

Klamath Hydroelectric Settlement Agreement

Implementation Report

Klamath Hydroelectric Project



FERC Project No. 2082



October 2021

Executive Summary

The Klamath Hydroelectric Settlement Agreement (KHSa) was signed on February 18, 2010, and the amendments were signed on April 6, 2016, and November 30, 2016. The Klamath River Restoration Corporation (KRRc) was incorporated in May 2016 and is the Dam Removal Entity (DRE) as envisioned in the KHSa. This report focuses on events that occurred January 1, 2020, through December 31, 2020.

Dam Removal Funding

The California and Oregon public utility commissions have authorized customer surcharges designed to provide the full \$200 million capped amount that PacifiCorp customers will contribute toward dam removal under the KHSa. PacifiCorp has collected dam removal surcharges from Oregon customers since March 2010 and from California customers since January 2012.

The Oregon customer surcharge, with accrued interest, is designed to provide approximately \$184 million for dam removal; surcharge collection in Oregon ceased in December 2019. The California surcharge, with accrued interest, is designed to provide approximately \$16 million in funding for dam removal. As of December 31, 2020, the dam removal trust accounts overseen by the Oregon Public Utility Commission (OPUC) and the California Public Utilities Commission (CPUC) had a combined balance of \$106.6 million. As of December 31, 2020, \$96.9 million had been disbursed to the KRRc from both trust accounts.

Interim Measures

PacifiCorp continues to implement the interim measures in the KHSa in the period prior to dam removal. While work toward dam removal progresses, PacifiCorp continues to support the various interim measures that monitor water quality and projects that improve water quality, fish habitat, and other environmental conditions in the Klamath Basin. This includes operation of Iron Gate Hatchery and support for conservation of Coho Salmon.

Key 2020 Updates

On July 16, 2020, the Federal Energy Regulatory Commission (FERC) issued a Partial License Transfer Order naming the KRRc and PacifiCorp as co-licensees and requiring PacifiCorp to remain as a co-licensee through the surrender process. Co-licensee status was not what PacifiCorp had agreed to when negotiating the KHSa. For this reason, on July 23, 2020, PacifiCorp initiated Meet and Confer under the relevant KHSa clause between the KHSa signatory parties. On November 17, 2020, a Memorandum of Agreement (MOA) was signed by the parties, resolving the Meet and Confer process and naming the states of Oregon and California as co-licensees with the KRRc for the balance of the license surrender and dam removal process. The MOA also created a \$45 million dollar contingency fund for potential cost overruns split evenly between PacifiCorp, Oregon, and California. The MOA allowed the immediate filing of an updated surrender application with FERC on November 17, 2020, and created a deadline of January 15, 2021, for filing a new license transfer application as well as property disposition applications with the public utility commissions.

In response, FERC formally noticed the surrender application on December 16, 2020. Comments, motions to intervene, and protests were sought by February 15, 2021. By December 31, 2020, FERC had not yet indicated the surrender application was ready for environmental review.

PacifiCorp is pleased with the progress made during the Meet and Confer process to chart a path that maintains the KHSa and supports timely removal of the dams. PacifiCorp notes the substantive contributions of KHSa parties, tribes, and involved state and federal agencies in these efforts and looks forward to working with our stakeholders as these efforts continue to move forward.

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1.0 Introduction

On February 18, 2010, PacifiCorp, along with representatives of more than 40 organizations, including federal agencies, the states of California and Oregon, Native American tribes, counties, irrigators, and conservation and fishing groups, signed the historic Klamath Hydroelectric Settlement Agreement (KHSA). The 2010 KHSA laid out the process for additional studies, environmental review, and, following the passage of federal legislation, a decision by the Secretary of the Interior regarding whether removal of four Klamath River dams owned by PacifiCorp should proceed. The four Klamath River facilities proposed to be removed are J.C. Boyle, Copco No. 1, Copco No. 2, and Iron Gate. The KHSA included provisions for the interim operation of the dams until their anticipated removal in 2020 and spelled out the process to transfer, decommission, and remove the dams. Federal legislation to enact the provisions of the KHSA was not passed by Congress and the agreement was amended in April 2016 to provide for an administrative pathway to potential dam removal consistent with the provisions of the Federal Power Act, as administered by the Federal Energy Regulatory Commission (FERC).

The KHSA also contains a set of interim measures that PacifiCorp is to implement during the period prior to potential dam removal to improve water quality and fish habitat, support and improve hatchery operations, and benefit environmental resources in the Klamath Basin. A copy of the KHSA can be found on PacifiCorp's website at:

<https://www.pacificorp.com/energy/hydro/klamath-river.html>

Since the execution of the KHSA, PacifiCorp has been working diligently in cooperation with parties to the KHSA and other affected stakeholders and regulatory agencies to implement its obligations under the KHSA and advance the settlement process. The purpose of this report is to document the progress made in implementing the KHSA.



Iron Gate Dam and Powerhouse



Copco No. 2 Dam



Copco No. 1 Dam and Powerhouse



J.C. Boyle Powerhouse

1.1 Background

PacifiCorp owns and operates the Klamath Hydroelectric Project (Project), located on the upper Klamath River in Klamath County (south-central Oregon) and Siskiyou County (north-central California). The Project consists of eight developments (Figure 1). Seven of the developments are located on the Klamath River between river mile (RM) 190.1 and 254.3, comprising (in order moving upstream) Iron Gate (RM 190.1 to 196.9), Copco No. 2 (RM 198.3 to 198.6), Copco No. 1 (RM 198.6 to 203.1), J.C. Boyle (RM 220.4 to 228.3), Keno (RM 233 to 253.1), and East Side and West Side (both in Link River at RM 253.1 to 254.3). The eighth development is on Fall Creek, a tributary to the Klamath River (in Iron Gate Reservoir) at RM 196.3.

The Project is licensed by FERC as Project No. 2082 (P-2082). With the exception of Fall Creek, the Project is largely dependent on water releases from Upper Klamath Lake at the Bureau of Reclamation's (Reclamation) Link River Dam (RM 254.3).

On February 25, 2004, PacifiCorp filed an application with FERC for a new 50-year license for the Project. PacifiCorp proposed in this application to operate five of the developments in a manner similar to historical operations with a set of environmental measures, the purposes of which included (but were not limited to) water quality and habitat enhancement, instream flow and ramp rate¹ management, facilitation of fish passage, and improved management of Iron Gate Hatchery fish stocks.

1.1.1 Origin of the KHSA

Following the submittal of its application for a new license, PacifiCorp began settlement discussions with a diverse group of stakeholders to resolve issues related to relicensing of the Project. PacifiCorp worked collaboratively with

this group of stakeholders to develop and enter into the KHSA. A precursor to the KHSA, the Klamath Agreement in Principle (AIP), laid out a framework for the KHSA and was signed on November 13, 2008.

After 5 years of negotiations, the original KHSA was signed by the involved parties on February 18, 2010. The 2010 KHSA identified a process and path forward that provided for the potential decommissioning and removal of Iron Gate, Copco No. 2, Copco No. 1, and J.C. Boyle dams as early as 2020.

PacifiCorp agreed to a potential dam removal path for the Project and executed the KHSA based on an assessment that the KHSA provided superior cost and risk protections for PacifiCorp and its customers as compared to continuing on a path of relicensing the Project. Under the KHSA, PacifiCorp's customers in California and Oregon were to be assessed surcharges to provide up to \$200 million in funding towards dam removal costs. The State of California will fund up to \$250 million for dam removal costs in excess of the \$200 million customer contribution.

1.1.2 Federal Legislation

There were several contingencies in the KHSA, including provisions for funding the dam removal effort and the passage of federal legislation. Congress had to pass legislation authorizing the Secretary of the Interior to make a determination on the KHSA and its companion agreement, the Klamath Basin Restoration Agreement (KBRA). Starting in 2010 and continuing through 2015, senators from Oregon and California introduced Senate bills that would have provided this authority. While hearings in the Senate Committee on Energy and Natural Resources occurred, the bill never moved out of committee for consideration on the Senate Floor.

¹ Hydroelectric facilities typically have the capability of increasing and decreasing flow levels downstream of

the facilities. In general, the rate at which these flow changes occur is called the "ramp rate" or "ramping."

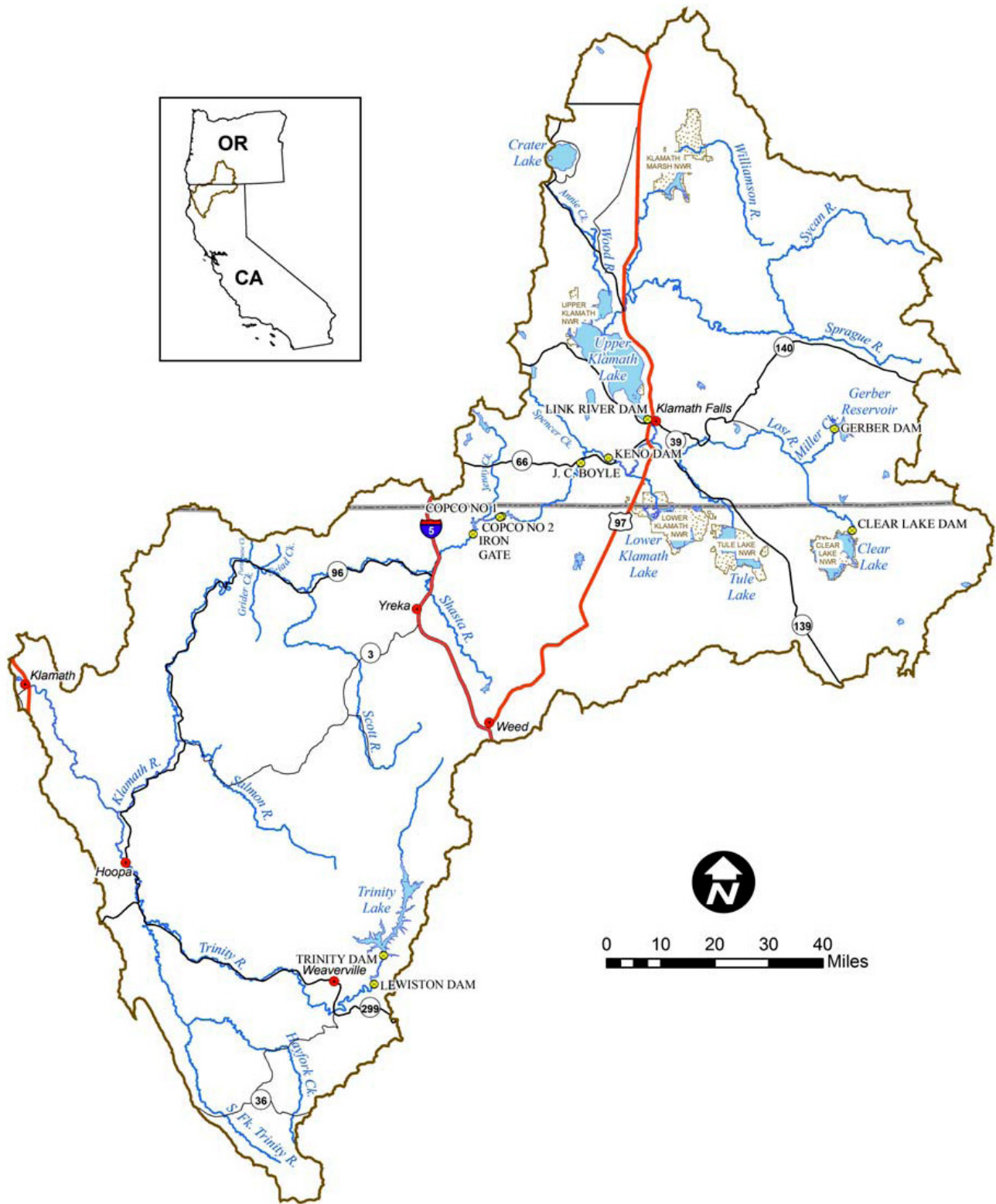


Figure 1. Klamath Basin

While the KHSA does not have an expiration date, the KBRA was designed to expire on December 31, 2015, if Congressional approval was not obtained. The required legislation was never passed and the KBRA expired at the end of 2015.

While PacifiCorp was not a party to the KBRA, the KBRA was important to the overall implementation of the KHSA because it provided funding for post-dam removal habitat restoration in areas that would be newly accessible to fish, addressed water rights disputes in the upper basin, and provided means to improve water supply reliability for Klamath Basin irrigators.

In early 2016, the parties to the KHSA met in an attempt to determine if there was a way to amend the KHSA to provide an administrative pathway to potential dam removal consistent with the provisions of the Federal Power Act, as administered by FERC. The amendment to the KHSA provides that PacifiCorp will apply to FERC to transfer ownership of J.C. Boyle, Copco No. 1, Copco No. 2, and Iron Gate developments to a Dam Removal Entity (DRE). The DRE would then accept the license for these developments and petition FERC to surrender the license and remove the facilities.

The amendment to the KHSA, executed on April 6, 2016, provides for potential dam removal to occur through a license surrender process before FERC. Federal legislation is no longer required to implement the KHSA.

1.1.3 Klamath River Renewal Corporation

Following the execution of the KHSA amendment in 2016, the Klamath River Renewal Corporation² (KRRRC) was incorporated as a nonprofit corporation in California on May 24, 2016. The KRRRC is the DRE as envisioned in the KHSA.

The mission of the KRRRC is to accept ownership of the four developments (J.C. Boyle, Copco No. 1, Copco No. 2, and Iron Gate) collectively known as the Lower Klamath Project (P-14803) from PacifiCorp and obtain approval from FERC to surrender the license and remove these facilities. To accomplish this mission, the KRRRC must obtain all necessary state, federal, and local permits for removal; create the necessary planning documents; select a contractor to conduct the removal process; and successfully implement the removal of the four lower dams on the Klamath River. Ownership of Keno Dam, currently a PacifiCorp facility, will be transferred to Reclamation as described in the KHSA.

The KRRRC continued to coordinate with stakeholders, signatories, and principal parties to the KHSA through 2020. Formal meetings of the signatories were held on February 4, March 25, May 1, June 25, and July 22, 2020.

1.2 FERC Transfer and Surrender Proceedings

On September 23, 2016, PacifiCorp and the KRRRC filed an application with FERC to transfer ownership of the J.C. Boyle, Copco No. 1, Copco No. 2, and Iron Gate developments to the KRRRC. Simultaneously with the filing of the transfer application, the KRRRC filed a surrender application with FERC for these same developments. Since 2016, the KRRRC has continued to file updates with FERC.

On March 15, 2018, FERC issued an order that splits the Klamath Hydroelectric Project (P-2082) into two separate projects. The Klamath Hydroelectric Project (P-2082) contains Keno Dam, the Eastside and Westside developments, and the Fall Creek Development. The Lower Klamath Hydroelectric Project (P-14803) contains the J.C. Boyle, Copco No. 1, Copco No. 2, and Iron Gate developments. However, acting on a petition submitted by

² Information about the KRRRC can be found here: <http://www.klamathrenewal.org/>

PacifiCorp to FERC on April 16, 2018, FERC issued an order on June 21, 2018, that stayed the implementation of this order until such time that FERC acts on the application to transfer ownership of the Lower Klamath Project to the KRRC.

The first substantive actions taken by FERC in 2020 were a February 4, 2020, request for the KRRC to provide a Guaranteed Maximum Price (GMP), Final Liability Transfer Corporation agreements, and a response to the Board of Consultant's (BOC) July 29, 2019, recommendations. On February 28, 2020, in response to FERC's actions, the KRRC filed a response to the BOC's recommendations, the GMP with assurances, an overall project funding summary, and an overview of the 60 percent design. A formal BOC meeting was held on March 4, 2020, and the resulting report was submitted to FERC on March 20, 2020.

On July 16, 2020, FERC issued a Partial License Transfer Order adding the KRRC to the PacifiCorp license and requiring PacifiCorp to remain as co-licensee through license surrender and dam removal. Because the July 16 Order did not conform to the structure of the KHSA, PacifiCorp initiated formal Meet and Confer proceedings with the KHSA signatories on July 23, 2020.

Meet and Confer negotiations continued through the fall of 2020 until a Memorandum of Agreement (MOA) was signed on November 17, 2020. As part of the MOA, the states of Oregon and California agreed to serve as co-licensees with the KRRC for license surrender and dam removal. The MOA also created a \$45 million contingency fund to address potential cost overruns for dam removal with PacifiCorp,

Oregon, and California each adding \$15 million to that fund; additional cost overruns are to be split evenly between PacifiCorp, Oregon, and California. The MOA allowed for the immediate filing with FERC of an updated surrender application. The MOA also created a deadline of January 15, 2021, for filing of (1) a new transfer application with the KRRC, California, and Oregon as the proposed license recipients, and (2) property disposition applications with the public utility commissions.

In response, FERC formally noticed the surrender application on December 16, 2020. Comments, motions to intervene, and protests were sought by February 15, 2021. By December 31, 2020, FERC had not yet indicated the surrender application was ready for environmental review.

1.3 FERC Licensing

The FERC license for the Project expired on March 1, 2006, and the Project is now operating under annual licenses from FERC. It is anticipated that the Project will continue operating under annual licenses until the dams are removed pursuant to the KHSA or a new license is issued. If FERC determines that dam removal should not proceed, or the KHSA terminates for other reasons, the FERC relicensing process for the Project would resume. The KHSA also provides that a new FERC license will not be issued and the licensing process will be held in abeyance pending the outcome of the KHSA dam removal process.

2.0 Parties to the Klamath Hydroelectric Settlement Agreement

This section lists the parties to the KHSA.

United States

Department of Commerce

National Marine Fisheries Service

Department of the Interior, including:

- Bureau of Indian Affairs
- Bureau of Land Management
- Bureau of Reclamation
- Fish and Wildlife Service

State of California

California Department of Fish and Wildlife

California Natural Resources Agency

State of Oregon

Oregon Department of Environmental Quality

Oregon Department of Fish and Wildlife

Oregon Water Resources Department

PacifiCorp

Klamath River Renewal Corporation

Tribes

Karuk Tribe

Yurok Tribe

Counties

Humboldt County, California

Nongovernmental Organizations

American Rivers

California Trout

Institute for Fisheries Resources

Northern California/Nevada Council Federation
of Fly Fishers

Pacific Coast Federation of Fishermen's
Associations

Sustainable Northwest

Trout Unlimited

3.0 Funding

The KHSA sets out a cost cap for facilities removal of \$450 million. Of this amount, up to \$200 million is to come from surcharges on PacifiCorp's customers in California and Oregon. The State of California will fund up to \$250 million for dam removal costs in excess of the customer cost cap. In November 2014, California voters approved the *Water Quality, Supply, and Infrastructure Improvement Act* (Proposition 1). This bond measure included funding for implementation of California's responsibilities under the KHSA.

As part of the MOA reached in November of 2020, an additional \$45 million contingency fund was established for potential dam removal cost overruns. PacifiCorp, Oregon, and California each allocated \$15 million to this fund and further agreed to evenly split overruns in excess of the \$45 million contingency fund.

3.1 Customer Contributions

3.1.1 Oregon Public Utility Commission Proceedings

On March 18, 2010, in accordance with KHSA Sections 4.1.1 and 7.3.9, PacifiCorp filed its analyses of the rate-related costs, benefits, and risks to customers from the KHSA as compared to relicensing the Klamath River dams with the Oregon Public Utility Commission (OPUC). This filing, with supporting testimony, was an application to implement provisions of Oregon Senate Bill 76 passed in the 2009 Oregon legislative session. PacifiCorp concurrently filed an advice letter establishing two surcharges, effective upon filing, to collect the customer contribution towards dam removal costs. In its application, PacifiCorp also requested that the depreciation schedule for Project facilities be adjusted in contemplation of their anticipated removal in 2020 and sought authorization to

transfer Project facilities to the DRE. On September 16, 2010, the OPUC issued a final order affirming the dam removal surcharges for Oregon customers and a depreciation schedule for the facilities that provides for removal in 2020.³ The OPUC order requires PacifiCorp to seek authorization to transfer Project facilities to the DRE at a later date. Since the surcharges commenced in March 2010, PacifiCorp has been remitting collected surcharges to trust accounts established by the OPUC with an independent financial institution. As of December 31, 2020, the balance of the Oregon customer dam removal trust accounts was as follows:

J.C. Boyle Trust Account	\$24,379,765.36
Copco No. 1, Copco No. 2, and Iron Gate Trust Account	\$75,133,361.11
Total	\$99,513,126.47

The Oregon customer surcharge, with accrued interest, is designed to provide approximately \$184 million in funding for dam removal; this amount has been collected and the surcharge collection ceased in December 2019.

3.1.2 California Public Utilities Commission Proceedings

On March 18, 2010, in accordance with KHSA Sections 4.1.1 and 7.3.9, PacifiCorp filed an application with the California Public Utilities Commission (CPUC) requesting authorization to begin collecting dam removal surcharges from its California customers and seeking authorization to transfer Project facilities to the DRE. This application included supporting testimony regarding the rate-related costs, benefits, and risks for PacifiCorp customers as compared to relicensing. In its application, PacifiCorp also requested that the depreciation schedule for Project facilities be adjusted in contemplation of their anticipated removal in 2020. On May 6, 2011, the CPUC issued a final

³ The OPUC Order is available at:
<http://apps.puc.state.or.us/orders/2010ords/10-364.pdf>

decision approving (1) the request for a surcharge of \$13.76 million collected over 9 years; (2) institution of two trust accounts for the deposit of the surcharge; and (3) depreciation of the rate base of the Project assets, and amortization of the relicensing and settlement costs associated with the Project, on an accelerated basis. On June 6, 2011, PacifiCorp filed an advice letter requesting approval of revised tariffs adding the Klamath Surcharge. The trust accounts were established with an independent financial institution by the CPUC in January 2012 and PacifiCorp began assessing the surcharge on January 10, 2012.

Because of a delay between the issuance of the decision and the establishment of the trust accounts, approximately 8 months of surcharge collections were lost. On January 13, 2012, PacifiCorp filed a request to increase the Klamath surcharge rate in order to collect the full amount of the surcharge within the original collection timeframe. The CPUC approved PacifiCorp's request on October 25, 2012⁴ and new rates became effective October 29, 2012.

As of December 31, 2020, the balance of the California customer dam removal trust accounts was as follows:

J.C. Boyle Trust Account	\$1,770,224.63
Copco No. 1, Copco No. 2, and Iron Gate Trust Account	\$5,345,914.21
Total	\$7,116,138.84

The California customer surcharges, with accrued interest, are designed to provide approximately \$16 million in funding for dam removal.

3.1.3 Total Trust Account Balances

The total balance of the California and Oregon dam removal trust accounts maintained by independent financial institutions under the

direction of the California and Oregon public utility commissions was \$106,629,265.31 as of December 31, 2020.

3.1.4 Management of the Trust Accounts

Pursuant to KHSA Section 4.2.4, the public utility commissions in California and Oregon have entered into trust management agreements with independent financial institutions to manage the trust accounts established to hold the dam removal surcharges that constitute the customer contribution towards dam removal costs.

Disbursement of funds to the KRRC for permitting and facilities removal expenditures has and will continue to occur at the direction of authorized representatives of the public utility commissions. By December 2017, the KRRC had obtained approval from the OPUC to access the Oregon surcharge funds and from the CPUC to access the California surcharge funds. As of December 31, 2020, \$96,983,963.00 has been disbursed to the KRRC from the trust accounts.

3.2 State of California Funding

If the cost of facilities removal exceeds the \$200 million customer contribution, then the State of California will fund up to \$250 million to cover the additional cost.

The *Water Quality, Supply, and Infrastructure Improvement Act* (Assembly Bill No. 1471) was submitted to the California voters on November 4, 2014, as Proposition 1. Voters approved the bond and it was signed into law by Governor Brown. Per KHSA Section 4.1.2, this bond provides for funding up to \$250 million to cover the difference between funds available under the customer surcharge and the actual costs for full facilities removal.

⁴ The final CPUC decision is available at: <https://docs.cpuc.ca.gov/PublishedDocs/Published/G000/M031/K876/31876963.docx>

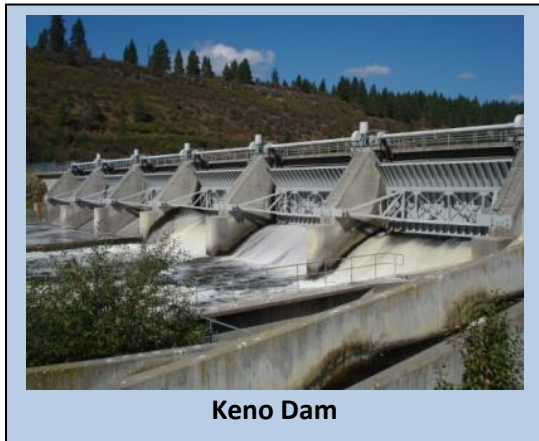
4.0 Interim Operations

4.1 Lease of State-Owned Beds and Banks

Pursuant to KHSA Section 2.4, PacifiCorp and the State of Oregon executed leases for J.C. Boyle and Keno dams in June 2011 and PacifiCorp is complying with the terms of those leases and remitting lease payments to the State of Oregon.

4.2 Keno Transfer

Pursuant to KHSA Section 7.5.2, PacifiCorp and Reclamation executed an Agreement in Principle in August 2012 regarding the potential transfer of the Keno Development to Reclamation. The Agreement in Principle memorializes broad principles designed to function as a framework for the development of a final transfer agreement. PacifiCorp and Reclamation continue good-faith negotiations to reach a final Transfer Agreement.



Keno Dam

The final Transfer Agreement will outline exactly how necessary lands and improvements will be transferred to Reclamation as specified in the KHSA. It will also include details related to ongoing access to affected lands and provisions for the transfer of control of the facility from PacifiCorp to Reclamation.

⁵ Per KHSA Section 1.4, the interim period is that period between the effective date of the KHSA (February 18, 2010) and when PacifiCorp physically

4.3 Local Community Power

Pursuant to KHSA Section 5.3, representatives of Interior, PacifiCorp, the Klamath Water and Power Agency (KWAPA), Klamath Water Users Association, Bonneville Power Administration, and the Western Area Power Administration have held numerous meetings regarding the development and implementation of a federal power program that would provide federal power to eligible Klamath Basin irrigation loads.

PacifiCorp transferred customer load information to KWAPA for customers that have indicated an interest in the program and who signed releases authorizing the release of their customer information to KWAPA. These customer load data informed KWAPA and Interior's planning for the delivery of federal power to serve eligible loads and estimated costs associated with the program.

PacifiCorp assisted KWAPA and its consultants to develop an analysis of the potential cost savings associated with implementation of the federal power program. PacifiCorp continues to work cooperatively with the involved parties to address power cost issues for Klamath Basin irrigators who are now paying higher power rates under tariffs approved by the public utility commissions.

4.4 Section 401 Water Quality Certification Process

Section 6.5 of the KHSA commits the KHSA parties to request abeyance of the California and Oregon Clean Water Act Section 401 water quality certification process for PacifiCorp's relicensing application, pending completion of the FERC transfer process to the KRRC and during the interim period⁵ prior to potential dam removal. Given the anticipated removal of the hydroelectric project facilities, abeyance of the Section 401 water quality certification process is intended to relieve the states,

disconnects the facilities from the transmission grid (decommissioning).

PacifiCorp, and other interested parties of the burden of processing relicensing-related certification applications during the interim period pursuant to the KHSa. At the same time, full authority of the states to condition the Project through the Section 401 certification process is preserved should dam removal under the KHSa not occur and the relicensing process resume.

With the execution of the KHSa in April 2016, PacifiCorp petitioned FERC for a formal abeyance of all work related to relicensing. FERC granted this abeyance on June 16, 2016, after which PacifiCorp withdrew its Section 401 applications from both the State Water Resources Control Board (SWRCB) and the Oregon Department of Environmental Quality (ODEQ) on June 23, 2016.

In September 2016, concurrent with submitting the transfer and surrender applications to FERC, the KRRC submitted Section 401 certification applications for facilities removal to the SWRCB and ODEQ.

On June 7, 2018, the SWRCB⁶ released a draft Section 401 water quality certification for the KRRC's proposed removal of the California dams. Following public comment and response to those comments, the SWRCB released a Final Environmental Impact Report (FEIR) and final water quality certification for dam removal on April 7, 2020.

4.5 Total Maximum Daily Loads

Pursuant to KHSa Section 6.3, PacifiCorp filed a *Plan for Implementing Management Strategies and Water Quality-Related Measures* with the

ODEQ and the North Coast Regional Water Quality Control Board (NCRWQCB) on February 22, 2011. PacifiCorp's submittal of this plan was triggered under the KHSa by the NCRWQCB's approval of the *Klamath River Total Maximum Daily Load* (TMDL) on September 7, 2010, and by ODEQ's issuance of the *Upper Klamath and Lost River Subbasins Total Maximum Daily Load* on December 21, 2010. These plans specify the interim water quality measures that PacifiCorp will implement prior to potential transfer of the Project to the KRRC.

The ODEQ 2010 TMDL was challenged and withdrawn. ODEQ worked on revisions and issued a final TMDL specific to nutrient loading and dissolved oxygen in January of 2019 – the *Upper Klamath and Lost River Subbasins Nutrient TMDL and Water Quality Management Plan*.⁷ In May of 2019, ODEQ issued a draft water temperature TMDL. A final version of the *Upper Klamath and Lost Subbasins Temperature TMDL and Water Quality Management Plan* was issued September 19, 2019. The U.S. Environmental Protection Agency approved the final temperature TMDL on September 30, 2019. PacifiCorp petitioned for reconsideration on November 15, 2019. On January 14, 2020, ODEQ denied PacifiCorp's petition (and all other petitions) for reconsideration of the TMDL. As a result, PacifiCorp challenged the technical aspects of the TMDL ODEQ's TMDL in Marion County District Court (No. 20CV12262). That case is still pending.

⁶ The SWRCB has posted California Section 401 information here: https://www.waterboards.ca.gov/waterrights/water_issues/programs/water_quality_cert/lower_klamath_ferc14803.shtml

⁷ The ODEQ has posted the finalized TMDL here: <https://www.oregon.gov/deq/wq/tmdls/Pages/TMDLs-Klamath-Basin.aspx>

5.0 Interim Measures Implementation

The KHSA documents a number of interim measures (IMs) PacifiCorp has undertaken to improve water quality and fish habitat conditions, support and improve hatchery operations, and benefit environmental resources in the Klamath Basin prior to potential dam removal.

This section provides an overview of the Interim Measures Implementation Committee (IMIC) membership and activities during 2020 and the current implementation status of these IMs, including those that are part of PacifiCorp's Interim Conservation Plan (ICP Interim Measures) and those in Appendix D of the KHSA that are not related to the ICP.

As the interim period has progressed, PacifiCorp has completed many of the IMs laid out in the KHSA. The following IMs are now complete:

- **Interim Measure 8: J.C. Boyle Bypass Barrier Removal.** Completed in 2010.
- **Interim Measure 10: Water Quality Conference.** Completed September 11-13, 2012.
- **Interim Measure 11: Interim Water Quality Improvements.** Studies or improvement actions completed under IM 11 include:
 - Conceptual Feasibility Study of Aeration/Oxygenation Systems at Keno Reservoir
 - Nutrient Removal Methods
 - Assessment of Potential Algae Harvesting and Removal Techniques at Link River Dam
 - Link River Algae Removal Demonstration Project
 - Study of Algal Conditions Management within a Reservoir Cove Using Physical Measure

- Planning and Design for a Demonstration Wetlands Facility Adjacent to the Klamath River
- 2014 Localized Treatment of Long Gulch Cove in Iron Gate Reservoir using Hydrogen Peroxide Based Algaecide
- Research on Microcystis Genotypes in the Klamath River System
- Multiyear Analysis of Microcystis Population Structure and Toxicogenicity in Copco and Iron Gate Reservoirs
- Klamath Tracking and Accounting Program
- Conceptual Design Evaluation for Full-scale Particulate Organic Matter Removal from Klamath River Source Water using Stormwater Treatment Technology
- Phase 1 Assessment of Irrigation Water Conservation Opportunities for Water Quality Improvement
- **Interim Measure 15: Water Quality Monitoring**
 - Periphyton Study
 - 2016 Genetics Special Study

The following overview summarizes the status of those IMs that continue to be actively implemented and includes the text of the IM in *italics* for reference. Past KHSA Implementation Reports are available for reference and can be found online at:

<https://www.pacificorp.com/energy/hydro/klamath-river/khsa-implementation.html>

5.1 Interim Measure 1: Interim Measures Implementation Committee

The purpose of the IMIC is to collaborate with PacifiCorp on ecological and other issues related to the implementation of the IMs set forth in Appendix D of the KHSA. The primary goals of the IMIC are: (1) to achieve consensus where possible; and (2) timely implementation of the matters within the scope of the IMIC's responsibilities under the KHSA.

The IMIC meets quarterly and members can attend in person or via a webcast and conference line. These meetings typically consist of a technical review of study plans, updates on IM study progress, and review of technical reports.

Meetings typically were held during the third week of January, April, July, and October. Because of poor travel conditions in January

2020 and COVID-19 travel restrictions for the remainder of the year, all four IMIC meetings in 2020 were held virtually.

Representatives to the IMIC come from 18 different organizations. The IMIC members who participated during 2020 are listed in Table 1.

Table 1. Interim Measures Implementation Committee Members and Affiliations

IMIC Member	Organization
<i>Vacant</i>	American Rivers
Chelsea Aquino	Bureau of Land Management
Rick Carlson	Bureau of Reclamation
Kurt Bainbridge	California Department of Fish and Wildlife
Joe Croteau	California Department of Fish and Wildlife
Kristen Gangl	California State Water Resources Control Board
Erin Ragazzi	California State Water Resources Control Board
Parker Thaler	California State Water Resources Control Board
Curtis Knight	California Trout
Mark Rockwell	Federation of Fly Fishers, N. CA Council
Glen H. Spain	Institute for Fisheries Resources
Susan Fricke	Karuk Tribe
S. Craig Tucker	Karuk Tribe
Bob Pagliuco	National Marine Fisheries Service
Jim Simondet	National Marine Fisheries Service
Clayton Creager	North Coast Regional Water Quality Control Board
Johnathan Warmerdam	North Coast Regional Water Quality Control Board
Mike Hiatt	Oregon Department of Environmental Quality
Chris Stine	Oregon Department of Environmental Quality
Robert M. Hooton	Oregon Department of Fish and Wildlife
Ben Ramirez	Oregon Department of Fish and Wildlife
Bill Tinniswood	Oregon Department of Fish and Wildlife
Ted Wise	Oregon Department of Fish and Wildlife

Table 1. Interim Measures Implementation Committee Members and Affiliations

IMIC Member	Organization
Kyle Gorman	Oregon Water Resources Department
Mary Grainey	Oregon Water Resources Department
Demian Ebert	PacifiCorp
Tim Hemstreet	PacifiCorp
Mark Buettner	The Klamath Tribes
Stan Swerdloff	The Klamath Tribes
Matt Baun	U.S. Fish and Wildlife Service
Jason Cox	U.S. Fish and Wildlife Service
Mike Edwards	U.S. Fish and Wildlife Service
Ryan Fogerty	U.S. Fish and Wildlife Service
Gina Glenne	U.S. Fish and Wildlife Service
Nick Hetrick	U.S. Fish and Wildlife Service
John Vradenburg	U.S. Fish and Wildlife Service
Matthew Hanington	Yurok Tribe
Louisa McCovey	Yurok Tribe

5.2 Interim Conservation Plan Interim Measures and Endangered Species Act Regulatory Process

Section 6.2.1 of the KHSa provides as follows:

PacifiCorp shall apply to the Services pursuant to ESA Section 10 and applicable implementing regulations to incorporate the Interim Conservation Plan measures, including both Appendix C (ICP Interim Measures) and the Interim Conservation Plan measures for protection of listed sucker species not included in Appendix C, into an incidental take permit.



Starting in 2009, PacifiCorp worked closely with the National Marine Fisheries Service (NMFS) and U.S. Fish and Wildlife Service (USFWS) to develop applications for and comply with Endangered Species Act (ESA) Section 10 permits consistent with agency regulations.

5.2.1 Coho Salmon Habitat Conservation Plan

In February 2011, PacifiCorp filed an application for an ESA Section 10 permit with NMFS. The permit application developed with NMFS included a Habitat Conservation Plan (referred to as the Coho HCP) that identifies a process to

implement measures that will avoid, minimize, and mitigate the effects of Project operations on Coho Salmon and attain the biological goals and objectives described in the Coho HCP's conservation strategy. Such measures include:

1. Implementing habitat enhancement activities through a Coho Enhancement Fund
2. Implementing flow releases and turbine venting at Iron Gate Dam to improve habitat conditions for Coho in the Klamath River
3. Funding research focused on fish disease in the Klamath River
4. Retrieval and passage of large wood trapped at PacifiCorp's facilities
5. Monitoring to assess the benefits of these measures

On February 24, 2012, NMFS issued a final Incidental Take Permit under Section 10 of the ESA that authorizes potential incidental take of Coho Salmon that could occur as a result of PacifiCorp's interim operation of the Project consistent with the terms of the Coho HCP. The term of the Incidental Take Permit extended through February 24, 2022. Because of delays in dam removal, PacifiCorp requested a 1-year extension of the Section 10 Incidental Take Permit from NMFS on December 18, 2020. Action by NMFS on this request was still pending as of the end of 2020. Annually, PacifiCorp files a report with NMFS documenting Coho HCP implementation actions taken the previous year.

Activities conducted under the Coho HCP to date include operational adjustments to improve dissolved oxygen in flow releases from Iron Gate Powerhouse, the implementation of habitat enhancement projects to benefit Coho Salmon downstream of Iron Gate Dam as funded through PacifiCorp's Coho Enhancement Fund, fish disease research, development of a Hatchery and Genetics Management Plan (HGMP), delivery of flows from Iron Gate Dam in support of Reclamation's regulatory requirements, and monitoring and adaptive management.

PacifiCorp developed a Gravel Augmentation Plan⁸ as required by the Coho HCP, which was approved by NMFS on March 6, 2013. The Gravel Augmentation Plan required addition of 3,000 cubic yards of gravel downstream of Iron Gate Dam over the 10-year period of the Coho HCP. Gravel augmentation immediately downstream of Iron Gate Dam has taken place in 2014, 2016, and 2017. As of December 31, 2020, a total of 4,600 cubic yards of spawning gravel has been placed downstream of Iron Gate Dam, exceeding the target volume in the Coho HCP.



The Coho HCP also requires water quality data collection and analysis. PacifiCorp submitted a final Water Quality Monitoring Plan⁹ to NMFS on February 24, 2013. This plan included procedures to monitor water temperature and dissolved

⁸ PacifiCorp. 2013a. Interim Operations Habitat Conservation Plan for Coho Salmon: Iron Gate Gravel Augmentation Plan, Version 1.0. February. 26 pp.

⁹ PacifiCorp. 2013b. Interim Operations Habitat Conservation Plan for Coho Salmon: Water Quality Monitoring Plan, Version 1.0. January. 24 pp.

oxygen at designated locations downstream of Iron Gate Dam. Since 2008, continuous monitoring of water temperature and dissolved oxygen has occurred in the Klamath River downstream of Iron Gate Dam. In May 2013, PacifiCorp completed arrangements with the U.S. Geological Survey (USGS) to install and collect continuous water temperature data in the Klamath River at Orleans. As required in the Incidental Take Permit, this location is used as a down-river reference location that is outside the area where water temperatures are influenced by releases from Iron Gate Dam. Data are collected and used to evaluate consistency with the water quality objectives contained in the Coho HCP and are included in the annual Coho HCP reports submitted to NMFS.

5.2.2 Sucker Habitat Conservation Plan

In August 2011, PacifiCorp filed an application for an ESA Section 10 Incidental Take Permit with USFWS, including a draft HCP (referred to as the Sucker HCP), to address potential incidental take of Lost River and Shortnose suckers that could occur during the period before Project removal (the interim period). PacifiCorp submitted a revised Sucker HCP to USFWS in late 2012 and public comments on PacifiCorp's application were solicited in March 2013. On February 20, 2014, USFWS issued a final Incidental Take Permit that authorizes potential incidental take of listed suckers that could occur as a result of PacifiCorp's interim operation of the Project consistent with the terms of the Sucker HCP.¹⁰

The Sucker HCP identifies a conservation strategy consisting of substantial shutdown of the East Side and West Side hydroelectric developments, continued support for restoration of the Williamson River Delta, and a protocol for implementing a Sucker Conservation Fund that will avoid, minimize, and mitigate take of listed suckers.

Since 2014, PacifiCorp has not operated the East Side and West Side developments except for tests generally lasting less than 24 hours and coordinated with USFWS to avoid take of suckers. PacifiCorp continues to provide revenue from the Tulana Farms lease to The Nature Conservancy. In 2020, these funds were used to support restoration actions on the Williamson River Delta. Through the Sucker Conservation Fund, PacifiCorp funded a fish screening and irrigation efficiency improvement project on the Sprague River in 2016 as documented in the last KHSA Implementation Report (through June 2018). In 2020 Trout Unlimited used the funds available in the Sucker Conservation Fund to upgrade an irrigation intake along the Sprague River near Lalo Springs by installing a new pump and fish screen. Engineering work was also conducted to assess passage conditions in the Lalo Springs outlet channel.

5.3 Interim Measure 2: California Klamath Restoration Fund/ Coho Enhancement Fund

PacifiCorp shall establish a fund to be administered in consultation with the California Department of Fish and Wildlife (after providing notice and opportunity for comment to the State Water Resources Control Board and North Coast Regional Water Quality Control Board) and NMFS to fund actions within the Klamath Basin designed to enhance the survival and recovery of Coho salmon, including, but not limited to, habitat restoration and acquisition. PacifiCorp has provided \$510,000 to this fund in 2009 and shall continue to provide this amount of funding annually by January 31 of each subsequent year in which this funding obligation remains in effect. Subject to Section 6.1.1, this funding obligation shall remain in effect until the time of decommissioning of all of the Facilities in California.

¹⁰ PacifiCorp. 2013c. PacifiCorp Klamath Hydroelectric Project. Interim Operations Habitat

Conservation Plan for Lost River and Shortnose Suckers. November. 146 pp.

As of December 31, 2020, PacifiCorp has provided funding of over \$5,800,000 into the Coho Enhancement Fund (CEF). Starting in 2009 and running through the 2020 grant cycle, 57 grants have been selected to receive funding for projects that benefit Coho Salmon downstream of Iron Gate Dam (Figure 2). These projects have a combined grant value of about \$5.7 million. Selections of projects to fund are made by PacifiCorp with the assistance of a technical advisory team comprising staff from NMFS and the California Department of Fish and Wildlife (CDFW).

PacifiCorp has developed a partnership with the National Fish and Wildlife Foundation to administer the fund. This partnership allows CEF grant recipients to be eligible for additional funding through other grant programs, further enhancing the conservation benefit of the fund. Using this process, grantees have leveraged nearly an additional \$10.9 million in matching funds for Coho restoration projects as of December 31, 2020.

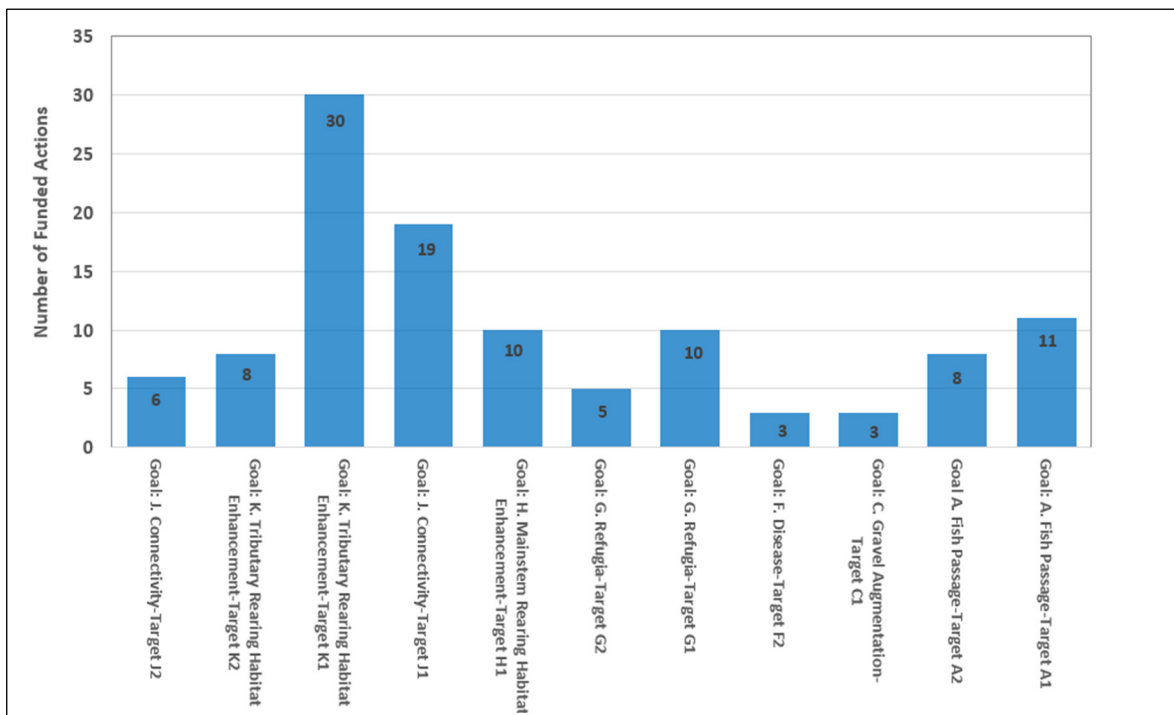


Figure 2. Number of Funded Activities Through 2020 as They Relate to Coho HCP Goals and Objectives

In 2020, PacifiCorp undertook a comprehensive review of CEF funded projects to catalog each project with a variety of performance metrics as listed in the annual monitoring forms. This database allowed for the creation of a CEF project map (Figure 3), which illustrates the spatial extent of funded projects in the Klamath River and its tributaries downstream of Iron Gate Dam.

Funded projects have resulted in a substantial benefit to Coho Salmon downstream of Iron Gate Dam. When the projects are considered collectively through 2020, the CEF has resulted in:

- Implementation of over 7,251 linear feet of channel restoration
- Creation of over 163,320 square feet of off-channel ponds
- Installation of three fish screens
- Removal of 363 passage barriers
- Improved access to over 441 miles of Coho habitat
- Installation of over 9 miles of riparian fencing
- Implementation of 23 separate water leases or exchanges providing improved flows in over 38 miles of stream
- Implementation of 173,316 square feet of other types of habitat enhancement projects
- Installation of 60 wood structure
- Installation of 17 beaver dam analogues

The recipients of CEF grants and the corresponding projects thus far include (projects are complete unless otherwise noted):

- **Karuk Tribe:** Seiad Creek Channel Restoration, Phase I, II, and III created engineering designs, permitting, stakeholder identification, and construction to realign Seiad Creek to a natural course, enabling Coho Salmon potential year-round habitat access.

- **Mid Klamath Watershed Council:** Seiad Creek Off-Channel Pond Habitat Construction.
- **Siskiyou County Resource Conservation District:** Fish Passage Improvement in the Scott River.
- **Siskiyou County Resource Conservation District:** Denny Ditch Fish Screen Improvements.
- **Emmerson Investments:** Shasta River Coho Habitat Project conserved and enhanced more than 6 miles of Shasta River habitat with fencing and provided livestock water lanes.
- **Grenada Irrigation District:** Huseman Ditch point of diversion fish passage improvements allowed for 4.7 miles of instream cold water retention.
- **Scott River Water Trust:** Scott River Water Acquisition Program enabled critical Coho streams to remain connected to the Scott River. This project has gone through three award cycles.
- **Mid Klamath Watershed Council:** Coho Rearing Habitat Enhancement created and restored more than 10 tributary cold water refugia areas at their confluences with the middle Klamath.
- **Mid Klamath Watershed Council:** Middle Klamath Restoration Prioritization Project identified Coho restoration projects that provide the greatest species benefit.
- **Mid Klamath Watershed Council:** Tributary Fish Passage Improvement Project created fish passage at the mouths and in the lower reaches of 72 Mid Klamath Subbasin tributaries.

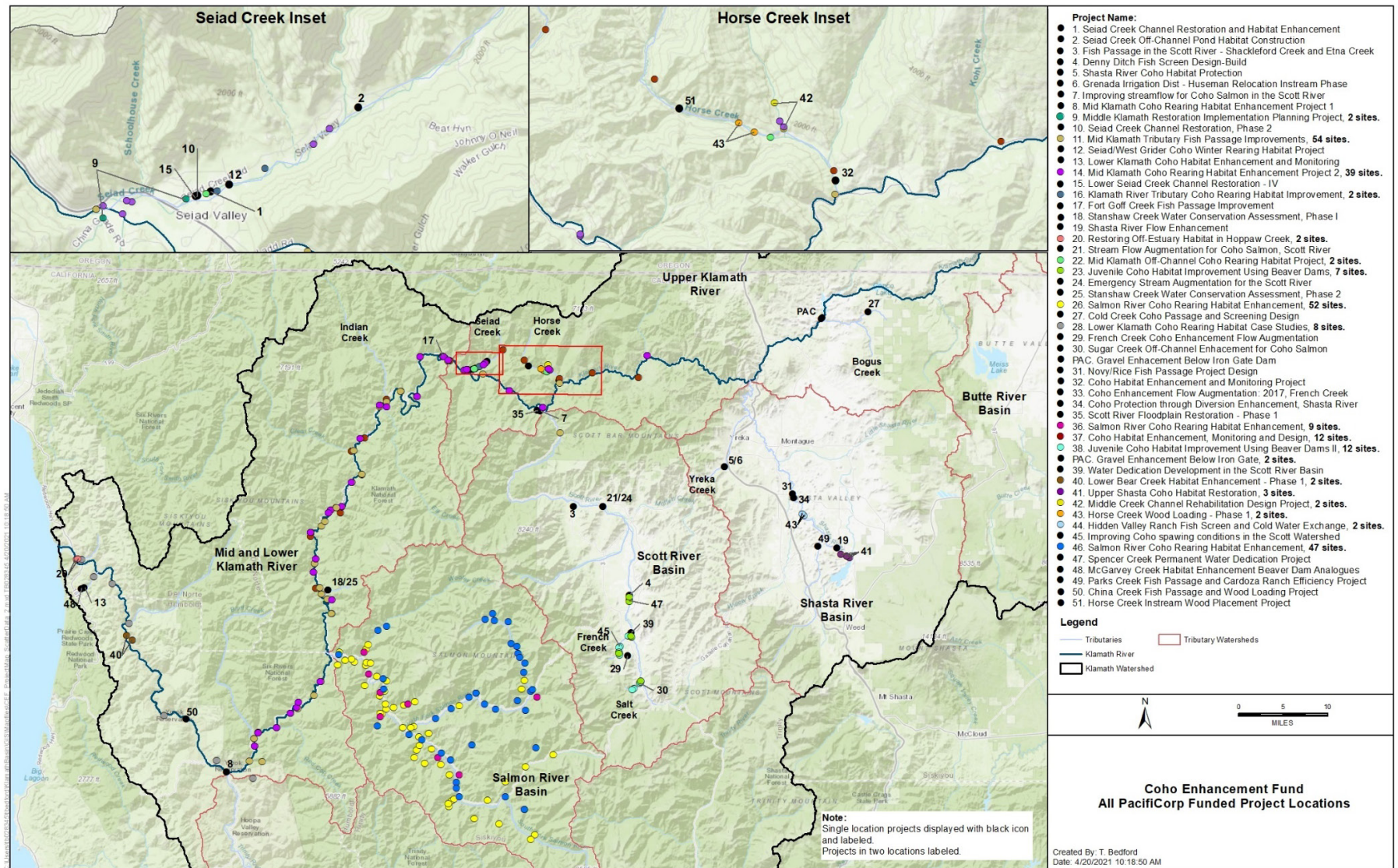


Figure 3. Coho Enhancement Fund Project Locations

- **Yurok Tribe:** Lower Klamath Coho Habitat Enhancement and Monitoring for construction of an off-channel habitat feature in McGarvey Creek increased juvenile Coho Salmon rearing capacity.
- **Mid Klamath Watershed Council:** Seiad/ West Grider Coho Winter Rearing Habitat Project created two off-channel ponds to improve winter habitat.
- **Mid Klamath Watershed Council:** Mid Klamath Coho Rearing Habitat Enhancement Project enhanced habitat complexity.
- **Caltrans District 2:** Replaced an existing culvert on Fort Goff Creek with a single-span bridge to restore the stream channel and provide passage for Coho along with enhanced habitat.
- **Mid Klamath Watershed Council:** Stanshaw Creek Water Rights Evaluation, Phase 1 and 2.



- **Mid Klamath Watershed Council:** Tributary Coho Rearing Habitat Improvement. This project created or enhanced off-channel rearing and thermal refugia for Coho Salmon.
- **Montague Water Conservation District:** Shasta River Flow Augmentation Project; now complete.

- **Yurok Tribe:** Restoring Off-Estuary Habitat. This project enhanced habitat in the Lower Hoopaw Creek to benefit Coho Salmon.
- **Mid Klamath Watershed Council:** Mid Klamath Off-Channel Coho Rearing Habitat. This project created approximately 22,000 square feet of critical off-channel winter and summer Coho rearing habitat at four different locations.
- **Scott River Watershed Council:** Juvenile Coho Habitat Improvement Using Beaver Dams. Beaver and beaver dam analogues were used to improve the quantity and quality of Coho rearing habitat in the Scott River and its tributaries.



- **Scott River Water Trust:** Emergency Stream Augmentation Project. This project added additional water to the Scott River to support rearing Coho during critical drought.
- **Salmon River Restoration Council:** Salmon River Coho Rearing Habitat Enhancement Project increased function and value of Coho rearing habitat.
- **Klamath Basin Rangeland Trust:** Cold Creek Coho Passage and Screening Design Project developed a design for a fish-friendly irrigation diversion to replace a push-up dam on Cold Creek, a tributary to Bogus Creek.

- **Yurok Tribe:** Lower Klamath Coho Rearing Habitat Case Studies. The Yurok Tribe conducted a detailed review of eight constructed habitats in the lower river tributaries and evaluated their effectiveness to ensure lessons are learned and shared.
- **Scott River Water Trust:** French Creek Coho Enhancement through Flow Augmentation 2015 and 2016.
- **Siskiyou Resource Conservation District:** Sugar Creek Off-channel Enhancement for Coho Salmon. By improving a connection from an existing groundwater-fed pond to Sugar Creek, Coho were provided access to cold water refugia.
- **Shasta Valley Resource Conservation District:** Novy/Rice Fish Passage Project Design. This project involved design of a replacement system for the last flashboard dam on the mainstem Shasta River and allowed access to 14 miles of habitat.
- **Mid Klamath Watershed Council:** Coho Habitat Enhancement and Monitoring Project. This project created a new 19,000-square-foot off-channel rearing pond and conducted detailed monitoring and maintenance on 13 other off-channel rearing sites.
- **GS Black, Inc.:** Shasta River Coho Protection through Diversion Enhancement. This project installed a self-cleaning cone screen and electric pump to replace a failed fish screen and diesel pump on the Shasta River.
- **Scott River Watershed Council:** Watershed-scale Floodplain Restoration to Enhance and Increase Juvenile Coho Salmon Off-Channel Summer Rearing and Overwintering Habitat in the Scott River Watershed—Phase 1, Planning and Design. Phase 1 of this project inventoried quality habitat and created a plan to restore high-priority sites in the Scott River.
- **Salmon River Restoration Council:** Salmon River Coho Rearing Habitat Enhancement Project. This project improved critical Coho Salmon rearing habitat by increasing cover, pool depth, and habitat complexity with manual modifications and the addition of small and large wood and brush bundles.
- **Mid Klamath Watershed Council:** Klamath River Coho Habitat Enhancement, Monitoring and Design Project. Created about 20,000 square feet of off-channel rearing habitat through the addition of wood structures on 1,500 linear feet of Horse Creek, MKWC monitored and maintained 17 off-channel ponds, developed designs for four new restoration sites, and presented project information at the two professional meetings in 2018.
- **Scott River Watershed Council:** Juvenile Coho Habitat Improvement Using Beaver Dams II. This project constructed three beaver dam analogues and monitored for habitat change and fish response.
- **Mid Klamath Watershed Council:** Middle Creek Channel Rehabilitation Project. This project created a comprehensive restoration design for about 3,300 feet of stream channel that tie into adjacent restoration projects. 2020 work included continuation of groundwater monitoring, design work, and data acquisition.
- **Yurok Tribe:** Lower Bear Creek Stream and Floodplain Habitat Enhancement Project: Phase 1. This project installed wood jams in Bear Creek to create rearing habitat for natal and non-natal Coho and conducted a detailed fish-use evaluation of the work. In 2020, the Yurok Tribe installed eight constructed wood jams in lower Bear Creek. Salmonids were observed using these and other structures.
- **California Trout, Inc.:** Upper Shasta Coho Habitat Restoration. This project improved Coho spawning and rearing habitat and access to cold-water refugia in the upper Shasta River. In 2020, this project built five spawning riffles, installed large woody material upstream of these riffles, planted

over 760 riparian trees, and enlarged an alcove.

- **Scott River Water Trust:** Water Dedication Development in the Scott River Basin. This project supported continued development of permanent instream water dedication. During 2018, two permanent water dedications in French Creek were negotiated, two more such negotiations were advanced, and one initial/early-stage discussion was begun.



Juvenile Coho Salmon

- **Mid Klamath Watershed Council:** Horse Creek Wood Loading and Floodplain Relief Implementation Project: Phase 1. This project helped retain valuable wood and gravel in the Horse Creek watershed that were mobilized as a result of the 2016 Gap Fire. The project was awarded in 2018 and in 2019, 12 wood structures were installed in the project reach. Pre-project surveys of large wood, sediment composition, and fish use were completed. Following wood loading, fish presence surveys were conducted in 2020.
- **California Trout, Inc.:** Hidden Valley Ranch Fish Screen and Cold Water Exchange Project. This project will improve Coho summer rearing habitat by installing an improved on-channel, solar-powered fish screen onto an existing diversion, and increase the release of colder spring water during summer month through irrigation efficiency improvements and irrigation source water exchange. This project was awarded in 2018. No work occurred on this project in 2019 pending submittal of the necessary petitions to the SWRCB. The SWRCB approved the petitions in late 2020 and instream work will occur in 2021.
- **Scott River Watershed Council:** Addressing a Limiting Factor for Coho Salmon by Improving Spawning Conditions in a Key Tributary of the Scott Watershed. This project improved Coho spawning habitat in French Creek (a tributary to the Scott River) through large wood installation and spawning gravel augmentation. In the fall of 2019, gravel was deposited, 10 large wood logs were placed instream, and 20 stream side trees were felled into the stream with the associated gravel to increase channel complexity and help slow high winter water velocities. In 2020, monitoring activities were undertaken.
- **Salmon River Restoration Council:** Salmon River Coho Rearing Habitat Enhancement Project. This project improved Coho rearing habitat by increasing cover, pool depth, and habitat complexity/connectivity through manually removing, adding, or manipulating blockages such as large wood or bush bundles. This project resulted in installation of 34 brush bundles at 12 rearing sites that created 1,043 square feet of instream cover. Additionally, 17 barriers were treated at 13 tributary confluences, improving access to over 26 miles of stream.
- **Scott River Water Trust:** Spencer Creek Permanent Water Dedication Project. In 2019, this project increased Spencer Creek flows to improve habitat for Coho Salmon and other anadromous fish by dedicating 0.76 cubic feet per second (cfs) in perpetuity to the stream. The agreement delivers approximately 255 acre-feet annually and improves 2.5 miles of habitat.
- **Yurok Tribe:** McGarvey Creek Coho Habitat Enhancement Using Beaver Dam Analogues. This project will increase salmonid rearing habitat capacity by installing two beaver dam analogues in the West Fork of McGarvey Creek; monitoring and maintaining these two sites and three other

existing beaver dam analogues; planning and designing at least one additional habitat enhancement site in McGarvey Creek; and reporting and conducting stakeholder outreach. In 2020, one beaver dam analogue was installed and designs for the next phase were initiated. Monitoring conducted in 2020 showed use of beaver dam analogues by juvenile Coho.



**West Fork McGarvey Creek
Beaver Dam Analogue**

- California Trout, Inc.:** Parks Creek Fish Passage and Cardoza Ranch Efficiency Implementation Project. This project will construct a new point of diversion (with fish screen) on the Shasta River for the Cardoza Ranch, while providing continuous fish passage and reduced summer water temperatures in Parks Creek, a primary tributary to the Shasta River. The project will evaluate an existing monitoring station and develop a monitoring program to document stream changes related to the new diversion. In 2020, flow data were collected to set the baseline conditions and installation of a new irrigation intake, including a fish screen, was nearing completion.
- Mid Klamath Watershed Council:** China Creek Fish Passage and Wood Loading Project. This project will remedy a chronic fish passage issue at the mouth of China Creek by using large wood to reroute the channel into a more desirable configuration across the existing delta. This project was awarded in 2019 and juvenile surveys were conducted in 2020.
- Mid Klamath Watershed Council:** Horse Creek (Klamath National Forest) Instream Wood Placement Project. This project added 35 wood structures to Horse Creek at strategic sites in a low-gradient reach on public lands. In 2020, a helicopter was used to install all 35 wood structures in Horse Creek.
- California Trout, Inc.:** Scott River Emergency Water Transactions 2020. The goal of this project is to increase instream habitat for juvenile Coho Salmon in the west side tributaries of the Scott River during the summer and fall of 2020 by enhancing instream flow through a voluntary water transaction program. Up to 220 acre-feet of water was leased from water rights holders in French and Miner Creek's to increase juvenile rearing habitat and enhance connection between pools. This project was awarded in 2020.
- California Trout Inc.** South Fork Floodplain Connectivity Phase III. This project is Phase III of a collaborative, multiyear effort between multiple stakeholders to restore floodplain function and instream habitat complexity within a 0.85-mile reach of the South Fork. This project is intended to continue restoration and enhancement efforts in a high priority reach for the benefit of Coho Salmon. Phase III activities are planned for the fall of 2021. This project was awarded in 2020.
- Scott River Water Council:** Miner French Creek Confluence Habitat Enhancement and Effectiveness Monitoring Project, Siskiyou County. This project will provide benefit to Coho Salmon by permitting and designing 7 large wood structures and 5 willow weave baffles, and planting 400 willow stems and 30 cottonwood poles, on a 1,050-foot reach of French Creek and a 250-foot reach of Miners Creek. This project was awarded in 2020.

- **Yurok Tribe:** Enhancing Coho Salmon Rearing Habitat in Upper & West Fork McGarvey Creek (CA). This project will enhance 7.0 acres of upper McGarvey Creek by reconfiguring impaired habitats to increase floodplain connectivity and channel complexity and adding the necessary structural elements (i.e., constructed wood jams, beaver dam analogues, post-assisted log structures) to promote beneficial, self-maintaining physical and ecological processes. This project was awarded in 2020.
- **Mid Klamath Watershed Council:** Horse Creek Coho Habitat Reclamation Design Project. Conceptual-level design for both instream and off-channel Coho Salmon spawning and rearing habitat along three miles of Horse Creek. This project was awarded in 2020.
- **Mid Klamath Watershed Council.** Beaver Creek Barrier Removal Project. Currently an abandoned fish rearing facility on lower Beaver Creek is racking large amounts of wood and debris and impeding adult fish passage in the fall/winter months. It is also causing erosion at the footing of the private landowner's home. This project includes the design to remove the high flow barrier and the environmental compliance of the barrier removal, working with CDFW through its Lake and Streambed Alteration permitting process. This project was awarded in 2020.

A Technical Review Team (TRT) was formed in 2012 and meets annually (if necessary) to review existing projects funded under the CEF and to recommend possible adaptive management changes based, in part, on the results of monitoring data developed from funded projects. To date, no changes have been recommended in the CEF process. The first TRT meeting was held in June 2012 and subsequent meetings were held in November 2013, October 2014, and January 2017. By consensus of the group a meeting was not held in 2015. Because of the federal government shutdown in the winter of 2018-2019, no TRT meeting was held

in 2018 or 2019. In 2020, a TRT meeting was held on December 3, 2020. No substantial discussion or topics of concern were raised by the TRT or other stakeholders regarding CEF implementation. Technical review meetings continue to be held annually as needed.

5.4 Interim Measure 3: Iron Gate Turbine Venting

PacifiCorp shall implement turbine venting on an ongoing basis beginning in 2009 to improve dissolved oxygen concentrations downstream of Iron Gate Dam. PacifiCorp shall monitor dissolved oxygen levels downstream of Iron Gate Dam in 2009 and develop a standard operating procedure in consultation with NMFS for turbine venting operations and monitoring following turbine venting operations in 2009.

Passive venting of the Iron Gate turbine was successfully tested at the Iron Gate Powerhouse in the fall of 2008 and PacifiCorp installed a blower system at the Iron Gate Powerhouse in January 2010 to enhance the effectiveness of turbine venting. The combined system was tested in 2010 and demonstrated an ability to increase dissolved oxygen levels in the river downstream of Iron Gate Dam. PacifiCorp developed a turbine venting Standard Operation Procedure in early 2013 consistent with the terms of PacifiCorp's incidental take permit for Coho Salmon and has been implementing turbine venting on an ongoing basis.

5.5 Interim Measure 4: Hatchery and Genetics Management Plan

Beginning in 2009, PacifiCorp shall fund the development and implementation of a Hatchery and Genetics Management Plan (HGMP) for the Iron Gate Hatchery. PacifiCorp, in consultation with the National Marine Fisheries Service and the California Department of Fish and Wildlife, will develop an HGMP for approval by NMFS in accordance

with the applicable criteria and requirements of 50 C.F.R. § 223.203(b)(5). To implement the HGMP, PacifiCorp, in consultation with NMFS and CDFW, will develop and agree to fund an adequate budget. When completed, CDFW shall implement the terms of the HGMP at Iron Gate Hatchery in consultation with PacifiCorp and NMFS. Funding of this measure is in addition to the 100 percent funding described in Non-ICP Interim Measure 18.

PacifiCorp worked collaboratively with NMFS and CDFW to develop the HGMP for the Iron Gate Hatchery Coho Salmon Program. The HGMP was submitted by PacifiCorp and CDFW to NMFS on September 16, 2010. After public notice and comment on the HGMP and other related documents followed by the submission of a final HGMP, NMFS formally approved the HGMP, and issued the final Environmental Assessment and Finding of No Significant Impact, Biological Opinion, and Incidental Take Permit (79 Federal Register 69428) in late October 2014.



The HGMP program operates in support of the Klamath River Basin's Coho Salmon recovery efforts by conserving a full range of the existing genetic, phenotypic, behavioral, and ecological diversity of the Coho Salmon run. The program's conservation measures include genetic analysis, broodstock management, and rearing and release techniques that maximize fitness and reduce straying of hatchery fish to natural spawning areas.

In 2010, in cooperation with CDFW and NMFS, PacifiCorp began funding an active broodstock management program at Iron Gate Hatchery, a program that continues annually. The program is based on real-time genetic analysis of Coho spawning broodstock that provides information necessary to reduce the rate of inbreeding in the hatchery Coho population and increase the proportion of natural-origin fish in the total hatchery Coho spawning population.

Hatchery culture practices under the HGMP program have also been improved to increase egg-to-smolt survival rates by increasing survival during egg incubation and covering raceways with netting to reduce bird predation. Ongoing water quality challenges at the Iron Gate Hatchery led PacifiCorp and CDFW to pool resources and install a sand filtration and ultraviolet (UV) light water treatment system capable of handling the entire flow to the hatchery egg-rearing building. This system was installed in fall 2015.

The system has been successful at improving water quality to the incubator stacks and has resulted in an improved survival rate in all eggs that receive this cleaner water. Average survival from green egg to ponded fish has increased from 48 percent to over 80 percent with the addition of the UV treatment system (Figure 4). In 2020, data show survival from green eggs to ponded fish was 87 percent, a substantial improvement over conditions before the filtration system was installed.

Pursuant to the HGMP, in 2016 PacifiCorp began monitoring Klamath River tributaries for the presence of Coho adults and redds during the spawning season in the geographic area of the Upper Klamath Population Unit (Bogus Creek downstream to Portuguese Creek). Spawning surveys have been conducted

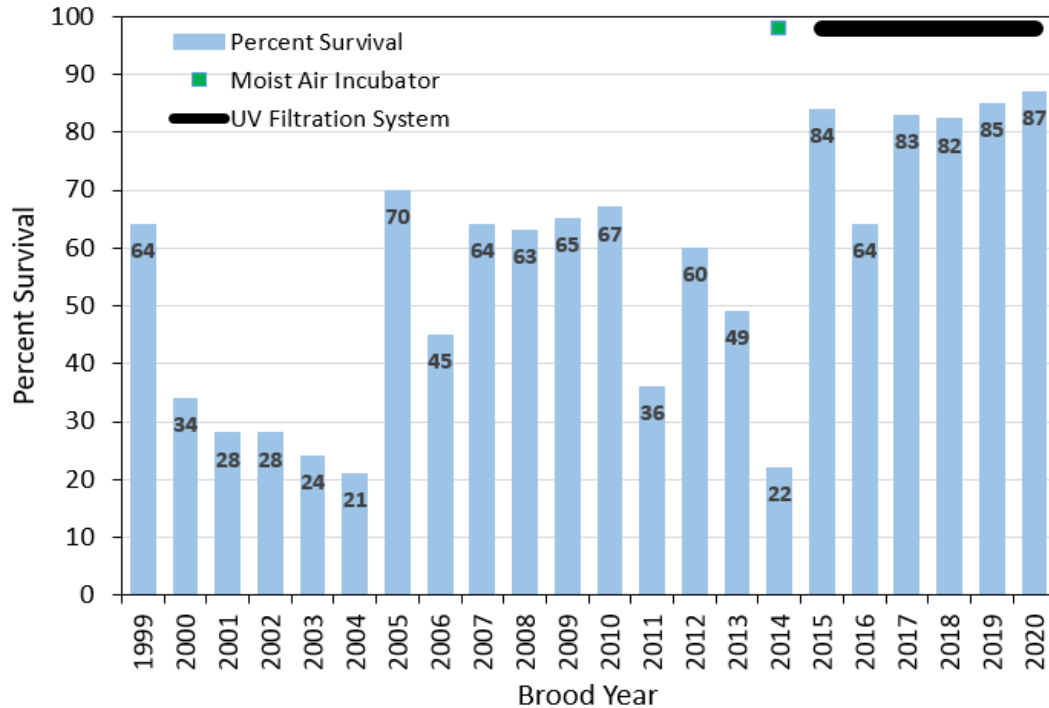


Figure 4. Percent Survival by Brood Year with Ultraviolet Filtration Period Indicated by the Top Black Bar

annually since the 2015-16 spawning seasons. While this work has documented spawning in several tributaries between Iron Gate Dam and Portuguese Creek, most spawning Coho have been observed in Seiad Creek, Horse Creek, and Bogus Creek.

The total population estimate from the tributary spawning surveys has varied from year to year, but averages about 292 fish (Figure 5). The total population estimate for the Upper Klamath population unit currently averages about 502 fish.

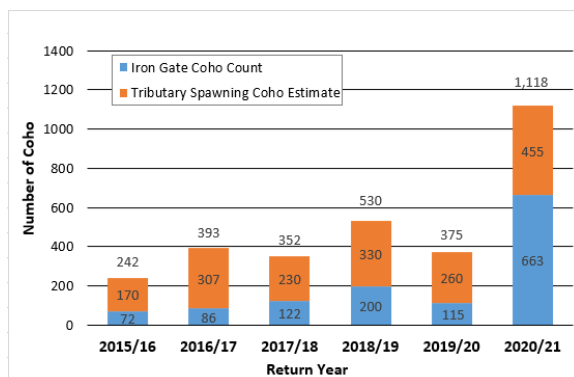


Figure 5. Adult Coho Captured at Iron Gate Dam and Coho Population Estimate Based on Spawning Surveys of

Tributaries from Bogus Creek to Portuguese Creek (does not include the Scott or Shasta rivers)

5.6 Interim Measure 5: Iron Gate Flow Variability

In coordination with NMFS, USFWS, States, and Tribes, PacifiCorp and Reclamation shall annually evaluate the feasibility of enhancing fall and early winter flow variability to benefit salmonids downstream of Iron Gate Dam, subject to both PacifiCorp's and Reclamation's legal and contractual obligations. In the event that fall and early winter flow variability can feasibly be accomplished, PacifiCorp, in coordination with NMFS, USFWS, and Reclamation will, upon a final Incidental Take Permit issued to PacifiCorp by NMFS becoming effective, annually develop fall and early winter flow variability plans and implement those plans. Any such plans shall have no adverse effect on the volume of water that would otherwise be available for the Klamath Reclamation Project or wildlife refuges.

The NMFS biological opinion on Reclamation's Klamath Project for 2019-2024^{11, 12} (2019 BiOp) includes provisions for variable flow releases from Iron Gate Dam to provide benefits to listed species. To achieve more "natural" flow variability in releases from Iron Gate Dam, Reclamation schedules variable flows based on the profile of the week-prior hydrograph of the Williamson River. In addition, accretions within PacifiCorp's Project area (downstream of Keno Dam to Iron Gate Dam) are accounted for and generally reflected in flow releases downstream from Iron Gate Dam. PacifiCorp has been working closely with Reclamation to coordinate river operations and dam releases in a manner that achieves Reclamation's flow requirements downstream of Iron Gate Dam while also meeting operational and other regulatory objectives of Reclamation and PacifiCorp.

In summer 2015, in response to a request from NMFS to further evaluate the opportunity to create additional variability in flow releases, PacifiCorp developed and tested a program to automatically adjust releases from the Iron Gate Powerhouse to provide a diurnally variable flow pattern that mimics that seen in an unregulated stream. PacifiCorp continues to implement this diurnal fluctuation program.

Through the fall of 2020, the snow water equivalent in the upper Klamath Basin was less than 5 inches. The snow water equivalent peaked at 10.8 inches on April 6, 2020, and remained below the 1981-2010 median for the entire 2020 water year (Figure 6) making 2020 a below average year. The proposed Klamath Project operation as evaluated in the USFWS and NMFS biological opinions allocates 50,000 acre-feet (AF)

of the Environmental Water Account (EWA) for disease mitigation or habitat flushing flows on a flexible basis in below average or dry years. The 2019 NMFS BiOp was legally challenged because it was found that the analysis relied on erroneous data. As of December 31, 2020, Reclamation was continuing to work with multiple stakeholders to reach a viable settlement agreement. With this process ongoing, the water management measures in the 2019 NMFS BiOp remain in use.

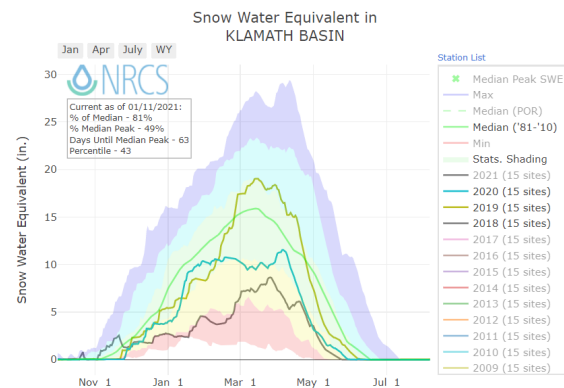


Figure 6. Snow Water Equivalent in the Klamath Basin, October 2019 - July 2020¹³

Flows downstream of Iron Gate Dam generally remained at or near biological opinion minimum target flows during 2020 with several exceptions (Figure 7). Increased flows downstream of Iron Gate Dam in early February 2020 were triggered by a storm-driven event in the upper basin. Reclamation initiated a modified surface flushing flow event on April 23, 2020 that increased flows downstream of Iron Gate Dam to the highest annual mean daily discharge of 5,970 cfs on that day. A brief increase in June was created by a flow augmentation event initiated by Reclamation in response to allocation of an

elevation management, there are not any elements related to flow in the Klamath River downstream of Iron Gate Dam. For details see USFWS 2019. Biological Opinion on the Effects of Proposed Klamath Project Operations from April 1, 2019 through March 31, 2024 on the Lost River Sucker and the Shortnose Sucker. TAILS #08EKLA00-2019-F-0068. 220 pp.

¹¹ NMFS 2019. Endangered Species Act Section 7(a)(2) Biological Opinion and Magnuson-Stevens Fishery Conservation and Management Act Essential Fish Habitat Response for Klamath Project Operations from April 1, 2019 through March 31, 2024. File WCR-2019-11512, WCRO-2019-00113.

¹² In 2019, the USFWS issued a separate biological opinion to Reclamation. While there are elements in this opinion that guide Upper Klamath Lake

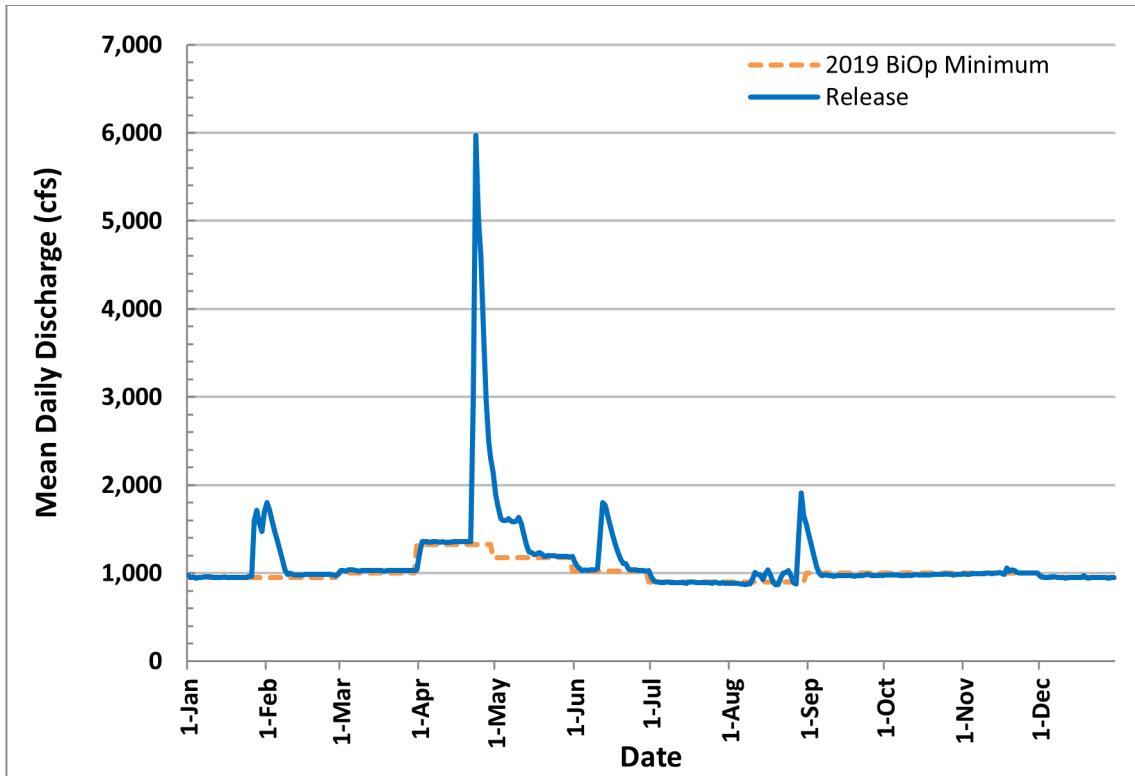


Figure 7. Mean Daily Discharge in the Klamath River Downstream of Iron Gate Dam (USGS Gage No. 11516530)

additional 8,000 acre-feet of water to the Environmental Water Account (EWA) that was used for dilution of the spores that cause the fish disease *Ceratomyxa shasta*. The last increase above minimum flows occurred in late August when PacifiCorp briefly increased flows to 2,000 cfs in an event designed to support the Yurok Tribe Ceremonial Boat Dance downstream of Iron Gate Dam.

5.7 Interim Measure 6: Fish Disease Relationship and Control Studies

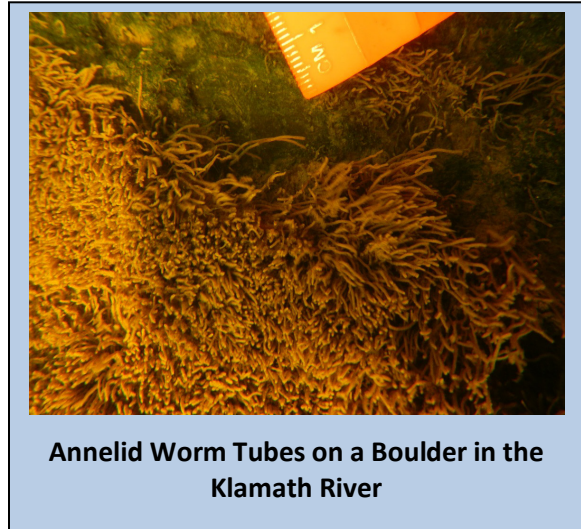
PacifiCorp has established a fund in the amount of \$500,000 in total funding to study fish disease relationships downstream of Iron Gate Dam. Research proposals will be solicited and agreed upon by PacifiCorp and NMFS for the purpose of determining that the projects are consistent with the criteria and requirements developed by PacifiCorp and NMFS in the ESA review process applicable under Settlement Section 6.2. PacifiCorp will

consult with the Klamath River Fish Health Workgroup regarding selection, prioritization, and implementation of such studies, and such studies shall be consistent with the standards and guidelines contained in the Klamath River Fish Disease Research Plan and any applicable recovery plans.

Humboldt State University, USGS, Oregon State University (OSU), the Karuk Tribe, and the Yurok Tribe collaborated on a research proposal to examine how management actions could be focused to reduce the incidence of ceratomyxosis. Specific studies as part of the proposal include:

- Determine combinations of water hydraulics and sediment compositions that produce mortality in annelid worms (formerly polychaetes)
- Measure the response of selected annelid worm populations in the Klamath River to any experimental control actions over appropriate temporal and spatial scales

- Determine the relative contribution of species-specific genotypes of *Ceratonova shasta* from tributary and mainstem sources and determine seasonal myxospore abundance
- Develop mathematical models to improve the understanding of *Ceratonova shasta* dynamics and provide opportunities for management (e.g., flow manipulations)



PacifiCorp funded implementation of these studies with money from the Fish Disease Fund. Results from these studies include several technical reports and a published journal article. Of the six grants issued by the Fish Disease Fund, the last two projects funded were completed in 2018. These comprised an OSU research project focused on data collection and development of models to evaluate the effectiveness of flow manipulation in controlling *Ceratonova shasta* and a USGS/OSU effort to develop models for juvenile Coho mortality caused by *Ceratonova shasta* in the Klamath River. With the completion of these two projects, the \$500,000 that PacifiCorp allocated to the Fish Disease Fund had been completely expended.

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

Beginning on the Effective Date and continuing through decommissioning of the J.C. Boyle Facility, PacifiCorp shall provide funding of \$150,000 per year, subject to adjustment for inflation as set forth in Section 6.1.5 of the Settlement, for the planning, permitting, and implementation of gravel placement or habitat enhancement projects, including related monitoring, in the Klamath River above Copco Reservoir.

Within 90 days of the Effective Date, PacifiCorp, in consultation with the IMIC, shall establish and initiate a process for identifying such projects to the Committee, and, upon approval of a project by the Committee, issuing a contract or providing funding to a third party approved by the Committee for implementation of the project.

The objective of this Interim Measure is to place suitable gravels in the J.C. Boyle bypass and peaking reach using a passive approach before high flow periods, or to provide for other habitat enhancement providing equivalent fishery benefits in the Klamath River above Copco Reservoir.

The IMIC and PacifiCorp collaborated on the development of a gravel enhancement and monitoring plan, which serves as the basis for ongoing implementation actions under this interim measure.

Because access to the river to implement this measure occurs on Bureau of Land Management (BLM) roads, BLM conducted a National Environmental Policy Act (NEPA) analysis to assess potential impacts from implementation of this interim measure. The BLM issued a Finding of No Significant Impact on October 3, 2011. Since 2011 the NEPA work has been revisited as new sites have been identified.

As of December 2019, just under 4,500 cubic yards of gravel had been added to nine sites in the Klamath River below J.C. Boyle Dam (Figure 8).

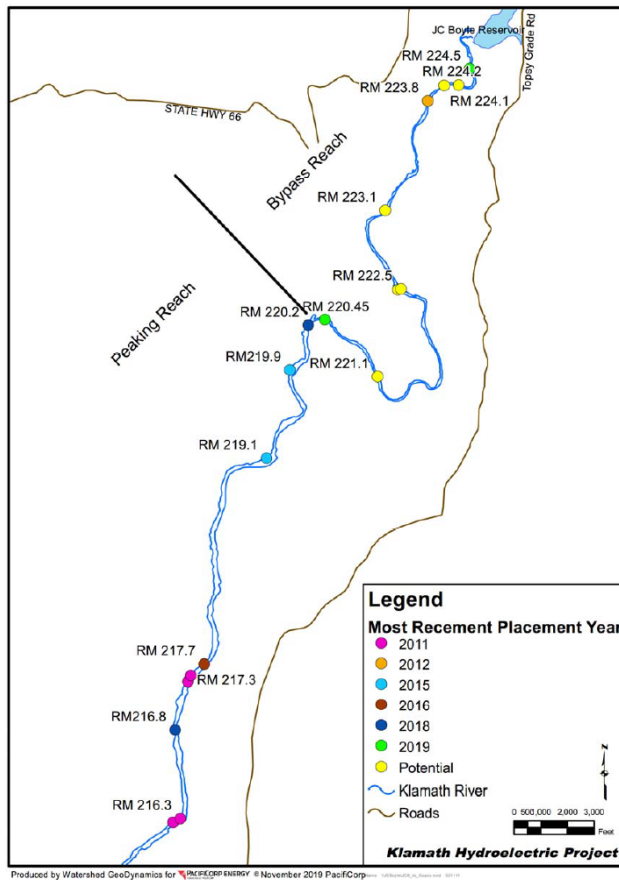


Figure 8. Gravel Placement Locations Downstream of J.C. Boyle Dam from 2011-2019

In 2020, PacifiCorp, in coordination with the IMIC, pursued alternative habitat enhancement measures under IM7. Specifically, discussions were initiated with a Green Diamond who owns the timber land along Spencer Creek to potentially improve riparian exclusion fencing to keep grazing livestock out of Spencer Creek. By December 2020, a contract was put in place to map the fencing along either side of Spencer Creek from the mouth at J.C. Boyle Reservoir upstream for about 8 miles. The survey work is planned for 2021.

5.9 Interim Measure 9: J.C. Boyle Powerhouse Gage

Upon the Effective Date, PacifiCorp shall provide the U.S. Geological Survey (USGS) with continued funding for the operation of the existing gage below the J.C. Boyle Powerhouse (USGS Gage No. 11510700). Funding will provide for continued real-time reporting capability for half-hour interval readings of flow and gage height, accessible via the USGS website. PacifiCorp shall continue to provide funding for this gage until the time of decommissioning of the J.C. Boyle Facility.

PacifiCorp continues to provide USGS with funding for the operation of the gage downstream of the J.C. Boyle Powerhouse (USGS Gage No. 11510700). These gaging data are available at:

http://waterdata.usgs.gov/usa/nwis/uv?site_no=11510700.

5.10 Interim Measure 11: Interim Water Quality Improvements

The purpose of this measure is to improve water quality in the Klamath River during the Interim Period leading up to dam removal. The emphasis of this measure shall be nutrient reduction projects in the watershed to provide water quality improvements in the mainstem Klamath River, while also addressing water quality, algal and public health issues in Project reservoirs and dissolved oxygen in J.C. Boyle Reservoir. Upon the Effective Date of the Settlement until the date of the DRE's acceptance of the FERC surrender order, PacifiCorp shall spend up to \$250,000 per year to be used for studies or pilot projects developed in consultation with the Implementation Committee regarding the following:

- *Development of a Water Quality Accounting Framework*
- *Constructed Treatment Wetlands Pilot Evaluation*

- **Assessment of In-Reservoir Water Quality Control Techniques**
- **Improvement of J.C. Boyle Reservoir Dissolved Oxygen**

Within 60 days of the DRE's acceptance of the FERC surrender order, PacifiCorp shall develop a priority list of projects in consultation with the Implementation Committee. The priority list will be informed by, among other things, the information gained from the specific studies conducted before the DRE's acceptance of the FERC surrender order and the information generated at the water quality conference specified in Interim Measure 10. Following the DRE's acceptance of the FERC surrender order, PacifiCorp shall provide funding of up to \$5.4 million for implementation of projects approved by the Oregon Department of Environmental Quality (ODEQ) and the State and Regional Water Boards, and up to \$560,000 per year to cover project operation and maintenance expenses related to those projects, these amounts subject to adjustment for inflation as set forth in Section 6.1.5 of this Settlement. Recognizing the emphasis on nutrient reduction projects in the watershed while also seeking to improve water quality conditions in and downstream of the Project during the Interim Period, the Parties agree that up to 25 percent of the funding in this measure for pre-surrender-order-acceptance studies and post-surrender-order-acceptance studies may be directed towards in-reservoir water quality improvement measures, including but not limited to J.C. Boyle.

Consistent with the intent of this interim measure, PacifiCorp is conducting studies that focus on nutrient reduction in the Klamath River while also addressing water quality issues in Project reservoirs. Annual study plans and draft technical reports generated by the ongoing work are prepared for IMIC review. After review and responding to comments from the IMIC, work plans for water quality studies and technical reports are finalized.

The Interim Measure 11 (IM 11) studies that were in progress or initiated between January 2020 and December 2020 are described below. Citations for each study follow this section and the reader is referred to the PacifiCorp Klamath Hydroelectric Project webpage for complete technical reports on these and previously completed works:

<https://www.pacificorp.com/energy/hydro/klamath-river/khsa-implementation.html>

Completed IM 11 studies, listed in Section 5.0 (Interim Measures Implementation), are not presented in detail in this report. Please see past KHSa Implementation Reports at the link cited above as provided in Section 5.0.

5.10.1 2020 Study Plan

Finalized in April of 2020, the Klamath Hydroelectric Project Interim Measure 11 Study Activities for 2020 (the 2020 Study Plan), outlined four studies that would be funded by PacifiCorp in 2020 to focus on water quality improvements in the Klamath River primarily through nutrient reduction. These projects include:

1. Sprague River Valley Floodplain Restoration
2. Evaluation of the Iron Gate Intake Barrier Curtain System for Water Quality Improvement of Powerhouse Releases
3. Increasing Sediment Phosphorus Binding Capacity in the Upper Klamath Basin: Feasibility Study for Phoslock™
4. Tulelake Irrigation District Modernization Study

Details of each study or pilot project outlined in the 2020 Study Plan and its implementation status as of December 31, 2020, are provided in the sections that follow.

Sprague River Valley Floodplain Restoration

Phosphorus loading from anthropogenic sources has contributed to the eutrophication of Upper Klamath Lake. Though historically a productive lake, excess phosphorus has led to

large cyanobacterial blooms in Upper Klamath Lake that severely degrade water quality during summer months.

The Sprague River watershed contributes approximately 30 percent of the external total phosphorus load to Upper Klamath Lake. Of this load, particulate phosphorus from sediment input is the major portion. River channelization implemented in the 1950s increased flow velocities and accelerated erosion and channel incision causing excess sediment and particulate nutrient input to the Sprague River.

In the Sprague River Valley, floodplain reconnection through levee removal and channel re-meandering has been identified as a priority restoration action to reduce total phosphorus loading to Upper Klamath Lake. To support this work, a hydrologic model of the Sprague River Valley is needed that would allow prioritization of areas of floodplain reconnection that will yield the highest water quality benefits. To be effective, such a hydrologic model would require updated digital elevation model data. This project will:

- Evaluate the digital elevation model to identify areas of significant geomorphic change.
- Update the digital elevation model in prioritized reaches.
- Begin development of a hydrologic model focused on floodplain reconnection.

Evaluation of Intake Barrier Systems for Water Quality Improvement from Iron Gate Powerhouse Releases

The purpose of this IM 11 activity is to continue to evaluate the effectiveness of the intake barrier system in Iron Gate Reservoir to improve water quality in Iron Gate Powerhouse releases to the Klamath River. Detailed discussion of the theory behind the curtain

design have been presented in previous KHSA Annual Reports.¹³ Since 2015, annual studies have been conducted to evaluate the operation of the curtain upstream of the intake as a means of reducing algae entrainment into the intake. A comprehensive analysis of the data collected between 2015 and 2018 was completed and a draft report of the findings circulated to the IMIC in October of 2020. Comments were requested and provided by the IMIC. That comprehensive report will be finalized in 2021. Collectively, the data analysis indicates that the curtain significantly reduces the release of cyanobacterial toxins to the Klamath River when the curtain is deployed at or below epilimnetic stratification. The curtain is the most effective when it is deployed to depths below the epilimnion and during periods of strong epilimnetic stratification in Iron Gate Reservoir.

Monitoring of the curtain in 2020 built on previous years of data collection and continues to inform management and operation of the system. This data will also supplement further evaluation of overall curtain function.



Iron Gate Reservoir on September 2, 2020, Showing Algae Upstream of Curtain and Clearer Water Downstream

As a secondary benefit, the curtain also functions as a simple selective withdrawal device that isolates warmer surface waters and

¹³ PacifiCorp 2020. Klamath Hydroelectric Settlement Agreement Implementation Report [for 2019]. FERC Project No. 2082. April.

preferentially draws deeper cooler waters for release to the Klamath River. This selective withdrawal ability can allow for some manipulation of temperatures in released water, which may be beneficial for managing fish disease because disease levels can be exacerbated by higher water temperatures. To this end, the curtain was deployed to its full design depth of 35 feet mid-day on June 3, 2020. The result was an immediate reduction in water temperatures downstream of Iron Gate Dam by about 2 degrees Celsius (°C) (Figure 9).

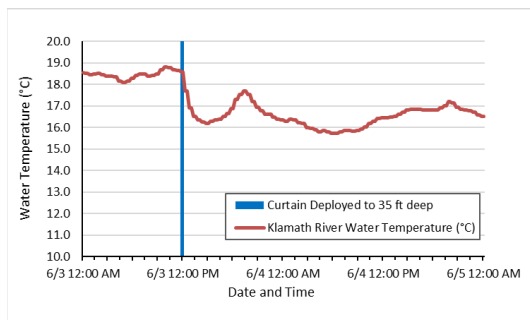


Figure 9. Klamath River 15-minute Water Temperature from June 3 through June 4, 2020, and Curtain Deployment on June 3, 2020

Increasing Sediment Phosphorus Binding Capacity in the Upper Klamath Basin: Feasibility Study for Phoslock™

Phosphorus is the key driver of water quality issues in the Upper Klamath Basin. As noted previously, phosphorus naturally occurs in relatively high levels in the local geology of the Upper Klamath Basin, but continues to be, released by land use activities in the watershed. This release when combined with the reduction in intact riparian areas and lake-fringe wetlands that historically filtered and retained phosphorus, can result in summer phosphorus concentrations in Upper Klamath Lake up to six times higher than the natural background levels.

Two potential restoration approaches, restoration of lake-fringe wetlands and construction of diffuse source treatment wetlands, were specifically identified by the IMIC as priority projects for water quality improvement in the Upper Klamath Basin.

However, there is some concern that restored wetlands, particularly when used previously for agricultural production or grazing can be a source of phosphorus following restoration and inundation and these wetlands may not function as phosphorus sinks for years to decades following restoration. One option to increase the phosphorus sequestration capacity of restored wetlands is the application of chemical compounds (typically called coagulants) to bind phosphorus and permanently sequester it in wetland sediments. Phoslock™ (bentonite clay amended with lanthanum) is an increasingly common coagulant for control of phosphorus in aquatic systems.

The purpose of this study is to determine the effectiveness of Phoslock™ in increasing phosphorus sequestration when directly applied to wetland sediments and investigating the possibility of toxicity effects. This study was contracted in 2020 and is underway. Ultimately it will:

- Develop a draft methods for a laboratory scale feasibility study of Phoslock™.
- Complete coagulant testing using lab-scale artificial batch-reactors, each lined with homogenized wetland sediments collected from the Wood River Valley.
- Complete data analysis and reporting on the results of the grab samples taken as part of lab effort.

Tulelake Irrigation District Modernization Study

The Farmers Conservation Alliance (FCA) has developed the Irrigation Modernization Program to help irrigation districts and the farmers they serve revolutionize their infrastructure. For this IM 11 project, FCA will assess opportunities to modernize agricultural infrastructure within Tulelake Irrigation District (Tulelake ID), which would benefit agriculture, water quality in the Klamath River, and the environment.

Tulelake ID delivers water to approximately 64,000 acres in the Klamath Basin through over 240 miles of canals; however, much of this infrastructure is aging and does not operate efficiently. Modernizing this infrastructure could improve water conveyance efficiency, reduce tailwater discharges, allow for managed groundwater recharge, reduce energy use, generate small-scale hydropower, expand the use of solar power, and reduce operations and maintenance costs. These improvements may indirectly improve water quality and quantity in the basin.

While there are four different work elements in the overall modernization assessment, just Work Element 1 – Preliminary Assessment and Initial Findings has been undertaken with 2020 IM 11 funding. The first Work Element includes a set of distinct tasks that will collect detailed information about the goals and objectives of Tulelake ID, create district-level briefing documents, allow for coordinated review of infrastructure conditions and operations patterns within the district, and collect and conduct a comprehensive review of data and reports pertaining to Tulelake ID's operations. An Initial Findings Report will be generated that informs the assessments to be completed through the irrigation modernization process. This Work Element will also identify any projects for accelerated implementation prior to completion of a modernization strategy.

5.10.2 Ongoing Studies

Agricultural Water Budget and Nutrient Assessment, Phase 2

Hydrologic modification throughout the Upper Klamath Lake Basin for agricultural irrigation, has resulted in many piped and pumped return flows to Upper Klamath Lake and the Klamath River that have phosphorus concentrations exceeding TMDL targets. The purpose of this project is to complete an assessment of specific locations, historical and current land use, nutrient budgets, water budgets, and seasonal water needs to ensure investments into water

quality improvement projects are targeted and effective.

In 2018, Trout Unlimited (TU) received IM 11 funding to begin an assessment of the Running Y and Caledonia farms to determine a water budget and temporal and spatial variability of soluble and particulate phosphorus and nitrogen. Phase 1, completed in 2018, focused on existing data analysis and farm operations summaries. As part of this effort, TU worked closely with the Oregon Department of Agriculture (ODA) and the landowners to summarize existing operations and develop monitoring plans. The landowners hired a consultant to produce a report about the existing wetlands on the Caledonia and Running Y farms. Flow data continue to be obtained from inlets and outlets of the two farms to allow nutrient loads to be calculated.

Phase 2, involves water quality and flow data collection as well as data analysis and development of the nutrient and water budget report. The following actions were accomplished in 2020:

- Funding obtained through an Oregon Watershed Enhancement Board Technical Assistance grant to develop water quality treatment designs based on IM 11 monitoring.
- The farm hired a new staff member to improve and expand their on-farm phosphorus sampling efforts.
- Developed and implemented the 2020 irrigation season sampling plan in coordination with farm staff, ODA, and USFWS.
- Completed draft memorandums on nutrient balance, tailwater return, and wetland treatment projects. A draft water quality analysis report was also completed.
- Secured additional funding from USFWS.

Agency/Barns Lake Restoration Project

The extensive hydrologic modification throughout Upper Klamath Lake Basin has led to the dramatic reduction in the number of wetlands and their functional capacity to sequester nutrients. Over the last 2 years, TU has worked closely with USFWS, private landowners, The Nature Conservancy, Natural Resources Conservation Service (NRCS), and other stakeholders to support the development of a large wetland restoration project adjacent to the Upper Klamath National Wildlife Refuge, and previously referred to as the “Agency-Barnes Ranch.” The project encompasses an area of about 14,000 acres, 70 percent of which is federally owned. The remaining 30 percent is privately owned but the properties have been enrolled in USFWS and NRCS easements to facilitate conservation and restoration on a large scale.

The goals of this project are to:

- Analyze existing data to determine nutrient loads and water volumes flowing into the Agency Wetlands project site, specifically those contributions from West Canal and Central Canal.
- Model multiple inundation and vegetation scenarios to evaluate treatment capacity of restored wetlands.
- Develop preliminary water quality treatment designs that can be incorporated into the USFWS environmental review process for the full wetland restoration design.

In 2020, water quality review work was completed by Stillwater Sciences. Nutrient removal estimates for the Agency-Barnes area and surrounding private conservation properties were developed and reviewed by project partners. Modeling of nutrient removal capacity was completed as part of the project and was shared with USFWS so that water quality treatment options could be included in the environmental review alternatives analysis being undertaken by USFWS.

Biochar Pilot Project

Through its Water Quality Program, ODA has been working with landowners, local conservation partners, and agencies since March 2018 to develop projects that improve water quality on properties around Upper Klamath Lake. This work was initiated in response to concerns about the endangered sucker species in Upper Klamath Lake and the detrimental effect of poor water quality and algal blooms on those fish. The goal is to substantially reduce phosphorus contributions from agricultural operations to Upper Klamath Lake. The Upper Klamath Lake TMDL states that 13 percent of the external phosphorus loading to the lake is from the agricultural return water pumped directly into the Lake.

The goal of this small-scale technology pilot project is to test biochar as a filter media to remove phosphorus from irrigation runoff. Because tailwater is concentrated at irrigation canal pumping stations or within irrigation canals, there is an opportunity to filter this water before it is returned to Upper Klamath Lake. The project as proposed has three phases. Phase 1 conducted laboratory testing to assess the effectiveness and lifespan of different filtration media options. Phase 2 includes a design and installation of a pilot filtration system. Phase 3 implements and tests a pilot system on a farm located adjacent to Upper Klamath Lake.

Despite restrictions in-place and associated delays as a result of the COVID-19 pandemic, this project moved through many of the planned project phases in 2020. In early 2020, initial designs were developed for in-field filter systems, lab protocols were established to test biochar medias efficacy, and a pilot project location was identified on the Running Y Farm. By summer of 2020, the laboratory testing was completed. This work successfully identified which media were most successful in phosphorus removal. Designs for Phase 2 were then finalized. A second laboratory-based jar test was undertaken in fall of 2020 to confirm results and looks for any residual metals of

concern that could have been released by the filter media. The extensive wildfires in Oregon in the fall of 2020 delayed the project's ability to secure feedstocks needed to create the biochar material for the on-farm pilot project.

As of December 31, 2020, the second round of jar tests was completed and the filter and media production were on track to meet the installation schedule to allow the pilot testing onsite in 2021.

Upper Klamath Basin Watershed Action Plan

Led by the Klamath Tribes and The Nature Conservancy, a collaborative group of agencies and land managers in the Upper Klamath Basin began preparation of a comprehensive Upper Klamath Basin Watershed Action Plan (Action Plan) in 2017. When the draft is completed, the Action Plan will provide a suite of site-specific targeted actions that, when implemented, will improve water quality in the Upper Klamath Basin. The Action Plan dovetails well with the IM 11 priority list of projects (Section 5.10.9). Because of this connection with the priority list of projects, PacifiCorp has been providing IM 11 funds to help support development of the Action Plan since 2017.

During 2020, the Watershed Action Plan team met several times to review the 2019 draft plan, address questions and comments, and continue work on updating the models. In summer of 2020, the team worked to develop unfinished impairment metrics, refine existing metrics, and refine reach designations. During fall of 2020, the team updated priority rankings with updated reaches, updated the interactive reach prioritization tool, and sent the revised draft for external stakeholder review on December 14, 2020. The Action Plan should be complete early in 2021.

Development, Monitoring, Identification, and Prioritization of Wood River and Sprague River Diffuse Source Treatment Wetland Sites

One way to reduce input of nutrients into Upper Klamath Lake is to treat water in some

fashion before it enters the lake. One of the treatment methods continuing to be investigated is diffuse source treatment wetlands (DSTWs). These are small wetlands that are constructed in specific locations where they can capture runoff, increase water transit time, and allow vegetation to take up nutrients from the water before that water enters channels and ultimately Upper Klamath Lake. In 2015, PacifiCorp provided IM 11 funding to TU to support the design, implementation, and detailed evaluation of DSTWs being constructed in the Wood River Basin. Three DSTWs have been built in the Wood River Valley. Two were completed in 2014 that were ultimately damaged by high-flow events and had to be decommissioned. A new 1-acre DSTW was constructed in 2018 to treat runoff from a 28-acre pasture.

In 2020, TU continued to monitor the nutrient reduction capacity of the 1-acre DSTW in the Wood River Valley. Vegetation monitoring in 2020 indicated a need for additional plantings to increase water retention time and improve nutrient removal capacity; additional plants will be installed in 2021. A dye tracer study to analyze hydrologic residence time of the DSTW was planned in 2020 and will be implemented in spring 2021.

In addition, TU continued sampling irrigation tailwater and stormwater in return ditches throughout the Wood River Valley to assess phosphorous and suspended sediment fractionation.

Development of a Priority List of Projects¹⁴

To this point, the IM 11 discussion in this section has focused on water quality improvement studies conducted in the interim period between authorization of the KHSA and dam decommissioning. As presented in the KHSA, the second half of IM 11 discusses the development of a Priority List of Projects (PLP) that could be implemented following the KRRC's acceptance of a FERC surrender order.

Beginning in fall of 2016, in advance of the surrender order, PacifiCorp and the IMIC have worked through the development of a PLP, governance structure, drafting a request for proposals, and selection of a fiscal agent. The final PLP includes (in no particular order) DSTWs, Natural Wetlands Restoration, Riparian Fencing and Grazing Management, and Irrigation Efficiency and Water Management. Funds from IM 11 have been allocated to these categories and to a flex-fund that will allow the steering committee to adjust as necessary. The Oregon Watershed Enhancement Board has been selected to be the fiscal agent.

As of December 31, 2020, the PLP report is final and awaits agency approval. Once an approval process is established, PacifiCorp will submit the Phase 3 reports for final approval per IM 11.

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

PacifiCorp shall install and operate stream gages at the J.C. Boyle Bypass Reach and at Spencer Creek. The J.C. Boyle Bypass Reach gaging station will be located below the dam and fish ladder and fish bypass outflow, but above the springs in order to record flow releases from J.C. Boyle Dam. The Spencer Creek gage will utilize an existing Oregon Water Resources Department gaging location.

It is assumed that the required measurement accuracy will be provided using stage gaging at existing channel cross-sections with no need for constructed weirs. The installed stream gages shall provide for real-time reporting capability for half-hour interval readings of flow and gage height, accessible via an agreed-upon website, until such time as it is accessible on the USGS website. The Spencer Creek gage shall be installed in time to provide flow indication for Iron Gate Flow Variability (ICP Interim Measure 5). Both gages shall be installed and functional prior to September 1, 2010. Installation of the bypass gage, and measurement and maintenance shall conform to USGS standards. The Spencer Creek gage will be maintained according to USGS standards, as applicable.

PacifiCorp completed installation of the J.C. Boyle bypass reach gage in 2011 and the gage is functional and logging data. Gaging data for the J.C. Boyle bypass reach gage are available at the following website:

<https://www.pacificorp.com/community/recreation/water-release/klamath-river.html>

Gaging data for the Spencer Creek gage are available at:

http://apps.wrd.state.or.us/apps/sw/hydro_near_real_time/display_hydro_graph.aspx?station_nbr=11510000

5.12 Interim Measure 13: Flow Releases and Ramp Rates

PacifiCorp will maintain current operations including instream flow releases of 100 cubic feet per second (cfs) from J.C. Boyle Dam to the J.C. Boyle bypass reach and a 9-inch per hour ramp rate below the J.C. Boyle powerhouse prior to transfer of the J.C. Boyle facility.

¹⁴ Jacobs. 2019. Klamath Hydroelectric Project Interim Measure 11: Priority List of Projects – Process for Project Governance, Selection, and

Implementation. Phase 3 Final Report. Prepared for PacifiCorp. June 7. 13 pp.

Provided that if anadromous fish have volitional passage to the J.C. Boyle bypass reach after removal or partial removal of the lower dams and before J.C. Boyle is transferred, PacifiCorp will operate J.C. Boyle as a run of river facility with a targeted ramp rate not to exceed 2 inches per hour, and flows will be provided in the J.C. Boyle bypass reach to provide for the appropriate habitat needs of the anadromous fish species. The operation will also avoid and minimize take of any listed species present. Daily flows through the J.C. Boyle powerhouse will be informed by reservoir inflow gages below Keno Dam and at Spencer Creek. Provided further that if anadromous fish have volitional passage upstream of Iron Gate Dam before the Copco Facilities are transferred, PacifiCorp will operate the remaining Copco Facility that is furthest downstream as a run of the river facility with a targeted ramp rate not to exceed 2 inches per hour and coordinate with NMFS and FWS to determine if any other flow measures are necessary to avoid or minimize take of any listed species present. In either event, flows in the respective bypass reaches will be based on species-specific habitat needs identified by the IMIC.

The Parties agree that if dam removal occurs in a staged manner, J.C. Boyle is intended to be the last dam decommissioned. If, however, the FERC surrender order or Definite Plan directs a different sequence for Decommissioning and Facilities Removal, then the Parties shall Meet and Confer to identify adjustments necessary to implement Facilities Removal in a manner that is consistent with PacifiCorp's Economic Analysis.

PacifiCorp is maintaining flow releases and ramp rates consistent with the existing FERC license and the requirements of applicable biological opinions as contemplated by this interim measure.

5.13 Interim Measure 14: 3,000-cfs Power Generation

Upon approval by OWRD in accordance with Exhibit 1, PacifiCorp may divert a maximum of 3,000 cfs from the Klamath River at J.C. Boyle Dam for purposes of power generation at the J.C. Boyle Facility prior to decommissioning of the facility. Such diversions shall not reduce the minimum flow releases from J.C. Boyle Dam required of PacifiCorp under Interim Measure 13. The implementation of this interim measure shall not: reduce or adversely affect the rights or claims of the Klamath Tribes or the Bureau of Indian Affairs for instream flows; affect the operation of Link River Dam or Keno Dam or any facility of the Klamath Reclamation Project; or otherwise adversely affect lake levels at Upper Klamath Lake, flows in Link River, or Keno Reservoir elevations.

As contemplated by this interim measure and pursuant to the Water Rights Agreement between PacifiCorp and the State of Oregon contained in Exhibit 1 of the KHSa, the Oregon Water Resources Department issued a limited license to PacifiCorp on April 20, 2010, authorizing diversions to the J.C. Boyle Powerhouse of up to 3,000 cfs. This limited license continues to be renewed annually.

5.14 Interim Measure 15: Water Quality Monitoring

PacifiCorp shall fund long-term baseline water quality monitoring to support dam removal, nutrient removal, and permitting studies, and also will fund blue-green algae (BGA) and BGA toxin monitoring as necessary to protect public health. Funding of \$500,000 shall be provided per year. The funding shall be made available beginning on April 1, 2010 and annually on April 1 until the time the dams are removed. Annual coordination and planning of the monitoring program with stakeholders will be performed through the Klamath Basin Water Quality Group or an entity or entities agreed upon by the Parties and in coordination with the appropriate water quality agencies. The

Regional Board and ODEQ will take responsibility for ensuring that the planning documents will be completed by April 1 of each year. Monitoring will be performed by the Parties within their areas of regulatory compliance or Tribal responsibility or, alternatively, by an entity or entities agreed upon by the Parties. Monitoring activities will be coordinated with appropriate water quality agencies and shall be conducted in an open and transparent manner, allowing for participation, as desired, among the Parties and water quality agencies.

Significant disputes that may arise between the Parties, or with the Regional Board, regarding the monitoring plan content or funding will be resolved by the Implementation Committee, acting on input and advice, as necessary, from the water quality agencies. Notwithstanding the forgoing, the Oregon Department of Environmental Quality and the California State Water Resources Control Board shall make final decisions regarding spending of up to \$50,000 dedicated to BGA and BGA toxin monitoring as necessary to protect public health.

As of December 31, 2020, PacifiCorp has completed 12 years of funding baseline water quality monitoring consistent with this interim measure, which was begun under the AIP in 2009. Annual planning, coordination, and monitoring for Interim Measure 15 is done collaboratively with PacifiCorp, ODEQ, NCRWQCB, U.S. Environmental Protection Agency Region 9, Karuk Tribe, Yurok Tribe, and Reclamation. The baseline monitoring program occurs over approximately 254 miles of river and reservoirs waters from Link River Dam near Klamath Falls, Oregon to the Klamath River estuary near Klamath, California. Parameters measured include basic water quality (temperature, dissolved oxygen, pH, and conductivity) along with a suite of nutrients.

The public health monitoring component is intended to provide timely information that can be used to inform public health agencies if cyanobacteria are present and generating

toxins at levels of concern. Public health agencies use this information to determine the need to post warning notices or issue advisories for Upper Klamath Lake, project reservoirs, and river reaches. Public health monitoring is done on a more frequent basis (e.g., biweekly) than the baseline sampling and occurs at public access points along Upper Klamath Lake; Keno, J.C. Boyle, Copco, and Iron Gate reservoirs; and the Klamath River from Iron Gate Dam downstream to the estuary. Results of water sample analysis are immediately forwarded to public health entities. Public health memos that summarize public health data available to date, are routinely provided by each monitoring entity to a wide array of stakeholders and the Klamath Basin Monitoring Program (KBMP), which subsequently posts these memos on their website (www.kbmp.net).

Interim Measure 15 water quality monitoring is coordinated to ensure appropriate quality assurance protocols and standard operating procedures, with transparency being a key element of the program. Study plans, laboratory comparison memoranda, annual summary reports, and data are available on the PacifiCorp (<https://www.pacificorp.com/energy/hydro/klamath-river/water-quality.html>) and KBMP websites (www.kbmp.net).

In 2020, the frequency of and locations for baseline nutrient sampling generally did not change from the 2018 or 2019 programs, nor did the constituents sampled. The baseline program sampling in 2020 continued to have most sites sampled monthly from May-October and only the Link Dam site and Klamath below Iron Gate dam being sampled more frequently.

Similarly, there were no changes to the 2020 public health sampling program compared to the 2018 or 2019 programs. Public health monitoring for cyanobacteria and microcystin toxin in water samples occurred at a total of 18 designated locations used for public access and recreation.

Expansion of public health monitoring in 2016 to Upper Klamath Lake continues to provide important information to the Oregon Health Authority about the presence of *Microcystis* and microcystin in Upper Klamath Lake. The data collected in samples from Upper Klamath Lake since 2016 have resulted in routine public health advisories issued for Upper Klamath Lake, Keno Reservoir, and occasionally J.C. Boyle Reservoir.

5.15 Interim Measure 16: Water Diversions

PacifiCorp shall seek to eliminate three screened diversions (the Lower Shovel Creek Diversion – 7.5 cfs, Claim # S015379; Upper Shovel Creek Diversion – 2.5 cfs, Claim # S015381; and Negro Creek Diversion – 5 cfs, Claim # S015380) from Shovel and Negro creeks and shall seek to modify its water rights as listed above to move the points of diversion from Shovel and Negro creeks to the mainstem Klamath River. Should modification of the water rights be feasible, and then successful, PacifiCorp shall remove the screened diversions from Shovel and Negro creeks associated with PacifiCorp's water rights prior to the time that anadromous fish are likely to be present upstream of Copco Reservoir following the breach of Iron Gate and Copco dams. To continue use of the modified water rights, PacifiCorp will install screened irrigation pump intakes, as necessary, in the Klamath River. The intent of this measure is to provide additional water to Shovel and Negro creeks while not significantly diminishing the water rights or the value of ranch property owned by PacifiCorp. Should costs for elimination of the screened diversions and installation of a pumping system to provide continued use of the water rights exceed \$75,000 then the Parties will Meet and Confer to resolve the inconsistency.

Implementation of this measure to relocate irrigation diversions on tributaries above Copco Reservoir is not contemplated to occur until just prior to the reintroduction of anadromous fish as a result of dam removal.

5.16 Interim Measure 17: Fall Creek Flow Releases

Within 90 days of the Effective Date and during the Interim Period for the duration of its ownership while this Settlement is in effect, PacifiCorp shall provide a continuous flow release to the Fall Creek bypass reach targeted at 5 cfs. Flow releases shall be provided by stoplog adjustment at the diversion dam and shall not require new facility construction or the installation of monitoring equipment for automated flow adjustment or flow telemetry.

Additionally, if anadromous fish have passage to the Fall Creek following removal of the California dams, flows will be provided in the Fall Creek bypass reach to provide for the appropriate habitat needs of the anadromous fish species of any kind that are naturally and volitionally present in the Fall Creek bypass reach. Flows will be based on species specific habitat needs identified by the IMIC. The operation will also avoid and minimize take of any listed species present.

Pursuant to Interim Measure 17, PacifiCorp adjusted instream flow releases in the Fall Creek bypass reach from 0.5 cfs to 5 cfs on May 18, 2010. The additional instream flow release is being provided through an existing bypass culvert at the Fall Creek Diversion Dam. PacifiCorp's operations staff monitor this flow release during the course of their routine visits to the Fall Creek Diversion Dam to ensure that the instream flow is maintained.

5.17 Interim Measure 18: Hatchery Funding

Beginning in 2010, PacifiCorp shall fund 100 percent of Iron Gate Hatchery operations and maintenance necessary to fulfill annual mitigation objectives developed by the California Department of Fish and Wildlife in consultation with the National Marine Fisheries Service and consistent with existing FERC license requirements. PacifiCorp shall provide funding of up to \$1.25 million dollars per year for operations and maintenance costs,

subject to adjustment for inflation as set forth in Section 6.1.5 of the Settlement. These operations and maintenance costs shall include a program for 25 percent fractional marking of chinook at the Iron Gate Hatchery facilities as well as the current 100 percent marking program for Coho and steelhead. Labor and materials costs associated with the 25 percent fractional marking program (fish marking, tags, tag recovery, processing, and data entry) shall be included within these operations and maintenance costs. This operations and maintenance funding will continue until the removal of Iron Gate Dam.

PacifiCorp will provide one-time capital funding of \$1.35 million for the 25 percent fractional marking program. This funding will include the purchase of necessary equipment (e.g., electrical upgrades, automatic fish marking trailer, tags and a wet lab modular building for processing fish heads). PacifiCorp will ensure the automatic fish marking trailer is available for use by April 2011. PacifiCorp is not responsible for funding the possible transition to a 100 percent Chinook marking program in the future.

PacifiCorp owns the Iron Gate Hatchery and the current Project license requires PacifiCorp to fund 80 percent of Iron Gate Hatchery operations and maintenance costs, with the remainder funded by CDFW. However, under Interim Measure 18, PacifiCorp has assumed funding of 100 percent of operation and maintenance costs for Iron Gate Hatchery.

Consistent with the interim measure, PacifiCorp purchased a fish marking system for Iron Gate Hatchery to provide 25 percent constant fractional marking of Chinook Salmon produced at the hatchery. The marking system was first used in the spring of 2011 and has been used every spring since then. The increased marking percentage at Iron Gate Hatchery is providing better data on the contribution of the hatchery-to-basin Chinook Salmon harvest and escapement. This information is helping to improve fisheries management in the basin.



State-of-the-Art Marking and Recording Equipment at Iron Gate Hatchery

In 2012, PacifiCorp completed construction of a new wet lab at CDFW's Yreka facility that has been used every season since then to analyze coded wire tags collected from returning adult Chinook.



Wet Lab for Reading Adult Salmon Tags

5.18 Interim Measure 19: Hatchery Production Continuity

Within 6 months of the Effective Date of the Settlement, PacifiCorp will begin a study to evaluate hatchery production options that do not rely on the current Iron Gate Hatchery water supply. The study will assess groundwater and surface water supply options, water reuse technologies or operational changes that could support hatchery production in the absence of Iron Gate Dam. The study may include examination of local well records and the feasibility of

increasing the production potential at existing or new hatchery facilities in the basin.

Based on the study results, and within 6 months following the DRE's acceptance of the FERC surrender order, PacifiCorp will propose a post-Iron Gate Dam Mitigation Hatchery Plan (Plan) to provide continued hatchery production for 8 years after the removal of Iron Gate Dam. PacifiCorp's 8-year funding obligation assumes that dam removal will occur within 1 year of cessation of power generation at Iron Gate Dam. If dam removal occurs after 1 year of cessation of power generation at Iron Gate Dam, then the Parties will Meet and Confer to determine appropriate hatchery funding beyond the 8 years. PacifiCorp's Plan shall propose the most cost effective means of meeting hatchery mitigation objectives for 8 years following removal of Iron Gate Dam. Upon approval of the Plan by the California Department of Fish and Wildlife or Oregon Department of Fish and Wildlife (as appropriate) and the National Marine Fisheries Service, PacifiCorp will begin implementation of the Plan. Plan implementation may include PacifiCorp contracting with the owners or administrators of other identified hatchery facilities and/or funding the planning, design, permitting, and construction of measures identified in the Plan as necessary to continue to meet mitigation production objectives. Five years after the start of Plan implementation, PacifiCorp, the California Department of Fish and Wildlife or Oregon Department of Fish and Wildlife (as appropriate) and the National Marine Fisheries Service, the CDFW or ODFW (as appropriate) and the NMFS shall meet to review the progress of Plan implementation. The 5 year status review will also provide for consideration of any new information relevant to Plan implementation. Plan implementation shall ultimately result in production capacity sufficient to meet hatchery mitigation goals for the 8-year period being in place and operational upon removal of Iron Gate Dam.

In 2011, PacifiCorp began a study to evaluate hatchery production options that do not rely on

the current Iron Gate Hatchery water supply. PacifiCorp engineering and environmental staff researched available water supply options in the area and historical records on hatchery water supply options considered at the time Iron Gate Hatchery was constructed. PacifiCorp, in consultation with CDFW and developed preliminary alternatives for continued hatchery operations. Further progress on the evaluation of these alternatives was delayed because of the uncertain future of the settlement agreements as the end of 2015 approached with little Congressional action. With execution of the revised KHS in 2016, formation of the KRRC, and filing of the application to transfer ownership to the KRRC, there was renewed interest in determining the future of Iron Gate Hatchery.

During 2020, the design for a post-dam removal replacement hatchery on Fall Creek was advanced. In October of 2020, the KRRC completed and release final design documents. The Fall Creek Hatchery is designed to rear a total of 3.325 million juvenile fish – both Coho and Chinook salmon. Fish are to be released as fry, subyearling, and yearling life stages in the spring and fall. As of December 31, 2020, PacifiCorp and other stakeholder review of the proposed hatchery design was underway.

5.19 Interim Measure 20: Hatchery Funding After Removal of Iron Gate Dam

After removal of Iron Gate Dam and for a period of 8 years, PacifiCorp shall fund 100 percent of hatchery operations and maintenance costs necessary to fulfill annual mitigation objectives developed by the California Department of Fish and Wildlife in consultation with the National Marine Fisheries Service. The hatchery mitigation goals will focus on Chinook production, with consideration for steelhead and Coho, and may be adjusted downward from current mitigation requirements by the California Department of Fish and Wildlife and National Marine Fisheries Service, in consultation with the other Klamath

River fish managers, in response to monitoring trends.

No implementation actions have occurred for this interim measure given that this requirement begins only following removal of Iron Gate Dam.

5.20 Interim Measure 21: BLM Land Management Provisions

Beginning in 2010 and continuing until Decommissioning of the J.C. Boyle facility, PacifiCorp shall fund land management activities by the Bureau of Land Management as specified in this interim measure. BLM will provide PacifiCorp an annual Work Plan for the management measures described below for road maintenance, invasive weed management, cultural resource management, and recreation. The Work Plan will include the status of Work Plan tasks from the prior year, a description of the prioritized tasks for the upcoming year, and their estimated costs. PacifiCorp or BLM will mutually establish the annual delivery date of the Work Plan taking into consideration fiscal and maintenance calendars and may request a meeting to coordinate the content of the plan. PacifiCorp will provide funding within 60 days of concurring with the Work Plan. Administrative services, environmental review or permitting efforts, if necessary, to implement actions under the funds shall not require additional PacifiCorp funding beyond the amounts specified below.

A. PacifiCorp shall provide up to \$15,000 per year to BLM towards projects identified through the coordination process described above for the purpose of road maintenance in the Klamath Canyon. This funding will be used to annually maintain the access road from State Highway 66 to the J.C. Boyle Powerhouse and terminate at the BLM Spring Island Boat Launch. Remaining funds will be used to do non-recurring road maintenance work on roads within the Canyon as mutually agreed upon in writing by BLM and PacifiCorp.

B. PacifiCorp shall provide up to \$10,000 per year to BLM for use by the Oregon Department of Agriculture (ODA) towards projects identified through the coordination process described above for the purpose of integrated weed management of invasive weed species along the road system and river corridor within the Klamath Canyon. Noxious weed control projects will be coordinated with Siskiyou County to ensure that weeds are controlled along the river corridor from the Oregon-California boundary to the top of Copco Reservoir.

C. PacifiCorp shall provide up to \$10,000 per year to BLM towards projects identified through the coordination process described above for the management of the following 5 BLM cultural sites which are within, or partially within, the T1 terrace of the J.C. Boyle full flow reach: 35KL21/786, 35KL22, 35KL24, 35KL558, and 35KL577. Management of additional sites with these funds can occur with mutual written agreement between PacifiCorp and BLM.

D. PacifiCorp shall provide up to, but no more than, \$130,000 in funding for the development and implementation of a Road Management Plan to be implemented during the Interim Period. The Road Management Plan shall be developed by BLM and PacifiCorp and will determine priorities for operation and maintenance, including remediation or restoration of redundant or unnecessary facilities, of the shared BLM/PacifiCorp road system within the Klamath River Canyon from J.C. Boyle Dam to the slack water of Copco Reservoir.

The BLM has continued to use funding under this interim measure for cultural resources, road maintenance, and invasive weed management. Recent actions implemented under this interim measure include:

- Cultural Resources: The BLM conducted detailed monitoring and updated baseline data at multiple sites identified in IM 21. Baseline data consisted of constructing detailed site maps, capturing spatial data, and documentation of any changes to the

sites (e.g., disturbances, newly found artifacts or features). Results of annual monitoring performed to date have not found any evidence that J.C. Boyle peaking operations are causing erosion of sites along the river.

- **Road Management Plan:** PacifiCorp and BLM worked collaboratively to complete road management measures including limiting access and closing roads on both PacifiCorp and BLM property at Frain Ranch in the Klamath River Canyon in 2017. Additional road management has not occurred although PacifiCorp continues to coordinate with BLM.
- **Road Maintenance:** Annually, BLM grades and does other maintenance work on approximately 13 miles of the Topsy Road and approximately 8 miles of the John C. Boyle Road from Highway 66 to the closure gate.
- **Invasive Weed Management:** The BLM has continued to address invasive weed management throughout the 4,390 acres of the Klamath River Canyon in both Oregon and California. The BLM has applied spot treatments to a total of about 125 acres in the Klamath River Canyon.



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