on fish (e.g. high wind events has been related to survival of larval suckers in Upper Klamath Lake). Multiple studies have shown relationships between wind and water quality dynamics in Upper Klamath Lake. Water quality and hydrologic models either presently in use or planned for future use require meteorological inputs to function properly.

Description of Activity: Establish and maintain network of weather monitoring stations, with an emphasis on Upper Klamath Lake and its major tributaries, and Keno Reservoir.

Products and Benefits: Deploying a network of meteorological stations will enhance the ability to elucidate important ecological cause-effect relationships, and will enhance water quality modeling capabilities. Water quality and hydrologic models are important tools for exploring and at times guiding management actions, and rely heavily on accurate, local meteorological data.

Basis for Cost Estimates: Fish managers prepared estimates of monitoring costs that are based on experience with similar work in the Klamath and other basins.

Remote Sensing Data Acquisition and Analysis (Line 59). Seven years: $0.3 million; 15-year total: $0.8 million.

Need: Remote sensing products greatly facilitate the planning, implementation, and monitoring of restoration actions. Such products take many forms, including aerial photography, aerial measurement of water temperature (thermal infrared radiometry) and topography (LiDAR – light detection and ranging), and satellite measurements of evapotranspiration.

Description of Activity: Periodically acquire remote sensing products to plan, implement, and monitor restoration projects. For example, a LiDAR-generated digital elevation model of the entire Sprague River valley was acquired in 2005, yielding a highly detailed 3-D digital map of the river, its floodplain, and the adjacent valley floor. It has been extensively used for planning restoration projects. Acquiring new coverage of specific reaches of the river where restoration projects have been implemented would enable careful evaluation of the performance of those restoration measures. Similar benefits accrue from updating aerial photo coverage, and other remote sensing products.

Products and Benefits: Periodic acquisition of various remote sensing products is an important supplement to field measurements in efforts to track landscape-scale patterns in water temperature (using Thermal Infrared Radiometry), riparian vegetation (using various forms of aerial photography and LiDAR), and river geomorphology (various forms of LiDAR). Results will enable managers to directly measure some attributes that cannot be measured at the site-specific scale, and will facilitate accurate extrapolation of site-specific field measurements to larger scales, all of which is important to guiding restoration efforts and evaluating their effectiveness. Remote sensing provides data from the entire landscape that is useful for determining the effectiveness of the restoration actions.

Basis for Cost Estimates: Fish managers prepared estimates of monitoring costs that are based on experience with similar work in the Klamath and other basins.

4.6 Water Resources Program (Seven year: $202 million; 15 year total $258 million)

Introduction: Allocating and managing available water has been a center of conflict in the Klamath Basin for decades, which is why this major program targeting solutions to our water management problems is a centerpiece of the KBRA. The Non-Federal Parties estimate that irrigated agriculture in the Upper Klamath Basin produces more than $600 million per year in farm-gate revenue and other regional economic activity. The salmon fisheries produce more than $150 million per year in commercial revenues. In addition,

six National Wildlife Refuges provide habitat for most of the migratory waterfowl on the Pacific Flyway. Four federally recognized tribes have cultures and economies based on the river. The Water Resources Program is an essential element in the Klamath Settlement Agreements. These measures are designed to implement a water balance that will provide reliable water and power supplies which sustain the agricultural economy and the National Wildlife Refuges, while rebuilding the Basin's fish populations to support sustainable harvest for commercial, sport, and tribal fisheries.

The Water Resources Program:

- improves water management system infrastructure;
- enhances water management tools and techniques;
- improves national wildlife refuge water supplies and management;
- stabilizes availability of Klamath Irrigation Project surface water diversions;
- uses and protects groundwater resources;
- balances environmental water needs with irrigation needs;
- facilitates change from status quo to the improved KBRA water management paradigm.

All of these elements are necessary to make the large changes that Parties agree must be made if we are to achieve the durable, stable, and viable water management outcomes provided by the KBRA.

Keno Dam Fish Passage (Line 60). Seven years: no costs; 15-year total: 3.5 million.

Need: Provide fish passage through Keno Dam.

Description of Activity: Keno Dam will remain on the Klamath River, and will be the most downstream dam if hydroelectric dams are removed. Because the fish passage facilities at Keno Dam are old and less effective than they should be, enhancements are necessary to accommodate use by anadromous fish.

Products and Benefits: Improving passage facilities will enhance the ability of adult fish to migrate to spawning and rearing areas in the upper Basin and juveniles to migrate downstream. In concert with the rest of the anadromous fish re-introduction program, this will improve performance of local and re-introduced fish populations.

Basis for Cost Estimates: Costs for ladder modifications for upstream passage and provisions for downstream passage are based on costs for similar facilities at other dams.

Adaptive Management: Science and Analysis; Real-Time Management: Calibration and Improvements to KLAMSIM or Other Modeling and Predictions; Data Analysis and Evaluation; and Development of Predictive Techniques (Lines 61 and 62 and Lines 87 and 88). Seven years: $1 million; 15-year total: $1.5 million.

Need: Information to support real-time water management to improve fish populations and achieve water balance.

Description of Activity: The KBRA identifies the need for enhanced predictability of irrigation demand in order to support real-time operations of facilities to maximize benefits to fish. In addition, other technical tools and evaluations will optimize water management. Pending detailed review and recommendation by the Technical Advisory Team, a preliminary, partial list of analytical and modeling needs includes: a) quantifying open water, wetland, and agricultural evapotranspiration under varying conditions and locations within the Upper Basin; b) establishing a network of geodetic control points around the periphery of Upper Klamath and Agency lakes referenced to the USBR datum used for reporting lake surface elevation; c) developing a new bathymetric map of Upper Klamath and Agency lakes to quantify the relationship between lake elevation and water storage capacity; d) quantifying relationships between Upper Klamath Lake levels and availability of habitats for important life stages of focal fish species; e) implementing a standardized review and publishing process for hydrological data; f) developing an Operations Model for the Klamath Reclamation Project that uses time steps appropriate to the operational realities of the Project and ecosystem management needs; g) improve capability to forecast near-term agricultural water demand; and h) fully incorporate the National Wildlife Refuges into both planning and operations models.

Products and Benefits: Many analytical and science tasks are needed to effectively plan and implement KBRA-related water management strategies and operations. Hydrologic models (e.g. KLAMSIM) provide the vehicle for devising water management strategies and evaluating the ramifications of various management alternatives. The accuracy and utility of such models rely upon the quality of data inputs and mathematical depictions of important functional relationships. Improvements to existing models will reduce uncertainty and increase efficiency of KBRA-related water management planning and operations.

Basis for Cost Estimates: Basin hydrologists developed cost estimates based on experience with similar activities.

Klamath Basin NWR's O&M of North and P Canal System (Line 63). Costs removed from cost estimates because project is being implemented with existing funds.

Klamath Basin NWR Walking Wetland Program (Line 64). Seven years: $1.5 million; 15-year total: $2.3 million.

Need: Continue and maintain National Wildlife Refuge Walking Wetland Program.

Description of Activity: The Walking Wetlands Program is an innovative step towards simultaneously enhancing waterfowl management and agricultural operations on the

Lower Klamath and Tule Lake National Wildlife Refuges. Under the Kuchel Act of 1964 (PL 88-567), the Refuges' major purpose is "proper waterfowl management, but with full consideration to optimum agricultural use that is consistent therewith", which this program fulfills by alternating temporary wetlands and agricultural uses among land parcels on a rotational basis. Further, the program supports Interior policy to reduce chemical use and improve water quality on Interior lands.

Products and Benefits: Program provides benefits to wildlife and irrigated agriculture.

Basis for Cost Estimates: Costs include the assessment, analysis, and development of a water distribution system for the Walking Wetland Program that complements the On Project Water Plan and Groundwater Technical Investigation programs. Assumed survey, engineering, and construction costs are based on a $500/acre estimate; the per acre costs are based on previous construction that has been completed on surrounding lands over the past 5 years.

Klamath Basin NWR Big Pond (Line 65). Funding removed from cost estimates because project is no longer feasible.

On-Project Plan (Line 66). Seven years: $67.5 million; 15-year total: $92.5 million.

Introduction: The Klamath Basin Restoration Agreement (KBRA) is structured to settle tribal water rights claims between the Party tribes in the Klamath Basin and Klamath Reclamation Project irrigators and provide predictability of water availability for irrigators. In essence, water users in the Klamath Project have agreed to limit, to a specified amount, the quantity of water diverted from Upper Klamath Lake and the Klamath River from points of diversion identified in Appendix E-1 of the KBRA. The applicable quantity varies based on hydrologic conditions of a given year. Tribes who are KBRA parties (Klamath Tribes, Yurok Tribe, and Karuk Tribe), and the United States as trustee for federally recognized tribes in the basin, have agreed not to assert tribal rights so as to interfere with this agreed upon Klamath Project use of water, in essence protecting this quantity as far as relevant tribal water rights and trust obligations are concerned. (KBRA Sections 15.3.2 – 15.3.9). Parties to the agreement also provide commitments toward protecting the agreed-upon quantities under regulatory laws such as the ESA. (KBRA Section 21.3.B.)

Need: Implementation of a comprehensive water management plan for approximately 175,000 acres within the boundaries of the Bureau of Reclamation's Klamath Project. Funding will be used to assist irrigators in meeting permanent reductions in diversion from the Klamath River system, based on the negotiated diversion limits set forth in the KBRA.

Description of Activity: Develop and implement a program so that Project water users will be able to "live within" the agreed quantity (KBRA Section 15.2 and Appendix E-1.)

resulting from a permanent, overall annual cap on the amount of water that could be diverted from diversions on the Klamath system for agriculture and refuge use (including irrigated refuge lands as well as wetlands and other uses). The plan would also have to accommodate new delivery commitments for National Wildlife Refuge use that become effective at the same time as the diversion limitations.

In developing and implementing the plan, Klamath Water and Power Agency (KWAPA) will evaluate the following measures to meet the purposes of the plan: conservation easements, temporary and long-term forbearance agreements, conjunctive use programs, increased efficiency measures, land acquisitions, water acquisitions, groundwater substitution, other voluntary transactions, water storage and any other applicable measures that are consistent with the terms of the KBRA. For example, KWAPA will likely enter into very long-term or permanent agreements with landowners who would be asked to idle land in certain hydrologic year types. Landowners would be compensated at a fair market value, likely one time (up front), to participate. Based on a competitive system, producers could elect to enroll all or part of their land into the program. KWAPA would have the responsibility to ensure that enough acres (increasing amounts the drier the water forecast) would be enrolled in the program. Once the March 1 forecast was made, program participants would be notified whether or not they would have water available that particular year, for the land they enrolled in the program. This would theoretically allow for enough time for planning and crop selection, etc. Long-term agreements for intermittent land idling will not be the only component of the plan, but similarly, the concept is that other agreements or measures would be taken in the near term which would provide the ability to limit water demand in a given future year.

Products and Benefits: The plan would align irrigation demand (including both private land and irrigated refuge "lease lands") with the available supply from the Klamath system in any given year, taking into account also the delivery for refuge wildlife purposes. The limitations will leave more water in Upper Klamath Lake and the Klamath River for fish. A related piece of the settlement would be that each signatory tribe agrees to waive specified claims it may have against the United States associated with the Klamath Project. These waivers also are contingent on the realization of certain events. Those events include the same events that must occur for final settlement between the tribes and Project irrigators, as well as additional contingencies. (KBRA Sections 15.3.5, 15.3.6.B, 15.3.7.B)

Basis for Cost Estimates: In the recent past, there have been programs conducted on an annual basis to reduce demand in the Klamath Project for water diverted from the Klamath system. The parties to the KBRA agreed that indefinite and uncertain reliance on annual programs and appropriations was not the appropriate or most cost-effective long-term strategy. As such, the settlement seeks full funding within the first 10 years to put in place measures that will accommodate permanent limitations on diversions. 2.5 million (part of which has been committed prior to FY 2012) is needed for development of a comprehensive plan and the remainder is for implementation and administration. In developing the cost estimates for this program, the Klamath Water Users Association (KWUA) used a variety of research including recent water settlements

and agreements such as the San Joaquin River Agreement, California State Water Resources Control Board's Water Quality Control Plan for the Sacramento Valley, Imperial Valley Irrigation District/Metropolitan Water District Agreement, Truckee River Operating Agreement, the 2002 BOR Klamath Basin Water Supply Enhancement Act, and others. KWUA assumed for the purposes of developing an estimate that all reduction in demand would be accomplished by "purchase" of water, and used a period of 50 years. The price per acre-foot was based on experience with annual water banks. Preliminary estimates of average annual need/shortfall were based on historic records. The costs for the land idling programs in 2010 ranged between $85 and $89 per acre foot; these were one-year programs. There is not a record of experience with long-term landowner agreements of this type. Landowner agreements will also involve transaction costs, likely including title work. The ultimate mix of measures for implementation of the On-Project Plan will not be known until the Plan is completed.

Groundwater Investigation (Line 67). Seven years: $0.6 million; 15-year total: $0.6 million.

Need: Enhance current ground water model to implement provisions of the KBRA to ensure that water operations do not have an adverse impact on springs of importance to fish (Section 15.2.4.B).

Description of Activity: Enhance the current USGS/OWRD regional ground water model to improve its capability to predict how ground water use by the Klamath Irrigation Project will affect flow of important springs entering Upper Klamath Lake and its tributaries, and the Klamath River.

Products and Benefits: Parties have agreed to use this enhanced model to quantify when ground water use adversely affects flows from important springs, and to condition management responses upon model results, making this project quite important to the overall agreement concerning water management.

Basis for Cost Estimates: USGS developed cost estimates to carry out work in Appendix E-2.

Remedy for Adverse Impacts (Line 68). This measure does not assume any funding.

D Plant pumping (Line 69). Seven years: $1.2 million; 15-year total: $2.6 million.

Need: Pay for Reclamation's and Lower Klamath National Wildlife Refuge's share of the cost of the pumping.

Description of Activity: One of the many components of the water balance and other commitments in the KBRA is this agreed allocation of responsibility for payment of pumping costs, which serve various purposes.

Products and Benefits: Under this provision, DOI (USBR & FWS) will reimburse Tulelake Irrigation District for 68.75% of O&M expenses associated with operations of the D Pumping Plant, which maintains Tule Lake sump elevations by pumping water through a ridge onto the Lower Klamath National Wildlife Refuge, some private lands, and ultimately back to the Klamath River. The reimbursement reflects flood control, wildlife, and other benefits realized through operation of the facility

Basis for Cost Estimates: DOI derived a cost estimate based on historical operating costs and the agreed-upon allocation percentages.

Off-Project Water Use Retirement Plan and Water Use Retirement Implementation (Lines 70 and 71). Seven years: $39 million; 15-year total: $46 million.

Need: Develop and implement Off-Project Water Use Retirement Plan.

Description of Activity: The lead entity will develop and implement a Water Use Retirement Plan, which will include a process for prioritizing water uses for retirement, landowner outreach, selecting among willing landowners, valuing water uses to be retired, developing alternative contractual arrangements, evaluating effectiveness, and defining a clear end point. In the Upper Basin there are approximately 200 landowners who may qualify for this program. All contracts will have to be developed on an individual basis.

Products and Benefits: A central component of the water balance agreement among the Parties to the KBRA is that inflows into Upper Klamath Lake be permanently increased by 30,000 acre feet through implementing a voluntary Water Use Retirement Plan (WURP). Increased inflows are to be obtained through retirement of water rights or water uses by voluntary agreements with willing land owners.

Basis for Cost Estimates: The funding reflected on line item 70 will in part provide the legal services and a program outreach coordinator as required to develop contracts and work with irrigators with respect to retiring water rights or other water uses. If the Program is incorporated into an Off Project Water Settlement, such contracts may be required between the Klamath Tribes and landowners; otherwise the contracts may be between landowners and Interior. Other costs involve acquiring expertise needed to inform prioritization of acquisitions, evaluate effectiveness, and quantify the value of water uses to be retired. The cost associated with line item 71 includes the estimated average value of retired irrigation water at $1,500 per acre foot. The goal of the voluntary WURP is a 30,000 acre foot increase in annual inflows. The total cost is based on required acre feet times cost per acre foot.

<u>Power Program (Lines 72 through 75)</u>. Seven years: $50.2 million; 15-year total: $50.2 million.

Introduction: The Bureau of Reclamation's Klamath Reclamation Project is unique and has had a longstanding relationship with PacifiCorp's Hydroelectric Project. Original plans for the Klamath Reclamation Project contemplated the development of power by the Bureau of Reclamation for use in the Klamath Reclamation Project. In 1917, PacifiCorp's predecessor entered an agreement by which it constructed Link River Dam and agreed to sell power at low cost to irrigators and Reclamation in lieu of Reclamation developing power on the river. The long relationship was reflected and codified in the Klamath River Basin Compact enacted by California and Oregon, and ratified by Congress in 1957, which provides that it is the objective of the states, in connection with the development of hydroelectric resources on the Klamath River "to secure…the lowest power rates which may be reasonable for irrigation and drainage pumping, including pumping from wells."

The FERC license issued to PacifiCorp in the 1950s has expired, but is automatically renewed for one-year terms pursuant to the Federal Power Act. The historic power contract is not part of the annual renewals. In the meantime, the FERC relicensing process is affected by the overall settlements under development in the Klamath Basin.

The plumbing of the Klamath Project is also unique; low cost power is a part of its infrastructure. A significant portion of the power goes to re-circulate water (achieving efficiencies), provide water to national wildlife refuges, to pump water back into the Klamath River for use by fish, and to operate pressurized sprinkler systems that use less water than flood irrigation. These pumping operations are essential for water efficiency and successful pursuit of the Water Resources Program. Already, Klamath Reclamation Project irrigators faced with potentially considerable power cost increases have considered or in some cases undertaken changes in practices that reduce historic water efficiencies. Dramatically increased power costs also threaten the viability of some operations.

Need: Stabilizing power costs is an important component of the Klamath Basin Restoration Agreement (KBRA) and is closely related to the Water Resources and conservation elements of the KBRA. The purposes of this program are to provide affordable electricity 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 as part of the implementation and administration of the On-Project Plan; (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 KBRA power program also addresses interests of irrigators in the Upper Klamath Basin both in and outside the Klamath Reclamation Project.

Description of Activity: The Power Resources Program consists of three elements. The composition and cost of those programs are interrelated. First, for the short-term, funding is provided to stabilize total power costs as other components of the program are brought on line. Second, the availability of some power generated at other federal (Reclamation) facilities should incrementally assist in meeting low power cost objectives, and would be supplemented by the renewable resources component of the overall Power Resources Program. Third, funding would be provided for energy efficient/conservation and renewable generation opportunities and investment. The activities that would be expected could include installation of efficiency measures, such as additional improvements in water pumping and piping efficiency, solar photovoltaic development and net metering programs, investment in renewable generation on a broader scale, and other practices. The benefits and objectives of this program are designed to serve irrigation interests both inside and outside of the Klamath Reclamation Project in the Upper Klamath Basin.

Products and Benefits: The Power Program includes measures and commitments designed to achieve a delivered power cost target that will be at or below the average cost for similarly situated Reclamation irrigation and drainage projects in the surrounding area, for eligible power users as provided in Section 17.3 of the KBRA. The Interim Power Sustainability Program is designed to limit impacts of power cost increases as identified in the KBRA during the longer-term planning and implementation phases of the overall Renewable Power Program. The Federal Power Program would provide cost-effective transmission and delivery of federal preference power to on and off Project irrigators who are parties to the agreement. The Renewable Financial & Engineering Plan would develop a financial and engineering plan for the Energy Efficiency and Renewable Power Program. The Energy Efficiency and Renewable Resources Program would increase irrigation power efficiencies and generate renewable energy to reduce net power costs and increase water reuse for eligible power customers.

Basis for Cost Estimates: the Interim Power Sustainability program costs are estimated at $7.69 million for 2012-2014. The costs for the Federal Power Program are for consultant or other expertise to make necessary agreements; irrigators would pay the BPA tariff rates for power. The costs of the Renewable Resources and Conservation Program were developed by settlement parties, with expert assistance provided by the State of Oregon and the Bureau of Reclamation, based on resource development strategies that would leverage expenditures through tax credits and available regulatory programs. The program cost, including engineering and planning costs, is $40.498 million over fiscal years 2013 through 2016.

Upper Klamath Lake Wetlands, Agency Lake and Barnes Ranches and Upper Klamath Lake Wetlands, Wood River (Lines 76 and 77). Seven years: $0.8 million; 15-year total: $5.6 million .

Need: Restore wetlands and related habitats and increase storage capacity in Upper Klamath Lake to provide more flexibility to meet the water balance goals.

Description of Activity: Over the past 100 years, more than 30,000 acres of wetlands around the edges of Upper Klamath and Agency lakes were diked and drained, reducing storage volume of the lakes, diminishing habitats for important fish species, and contributing to nutrient problems in the lakes. Parties to the KBRA agreed to support reconnecting two such areas around Agency Lake, the Agency Lake/Barnes Ranch complex, and the Wood River Wetlands.

Products and Benefits: Reconnection will move the lakes closer to their natural volumes, and increase habitats available for use by listed and other important fish and wildlife species. While the Parties intend that the levees around these areas be breached to re-establish complete hydrologic connectivity with the lake, NEPA compliance will first be necessary. Funding in lines 66 and 67 will support necessary planning studies, public involvement, NEPA compliance, final design and engineering, and some of the implementation costs. KBRA line items 5 and 8 will supplement the implementation, because it is part of aquatic habitat restoration in Upper Klamath Lake, and part of the Fourmile and Sevenmile creek restoration projects in the Wood River valley.

Basis for Cost Estimates: Cost estimates were based largely on costs experienced in the Williamson River Delta reconnection project, which is very similar and located just across Agency Lake. Agency experience with similar studies and environmental compliance processes also informed the cost estimates. More detailed estimates of the costs to implement these measures will be developed as part of the planning process.

<u>Drought Plan Development and Implementation (Lines 78 and 79)</u>. Seven years: no funding; 15-year total: $6 million.

Need: Implement a drought plan to address the impacts of low-water years on fish populations in Upper Klamath Lake and the Klamath River, and the water needs of the national wildlife refuges and Klamath Irrigation Project.

Description of Activity: Development of the Draft Drought Plan does not require Federal funding. The Drought Plan describes procedures for designating Drought and Extreme Drought conditions, and for subsequently managing water to equitably distribute among the Parties the burdens imposed by such challenging conditions. The Drought Plan measures include voluntary actions such as dry-year water leasing and forbearance agreements, and will address involuntary reductions on the Klamath Reclamation Project in Extreme Drought. These measures would be in addition to the reductions in water diversion for the On-Project Plan and the Off-Project Water Use Retirement Program to address the lowest water years in the Klamath Basin when concerns for fish populations are also greatest.

Products and Benefits: Once final, the Drought Plan is expected to include a process to declare drought and extreme drought conditions, and a process to develop and implement voluntary programs including the lease of water on a willing seller basis which would

otherwise be diverted for irrigation purposes, use of groundwater, either for irrigation purposes to replace that which would otherwise have been diverted or other measures to reduce water diversion by exercise of water right priorities within the Klamath Basin. These tools will be designed to increase the amount of water available in Upper Klamath Lake and the Klamath River to protect listed species and other important fish populations.

Basis for Cost Estimates: The Parties used existing resources to develop the Drought Plan. The funding request supports programs to contract with water users to reduce irrigation diversions in Drought and Extreme Drought years and other measures identified in the KBRA. Near-term funding to deal with low-water conditions is assumed under the Interim Flow and Lake Level Program (line 89). Thereafter, specified amounts of $1 million per year would accumulate in a fund for this purpose contemplated under the KBRA, to be drawn upon based on need and the declaration of Drought and Extreme Drought.

Emergency Response Plan and Emergency Response Fund (Lines 80 and 81). No funding assumed in revised cost estimate.

Need: Develop an emergency plan to address breaks in dikes in the upper Klamath Basin.

Description of Activity: Parties will develop and implement a plan to responding to emergent situations.

Products and Benefits: Many commitments are made in the KBRA regarding storage and delivery of water, which could become impossible to fulfill in certain emergency situations such as the failure of Klamath Reclamation Project facilities, or dikes around Upper Klamath Lake or Keno Reservoir. Just such an event occurred in 2006 when a dike failure re-flooded 2,000 acres of farmland, destroyed part of a state highway, flooded part of a resort golf course, and seriously complicated water management issues involving listed species and agricultural water diversions.

Basis for Cost Estimates: Costs to address emergencies were removed; Reclamation cannot reliably plan for and does not budget for this specific type of emergency action.

Climate Change (Line 82). No funding assumed in revised cost estimate.

Need: Review analysis that assesses the impacts of climate change on the fisheries and communities in the Klamath Basin addressed in the KBRA.

Description of Activity: The commitments central to the KBRA may be affected by climate change, a possibility acknowledged by all Parties. Should climate change render important portions of the agreement ineffective or unattainable, it may trigger further negotiations under the terms of the KBRA, so that Parties can achieve the goal of maintaining sustainable fisheries and communities.

Products and Benefits: The analysis will be based on ongoing research on the potential impacts of climate change. For example, Reclamation is conducting the Water Smart Program and West-Wide Risk Assessment; USGS is also studying climate change. These and other studies will be analyzed to determine potential impacts on the Klamath Basin from climate change and develop recommendations for potential supplemental agreements to the KBRA to address future changes in climate.

Basis for Cost Estimates: The analysis will be developed under existing programs that were not taken into account in the original budget estimate and will furnish information needed for the assessments contemplated under the KBRA. For example, climate change scenarios have been conducted under the Secretarial Determination process (under the KHSA) and are also being conducted by Reclamation through a Congressional program call the West Wide Risk Assessment study. The Parties have not included costs for supplemental terms to the KBRA that could be developed based on climate change.

Off-Project Reliance Program (Line 83).

Need: Develop and implement the Off-Project Reliance Program to mitigate the effects of water shortages to Off-Project irrigators resulting from unforeseen circumstances related to the implementation of the KBRA.

Description of Activity: Although the KBRA greatly improves reliability of water deliveries through the identified water balance, the OPRP will provide options to Off Project irrigators in the event that the KBRA-defined water balance is upset such as if unexpected calls are made between water users. This fund is to help mitigate the immediate effects of such circumstances and to allow Off Project irrigators economic support while they and KBRA parties seek to rectify the problem.

Products and Benefits: The KBRA parties recognize the potential for unforeseen events affecting the water balance. The OPRP provides a contingent “bridge package” supporting short term economic stability in the event of unexpected circumstances affecting water availability after other programs have been implemented. In particular, the Off-Project water user community is agreeing to water use retirement that will have effects on the community, in exchange for certainty about the remaining water supply, subject to the limited exceptions in Section 19.2 of the KBRA.

Basis for Cost Estimates: The Off-Project Reliance Program (OPRP) is a short term, interim program. The OPRP is not seeking additional funds, instead funding for this program will come from interest accrued from dollars secured in the Water Use Retirement Program (WURP). The funds will be held in a "trust" and will only be accessible in the event that expectations under the KBRA have not been met.

Real-Time Water Management (Line 84). No funding in revised cost estimates.

Need: Develop and implement a real-time water management program.

Description of Activity: Real-time management of environmental water will require extensive participation by many parties on an on-going basis, as it will require continuous monitoring of current and forecasted hydrologic conditions, integrating biological and hydrological information, interacting with scientists and modelers, and ultimately formulating recommendations to water managers, and then evaluating the effects of subsequent water management decisions.

Products and Benefits: maximize the biological benefits from environmental water that is the result of other KBRA programs.

Basis for Cost Estimates: The revised cost estimates assume the Parties will fund their participation in the real time water management.

Real-Time Water Management: Water Flow Monitoring and Gauges (Lines 85 and 86). Seven years: $1.5 million; 15-year total: $3 million

Need: Install gauges and monitor water supplies and flows.

Description of Activity: Effective real-time water management will require substantially more stream flow gauges than are presently in use. The Technical Advisory Team (TAT) will review the existing gauging network and recommend locations for new gauges; the list here is preliminary. Gauges will be telemetered for real-time access to data, and will require ongoing maintenance. Trends in groundwater accretions in the Upper Basin will be important to know, and will be tracked by installing gauges on Spring Creek, on some of the large springs in the Wood River system, and below the springs in the Klamath River below J.C. Boyle Dam. Relatively dense gauge networks will be necessary in the Sprague and Wood river systems to facilitate implementation of the Water Use Retirement Program (KBRA Section 16). Additional gauges may be needed within the Klamath Irrigation Project to facilitate Project operational planning and implementation of the On-Project Water Plan. Additional gauges may also be needed on Klamath River tributaries. Overall, expanding the gauge network will enable the TAT and managers to plan and implement KBRA-related water management strategies.

Products and Benefits: Combined with other elements of real-time water management, this will enable managers to plan and implement water management strategies with less uncertainty.

Basis for Cost Estimates: Cost estimates for gauges and real-time data systems are based on 10 new gauges at $25,000 each for installation and annual O&M costs for 10 gauges of approximately $200,000/year.

Adaptive Management and Improved Modeling (Lines 87 and 88). See narrative for Lines 61 and 62.

Interim Flow and Lake Level Program (Line 89). Seven years: $38.5 million; 15-year total: $44 million.

Need: An essential element to achieve the water balance struck by the KBRA is the Interim Flow and Lake Level Program, which provides an interim water leasing and purchase program designed to facilitate the major shift from the old water management paradigm to the new one under the KBRA. This interim program provides additional water for fish while the On-Project Plan and the Water Use Retirement Program in the Upper Klamath Basin are being implemented.

Description of Activity: Develop and implement a program that uses voluntary actions to increase the amount of water available in Upper Klamath Lake and the Klamath River to meeting the biological needs identified by fish managers.

Products and Benefits: This program enables voluntary reductions of surface water diversions to maintain Upper Klamath Lake elevations and Klamath River flows for listed species until the implementation of the On-Project Water Plan is complete and the Project water allocation is permanent. Costs are based on experience with current water leasing programs in the Klamath Reclamation Project.

Basis for Cost Estimates: The costs are based on experience with water bank and other similar pilot programs in the Basin. The revised estimates, on an average annual basis, are expected to be adequate to meet the Program purpose. Flexibility to allocate total funds in response to need in a given year will be important to Program success. Revised estimates also reflect the objective to coordinate the Program with implementation of the On-Project Plan, as contemplated in KBRA section 20.1.

4.7 Regulatory Assurances (Seven year total: $3 million; 15 year total $31 million)

Keno Reservoir KIP Program (Line 90). Seven years: $0.3 million; 15-year total: $25.2 million.

Need: Develop and implement a program to prevent returning salmon and other fish species from entering into the diversion canals of the Klamath Reclamation Project.

Description of Activity: Reclamation will consult with federal, state, and KIP parties to evaluate appropriate methods and locations for addressing fish entrainment in the Lost River Diversion Channel, canals diverting from Keno Reservoir, and possibly the Klamath Straits Drain. Klamath Irrigation Project interests have been integral in bringing

about the circumstances that will bring salmon and other fish to the Upper Klamath Basin and the parties recognize the need to avoid new regulatory burdens or costs.

Products and Benefits: Appropriate screening or other techniques will prevent salmon returning to the upper Klamath Basin and other fish from entering and becoming trapped in irrigation canals; this will increase the survival of salmon and increase populations.

Basis for Cost Estimates: These costs are scheduled to begin in FY 2019 so screens and other entrainment devices are in place when fish begin to return to the Upper Klamath Basin. Costs are based on recent experience with screening the A Canal.

Federal General Conservation Plans/Habitat Conservation Plans (Line 91). Seven years: $2.8 million; 15-year total: $5.5 million.

Need: Under Section 22.2 of the KBRA, regulatory processes are described that would provide Federal ESA assurances to members of KWAPA and other non-Federal parties who may incidentally take listed Species in the upper Klamath Basin as a result of implementation of the KBRA consistent with section 10 of the Federal ESA. These regulatory processes should be completed by NMFS and FWS before salmon return to the area.

To facilitate completion of these regulatory processes that would result in regulatory assurances to members of KWAPA for incidental take associated with full implementation of the On-Project Plan when the conditions of the KBRA for full implementation have occurred, an application for an incidental take permit with a General Conservation Plan (GCP) or Habitat Conservation Plan (HCP) needs to be submitted to the Services two years before the deadline for implementation of the On-Project Plan under section 15.3.8.A of the KBRA. This section of the KBRA provides that, no later than March 1, 2017, KWAPA will select the deadline for implementation of the On-Project Plan, and the deadline will be March 1, 2022 at the latest. Under section 15.3.1.A, the HCP application must be submitted at least two years before the deadline. For these reasons, it is necessary to assume the development of a GCP or HCP for implementation of the On-Project Water Plan will need to begin in 2015.

To facilitate the application for incidental take permits by Off-Project Water Users, that would result in regulatory assurances before salmon occur above Upper Klamath Lake (expected in 2021), NMFS and FWS will lead the development of a GCP under section 10(a)(1)(B) of the ESA beginning in 2017. As described in section 22.2.2 of the KBRA, NMFS and FWS will develop the GCP in collaboration with interested Tribes and in coordination with other interested parties, applicants and other stakeholders. In addition, the Services will develop the GCP in coordination with the Fisheries Restoration and Reintroduction Plans.

Description of Activity: The National Marine Fisheries Service and the U.S. Fish and Wildlife Service will work with local landowners, fish managers, and other organizations to develop the Plans and complete environmental compliance.

Products and Benefits: When salmon begin returning to the Upper Klamath Basin, local interests will need General Conservation Plans or Habitat Conservation Plans to address potential impacts to ESA-listed species.

Basis for Cost Estimates: Cost estimates to support GCP or HCP development for KWAPA and Project Water Users include the equivalent of two FTEs as well as costs associated with preparation of the GCP or HCP, any environmental compliance documents, and conducting public meetings. The schedule for the cost estimates includes beginning preparation of a GCP or HCP in 2015 (i.e., 2015 $350K, 2016 $1 million, 2017 $350k, and 2018 $350K).

Due to the need to work in close cooperation with Off-Project Irrigators (*e.g*. OPWAS Parties) and other interested parties to evaluate site-specific conditions to determine appropriate conservation measures, the Services will need additional staffing (four FTEs, two NMFS, two FWS) as well as additional resources to prepare the GCP, appropriate environmental compliance documents and conduct numerous public meetings and site visits in the Upper Klamath watershed. In addition, one equivalent FTE for OPWAS to provide critical liaison support between NMFS and FWS and private landowners is necessary to facilitate the issuance of regulatory assurances to Off-Project Irrigators. The schedule for the cost estimates includes beginning preparation of the GCP in 2017 (i.e, 2017: $350K; 2018: $650K; 2019: $1.15 million; 2020: $1.15 million; 2021: $650K; 2022: $650K) and the reprogramming in 2018 of funds equivalent to two FTEs as identified for the GCP or HCP applicable to KWAPA and On-Project Water Users.

Regulatory Assurances - California Laws (Line 92). California will pay these costs and they were removed from the revised cost estimates.

Regulatory Assurances - Oregon Laws (Line 93). Oregon will pay these costs and they were removed from the revised cost estimates.

4.8 Counties Program (total: $23 million from state funding)

The Counties Program budget estimates in Lines 94 and 95 will be funded by the State of Oregon. The Counties Program budget for Lines 96 through 98 will be funded by the State of California.

4.9 Tribal Program (Seven year total: $51 million; 15 year total $87 million)

Introduction: Under the Restoration Agreement, the parties will support the goals of each tribal party to achieve the revitalization of tribal subsistence and related economies which have suffered over the past century as natural resources have dwindled. The parties support the tribes playing active roles in working to restore tribal fisheries to sustainable, harvestable levels. 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, but that these alone are insufficient to allow tribes to advance towards parity with the rest of the communities in the Klamath Basin. Accordingly, the parties agree that they will also support efforts by the tribes to develop economic revitalization programs that will move the tribes towards long-term economic self-sufficiency. Funding will be provided to each tribal party for the planning and development of long-term economic revitalization projects, including the Klamath Tribes' Mazama Forest Project in Klamath County, Oregon.

Fisheries Management: Karuk (Line 100), Klamath (Line 101), and Yurok (Line 102). Seven years: $19.5 million; 15-year total: $43.5 million.

Need: Tribal participation in fisheries management activities under the KBRA.

Description of Activity: The Tribes will use KBRA funds to build this capacity, and to shoulder their responsibility to collaboratively restore and manage the fisheries and the Klamath River Basin ecosystems that sustain them. Increasing capacity may include hiring scientists, technicians, and administrative personnel, purchasing equipment**,** or filling other programmatic needs based on what each tribe requires to restore and manage tribal fisheries. In addition, funds may be used to develop and manage tribal fish harvest programs and fund high priority cultural resource projects focused on fisheries.

Products and Benefits: Many Klamath River tribal fisheries have either been extirpated or have experienced steep declines, some of which have diminished or completely eliminated tribal harvest. The strong emphasis on fisheries restoration in the KBRA is an acknowledgement of the importance of these fisheries, and of the enormous effort that is required to restore them. Klamath River tribes (Karuk, Klamath, and Yurok) have the right and responsibility to manage their fisheries, but must also have the capacity to do so.

Basis for Cost Estimates: This program represents an investment of $500,000 in 2012, and $1,000,000 per year for each tribe from 2013 through 2021 to support staffing to participate in the fishery program development and implementation.

Conservation Management: Karuk (Line 104), Klamath (Line 105), and Yurok (Line 106). Seven years: $10.5 million; 15-year total: $22.5 million.

Need: Tribal participation in the conservation management activities of the KBRA.

Description of Activity: KBRA funding will expand organizational capacity to collaboratively conserve and manage terrestrial and cultural resources, which will vary according to tribal need but may include forest management activities or cultural resources projects. Increasing capacity may include hiring scientists, technicians, and administrative personnel, purchasing equipment**,** or filling other programmatic needs based on what each tribe requires.

Products and Benefits: In addition to the need for aquatic ecosystem and fisheries restoration, needs on tribal lands, other areas where tribal members exercise their rights, and cultural resources require serious attention as well. Responsible stewardship of terrestrial and cultural resources will diversify the availability of subsistence resources, accrue indirect benefits to the aquatic ecosystems, and enhance tribal economies.

Basis for Cost Estimates: This program represents an investment of $500,000 per year for each tribe from 2012 through 2021.

Economic Development: Study Karuk (Line 108), Klamath (Line 109), and Yurok (Line 110). Seven years: $0.75 million; 15-year total: $0.75 million.

Need: Develop plans to promote economic development.

Description of Activity: Each Party tribe will develop plans to promote long-term, sustainable growth and development.

Products and Benefits: To 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.

Basis for Cost Estimates: the Agreement provides $250,000 to each Party tribe.

Klamath Tribes: Mazama Forest Project (Line 111). Seven years: $21 million; 15-year total: $21 million.

Need: Purchase the Mazama Forest lands.

Description of Activity: In the Treaty of 1864, the Klamath Tribes ceded 20 million acres of their aboriginal holdings, but retained a Reservation of about 2 million acres. In ensuing years, in addition to their subsistence economy, the Klamaths maintained a

healthy logging and ranching economy based on Reservation pasture and timberlands. The Tribes were among the most successful and independent in the country. By the 1950s tribal income was 93% that of the majority culture.

The Klamaths' success made them a target for Congress' "Termination" policy; in 1954 the Klamath Termination Act liquidated the Reservation and terminated the Klamath Tribes. Ironically, it was determined that because the Klamaths were self-sufficient, Congress should take from them exactly the resource—their land base—that underwrote their self-sufficiency. The Tribes fell into extreme poverty and horrible social malaise. Fortunately, the Termination policy was repudiated by the United States; the Tribes were restored to federal recognition in 1986, but no land was restored.

Products and Benefits: The balance of economic benefits in the KBRA depends on the Klamaths' reacquisition of a portion of the lands lost to Termination. Because of their location at the head of the Basin, the Klamath's will not realize the benefits of restored fisheries or stabilized agricultural water supplies for decades, long after many other parties have realized their own benefits. Thus, the KBRA parties support federal contributions to help the Klamath Tribes reacquire the Mazama Forest, a 90,000 acre tract of former Reservation lands now privately owned by Cascade Timberlands.

Basis for Cost Estimates: Costs are based on the purchase price of the Mazama Forest.

Appendix A
Summary of the Klamath Basin Settlement Agreements

May 2010

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: http://www.edsheets.com/Klamathdocs.html.

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 developed estimates for the costs of implementing the Restoration Agreement and will support authorization and appropriation of funds from federal and state governments. The Klamath Settlement Group estimates that the cost of implementing the agreement in its first year would be approximately $41 million. The long-term cost of the habitat, water programs, and other measures in the agreement would be about $97 million dollars per year. Of the total, over 90 percent is budgeted for fisheries restoration and reintroduction and actions to enhance the amount of water for fish.

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. The Secretary will use best efforts to complete this determination by March 31, 2012.

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); Oregon has passed the law necessary to begin the collection of the Oregon share. Theses contributions are designed so they would not increase any rate by more than two percent. In addition, $250 million would come from the sale of bonds in California. The United States will not be responsible for facilities removal costs.

Management of the funds: The states of California and Oregon would establish 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 parties are developing a proposal for federal legislation to recommend to the Administration and Congress. The proposed legislation includes the authorization for federal agencies to implement the two agreements and specific authorities that require Congressional action. Under the proposed federal legislation, 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
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

Tribes
Karuk Tribe
Klamath Tribes
Yurok Tribe

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