Klamath Hydroelectric Settlement Agreement

Implementation Report

Klamath Hydroelectric Project

FERC Project No. 2082

PacifiCorp

April 2020

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. This report focuses on events that occurred July 1, 2018, through December 31, 2019.

Amended KHSA

Legislation necessary for federal approval of the Klamath Basin Restoration Agreement (KBRA) never passed Congress and the KBRA Expired on December 31, 2015. In early 2016, the parties to the KHSA and KBRA met to chart a new path forward to implement the KHSA that did not rely on congressional approval. The result was an amended KHSA that specified a pathway by which PacifiCorp would apply to the Federal Energy Regulatory Commission (FERC) to transfer ownership of J.C. Boyle, Copco No. 1, Copco No. 2, and Iron Gate to a specially created Dam Removal Entity (DRE). That DRE would then apply to FERC to surrender the license for these facilities and decommission them. The amended KSHA was signed in April 2016 and does not require federal legislation for implementation. The Klamath River Restoration Corporation (KRRC) was incorporated in May 2016 and is the DRE.

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 in January 2012.

The Oregon customer surcharge, with accrued interest, is designed to provide approximately $184 million for dam removal; this amount has been collected and the surcharge collection 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, 2019, the dam removal trust accounts overseen by the Oregon Public Utility Commission (OPUC) had a balance of $122.9 million and the dam removal trust accounts overseen by the California Public Utilities Commission (CPUC) had a balance of $7.5 million, for a combined balance of $130.5 million. The KRRC has entered into funding agreements with both the OPUC and CPUC and has access funds to implement dam removal activities. As of December 31, 2019, $68.7 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. The company is funding basinwide water quality monitoring and studies intended to reduce nutrient levels in the Klamath River and improve water quality in the Klamath Hydroelectric Project (Project) reservoirs. PacifiCorp has made operational adjustments to the Project and is implementing and funding fish habitat improvements within the Project and in the Klamath Basin downstream of Iron Gate Dam. PacifiCorp is also now funding the ongoing operations of Iron Gate Hatchery and the implementation of a Hatchery and Genetics Management Plan to aid in the conservation and recovery of Coho Salmon.

PacifiCorp is pleased with the progress made in implementing the KHSA and the various interim measures that continue to create improvements to water quality, fish habitat, and other environmental conditions. PacifiCorp notes the significant 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.

Contents

Table

Figures

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 U.S. 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 rate[1] 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 provide up to $250 million in funding for dam removal costs in excess of the $200 million customer contribution.

1.1.2 Federal Legislation

There were, however, 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."

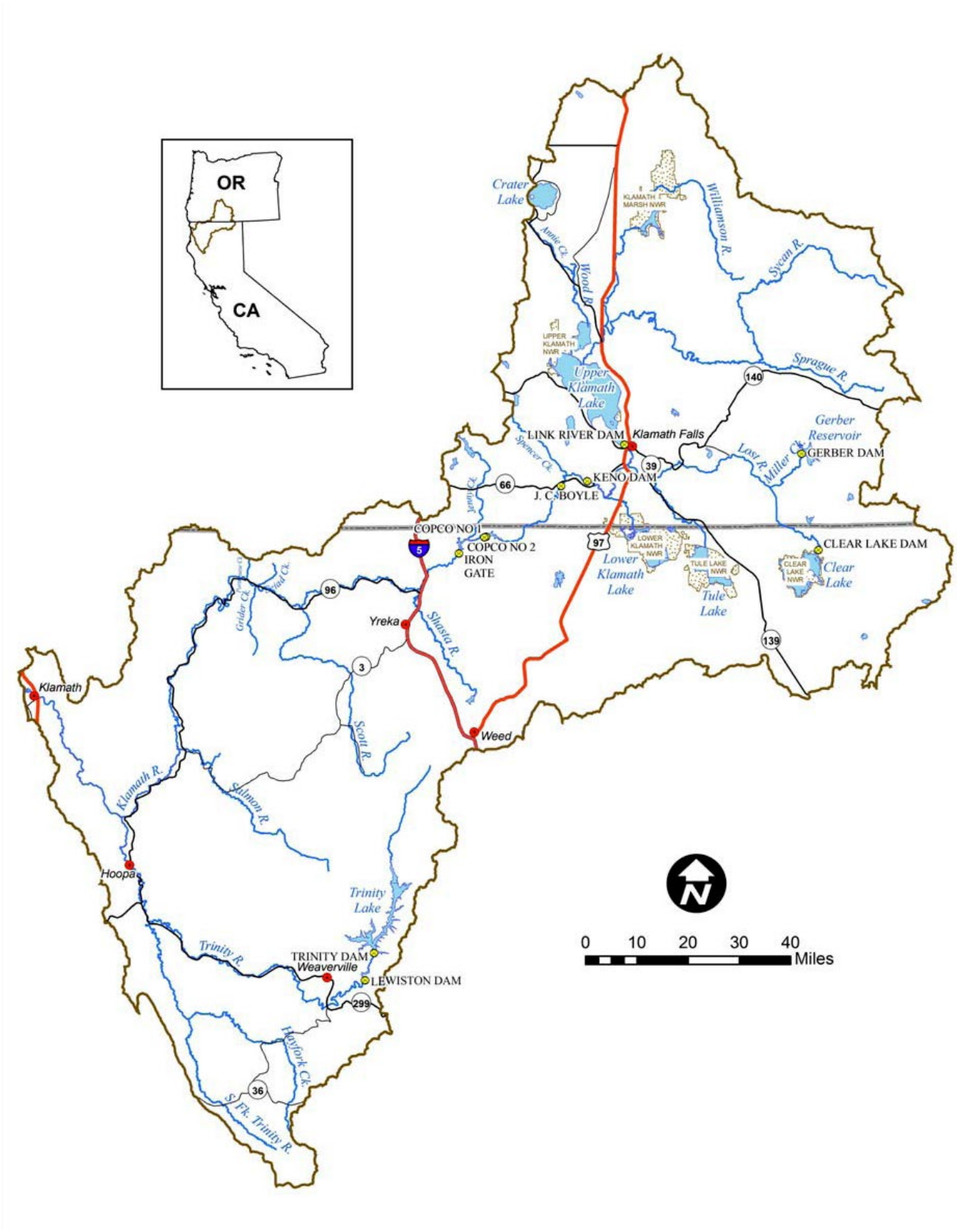

Figure 1. Klamath Basin

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. Senate hearings on the proposed legislation never occurred, and the required legislation was never passed. As a result, 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 amended 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 amended 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 amended KHSA.

1.1.3 Klamath River Renewal Corporation

Following the execution of the amended KHSA, the Klamath River Renewal Corporation[2] (KRRC) was incorporated as a nonprofit corporation in California on May 24, 2016. The KRRC is the DRE as envisioned in the amended KHSA.

The mission of the KRRC 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 eventually remove these facilities. To accomplish this mission, the KRRC 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 as it will continue to serve irrigation purposes.

1.1.4 Studies and Environmental Review

As described in Section 3 of the original KHSA, the Secretary of the Interior, in cooperation with the Secretary of Commerce and other federal agencies, conducted studies and environmental review to determine whether to proceed with facilities removal.

On April 4, 2013, the Department of the Interior (Interior) released a Record of Decision and Final Klamath Facilities Removal Environmental Impact Statement (Final EIS) in compliance with the National Environmental Policy Act (NEPA). The Final EIS identified full removal of J.C. Boyle, Copco No. 1, Copco No. 2, and Iron Gate developments as the preferred alternative to achieve a free-flowing river and realize other objectives expressed in the KHSA and KBRA.

Congressional action was necessary to authorize the Secretary of the Interior to make a determination whether the removal should proceed. As discussed previously, this authorization was never provided and the KBRA expired at the end of December 2015.

Because the KBRA has expired and it was part of the proposed action analyzed in the Final EIS, the usefulness of the 2013 Final EIS in supporting

[2] Information about the KRRC can be found here: http://www.klamathrenewal.org/

implementation of the 2016 amended KHSA is unclear. However, it is anticipated that FERC will conduct supplemental NEPA analysis of the KRRC's Definite Plan for dam removal once the transfer and surrender applications have been approved by FERC.

1.2 FERC Transfer and Surrender Proceedings

On September 23, 2016, PacifiCorp and the KRRC 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 KRRC. Simultaneously with the filing of the transfer application, the KRRC filed a surrender application with FERC for these same developments. On March 1, 2017, the KRRC filed additional information with FERC in support of the September 23, 2016 filing. On April 24, 2017, FERC requested additional information from PacifiCorp and the KRRC. The responses to this request were submitted to FERC on June 23, 2017. Subsequent requests for additional information have been received from FERC on July 14, 2017, and October 5, 2017, and responses to several of these requests were provided to FERC on December 4, 2017, and June 28, 2018.

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 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.

On June 28, 2018, the KRRC filed the first version of the Definite Plan with FERC. The Definite Plan provides the details on how removal of J.C. Boyle, Copco No. 1, Copco No. 2, and Iron Gate developments would occur.[3] The KRRC filed the initial Board of Consultants (BOC) report on December 12, 2018. FERC responded to this on January 23, 2019, and included requests for additional information. In April 2019, the KRRC requested that FERC extend the deadline for submitting this additional information to July 29, 2019, a request that FERC approved. On July 29, the KRRC filed with FERC the BOC's supplemental report to its Meeting Report No. 1.

Regardless of this activity, as of December 31, 2019, no substantive changes in FERC's activity have occurred with regard to the transfer or settlement applications.

1.3 FERC Licensing

The current 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, should dam removal not proceed, 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.

[3] The Definite Plan can be found on the KRRC's website: http://www.klamathrenewal.org/definite-plan/

2.0 Parties to the Klamath Hydroelectric Settlement Agreement

The parties to the KHSA, as amended, are listed below.

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 in 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.

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.[4] 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, 2019, the balance of the Oregon customer dam removal trust accounts was as follows:

J.C. Boyle Trust Account	$30,325,429.34
Copco No. 1, Copco No. 2, and Iron Gate Trust Account	$92,613,174.77
Total	**$122,938,604.11**

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 of 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 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

[4] The OPUC Order is available at: http://apps.puc.state.or.us/orders/2010ords/10-364.pdf

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, 2012[5] and new rates became effective October 29, 2012.

As of December 31, 2019, the balance of the California customer dam removal trust accounts was as follows:

J.C. Boyle Trust Account	$1,885,461.86
Copco No. 1, Copco No. 2, and Iron Gate Trust Account	$5,687,468.50
Total	**$7,572,930.36**

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 $130,511,534.47 as of December 31, 2019.

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. As of December 2017, the KRRC has 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, $68,704,135.00 had 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 is to provide funding of 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.

[5] Final CPUC decision is available at: http://docs.cpuc.ca.gov/PUBLISHED/FINAL_DECISION/134812.htm

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.

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 period[6] 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, PacifiCorp, and other interested parties of the burden of

[6] 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 disconnects the facilities from the transmission grid (decommissioning).

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 amended 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 SWRCB[7] released a draft Section 401 water quality certification for the KRRC's proposed removal of the California dams. In December, 2018, the SWRCB released the Draft Environmental Impact Report (DEIR) for the Lower Klamath Project License Surrender as part of their standard processing of the KRRC's application. PacifiCorp submitted comments on the DEIR to the SWRCB on February 26, 2019. On December 31, 2019, the SWRCB submitted to FERC a Notice of Availability for public comment on recirculated portions of the DEIR. As of December 31, 2019, a target date for release of a final EIR was not available.

On May 23, 2018, ODEQ[8] issued a draft Oregon Section 401 water quality certification for KRRC's proposed dam removal of J.C. Boyle and a public hearing was held on June 12, 2018. ODEQ issued the final Section 401 water quality certification to the KRRC for the removal of J.C. Boyle on September 7, 2018.

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*. [9] In May of 2019, ODEQ issued a draft water temperature TMDL. PacifiCorp submitted comments on July 15, 2019, on the 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; as of the end of the year, the decision was pending with ODEQ.

[7] 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

[8] The ODEQ has posted Oregon Section 401 information here: https://www.oregon.gov/deq/wq/wqpermits/Pages/Section-401-Hydropower.aspx

[9] 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 membership and activities in the July 2018-December 2019 period 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 and verified by the U.S. Fish and Wildlife Service (USFWS), National Marine Fisheries Service (NMFS), Bureau of Land Management, (BLM), and Oregon Department of Fish and Wildlife (ODFW).

- **Interim Measure 10: Water Quality Conference.** Completed September 11-13, 2012. A report on the outcomes from the workshop activities is available from PacifiCorp on request.

- **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
  - Multi-year Analysis of Microcystis Population Structure and Toxigenicity 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

- **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 Interim Measures Implementation Committee (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. The IMIC has held most of its quarterly meetings in Yreka, California, which is a central location for most members.

Between July 2018 and December 2019, IMIC held six meetings; two in the second half of 2018, and four in 2019. Meetings typically were held during the third week of January, April, July, and October. Representatives to the IMIC come from 18 different organizations. The IMIC members who participated during the July 2018 to December 2019 period covered by this report are listed in Table 1.

Table 1. Interim Measures Implementation Committee Members and Affiliations

IMIC Member	Organization
Steve Rothert	American Rivers
Chelsea Aquino	Bureau of Land Management
Rick Carlson	Bureau of Reclamation
Donna Cobb	California Department of Fish and Wildlife
Jane Vorpagel	California Department of Fish and Wildlife
Erin Ragazzi	California State Water Resources Control Board
Parker Thaler	California State Water Resources Control Board
Kristen Gangl	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
Jim Simondet	National Marine Fisheries Service
Clayton Creager	North Coast Regional Water Quality Control Board
Johnathan Warmerdam	North Coast Regional Water Quality Control Board
Chris Stine	Oregon Department of Environmental Quality

Table 1. Interim Measures Implementation Committee Members and Affiliations

IMIC Member	Organization
Mike Hiatt	Oregon Department of Environmental Quality
Robert M. Hooton	Oregon Department of Fish and Wildlife
Bill Tinniswood	Oregon Department of Fish and Wildlife
Ted Wise	Oregon Department of Fish and Wildlife
Ben Ramirez	Oregon Department of Fish and Wildlife
Kyle Gorman	Oregon Water Resources Department
Mary Grainey	Oregon Water Resources Department
Tim Hemstreet	PacifiCorp
Demian Ebert	PacifiCorp
Stan Swerdloff	The Klamath Tribes
Ryan Fogerty	U.S. Fish and Wildlife Service
Gina Glenne	U.S. Fish and Wildlife Service
Nick Hetrick	U.S. Fish and Wildlife Service
Mike Edwards)	U.S. Fish and Wildlife Service
John Vradenburg	U.S. Fish and Wildlife Service
Jason Cox	U.S. Fish and Wildlife Service
Matt Baun	U.S. Fish and Wildlife Service
Louisa McCovey	Yurok Tribe
Matthew Hanington	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.***

Coho Salmon

Starting in 2009, PacifiCorp worked closely with NMFS and 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. 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 Plan[10] as required by the Coho HCP, which was submitted to NMFS for review and 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, 2019, 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 Plan[11] to NMFS on February 24, 2013. This plan included procedures to monitor water temperature and dissolved 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

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

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

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.[12]

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 2018 and 2019, 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 February 2018, PacifiCorp made the second contribution to the Sucker Conservation Fund and continues to work with the Sucker Recovery Team to identify appropriate projects.

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.

As of December 2019, PacifiCorp has provided funding of over $5,400,000 into the Coho Enhancement Fund (CEF). Starting in 2009 and running through the 2019 grant cycle, 51 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 $5.2 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).

[12] PacifiCorp. 2013c. PacifiCorp Klamath Hydroelectric Project. Interim Operations Habitat Conservation Plan for Lost River and Shortnose Suckers. November. 146 pp.

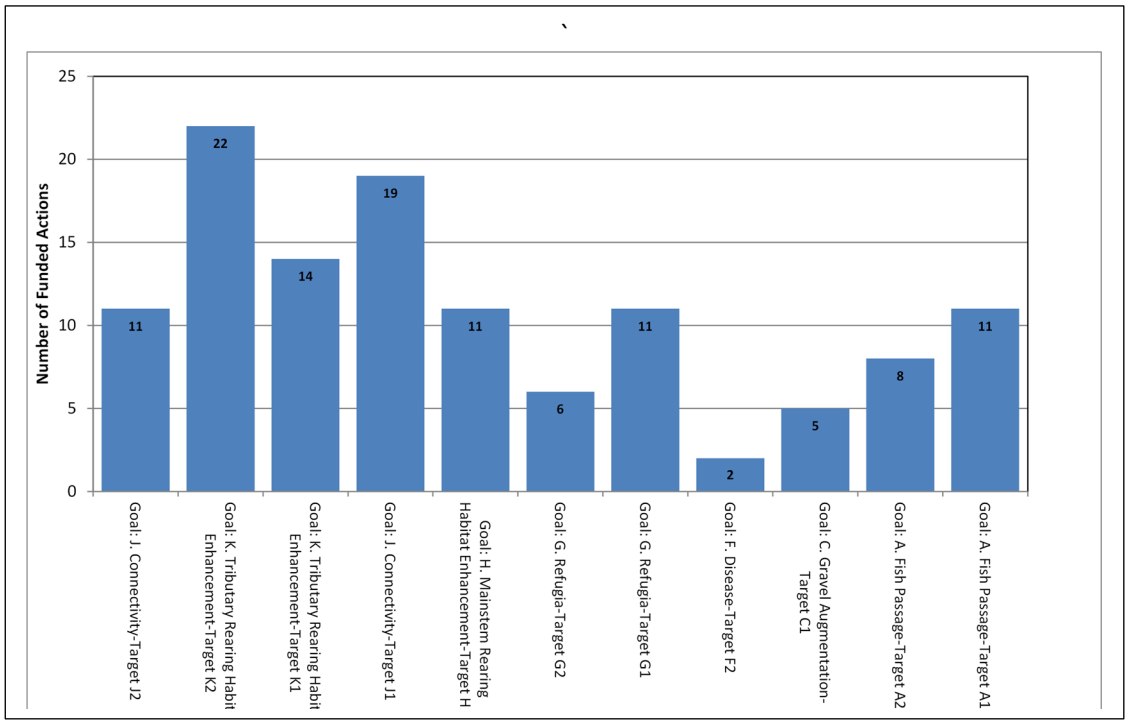

Figure 2. Number of Funded Activities Through 2019 as They Relate to Coho HCP Goals and Objectives

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 $10.2 million in matching funds for Coho restoration projects as of 2019.

Funded projects have resulted in a substantial benefit to Coho Salmon downstream of Iron Gate Dam. When the projects are considered collectively through 2019, the CEF has resulted in:

- Implementation of over 11,820 linear feet of channel restoration;
- Creation of over 163,320 square feet of off-channel ponds;
- Installation of five fish screens;
- Removal of 91 passage barriers;
- Improved access to over 111 miles of Coho habitat;
- Installation of over 7 miles of riparian fencing;
- Implementation of 31 separate water leases or exchanges providing improved flows in over 38 miles of stream;
- Implementation of 111,643 square feet of other types of habitat enhancement projects;
- Installation of 56 wood structures; and
- Installation of eight beaver dam analogues.

The recipients of CEF grants and the corresponding projects thus far include:

- **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 to enable 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.

Completed Seiad Creek Channel Restoration Project

- **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 as well as providing livestock stock 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.
- **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 to enhance habitat complexity. Past years' efforts on this project are now complete; year 5 of the project continued during the 2018-2019 report update period.
- **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; now complete.
- **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.

Sugar Creek Off-Channel Pond after Improvement

- **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. This project was terminated in 2019 as the Trust changed their focus from providing seasonal flow enhancements to permanent water dedication.
- **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. In 2018, this 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. In 2018, a topographic survey was completed of nearly 4,000 linear feet of stream channel and floodplain. Existing vegetation surveys were also begun. In 2019, MKWC continued topographic surveys, installed groundwater and surface water monitoring stations and collected data, and began planning for 2020 survey work and hydraulic modeling.
- **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. Construction delays postponed work in 2018. In 2019, the Yurok Tribal Fisheries Program completed environmental and cultural compliance, conducted habitat mapping, photo-monitoring, topographic and fish use surveys, secured 80 trees for wood jams, and collaborated with partners to install eight constructed wood jams.
- **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 2018, a detailed survey of the reach, a geomorphic investigation, baseline hydraulic modeling, and designs for the large wood structures were all completed. In 2019, the design was completed, all necessary permits obtained, five spawning beds/riffles were built, and large woody material was installed upstream of each new riffle to direct flow into the thalweg of the riffles as well as provide cover and deepen pools. The alcove on Hidden Valley was also enlarged.
- **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. A final report was submitted in 2019; the project is now complete.

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. Preproject surveys of large wood, sediment composition, and fish use were completed.
- **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.

- **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. This project was awarded in 2018. In the fall of 2019, gravel was placed at specific locations with known Coho Salmon utilization, 10 large wood logs were placed instream, and 20 stream side trees were fallen into the stream with the associated gravel to increase channel complexity and help slow high winter water velocities.
- **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 was awarded in 2018. In 2019, 34 brush bundles were added at 12 rearing sites, creating 1,043 square feet of in-stream 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; monitor and maintain these two sites and three other existing beaver dam analogues; plan and design at least one additional habitat enhancement site in McGarvey Creek; and report and conduct stakeholder outreach. This project was awarded in 2019.
- **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. This project was awarded in 2019.
- **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.
- **Mid Klamath Watershed Council:** Horse Creek (Klamath National Forest) Instream Wood Placement Project. This project will add 35 wood structures to Horse Creek at strategic sites in a low-gradient reach on public lands. Adding these structures to 1.5 miles of Horse Creek will increase habitat complexity and provide resilience to excessive sedimentation from recent extreme wildfires. This project, awarded in 2019, builds on the Phase 1 effort awarded in 2018.

A Technical Review Team was formed in 2012 and meets annually (if necessary) to review existing projects funded under the CEF and to recommend possible adaptive management changes, if warranted, 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 Technical Review Team 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 Technical Review Team meeting was held in 2018 or 2019. 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.

Water Filtration System at Iron Gate Hatchery

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, 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 3). In 2018, data show survival from green eggs to ponded fish was 82 percent and in 2019 preliminary data indicate survival was 90 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 in 2015-16, 2016-17, 2017-18, 2018-19, and 2019-20 spawning seasons. While this work has documented spawning in several tributaries between Iron Gate and Portuguese Creek, most spawning Coho have been observed in Seiad Creek, Horse Creek, and Bogus Creek.

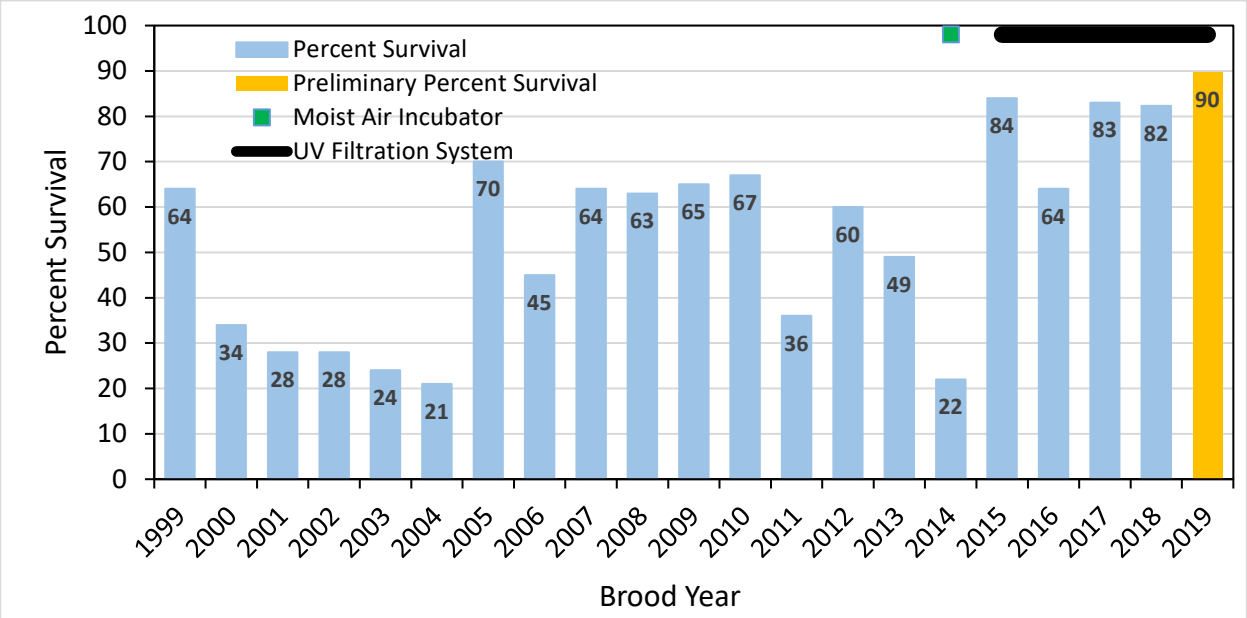

Figure 3. Percent Survival by Brood Year with Ultraviolet Filtration Period Indicated by the Top Black Bar

The total population estimate from the spawning surveys has varied from year to year, but averages about 259 fish (Figure 4). The total population estimate for the Upper Klamath population unit averages about 380 fish.

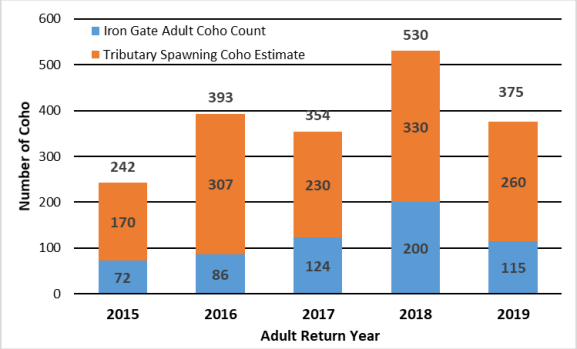

Figure 4. Adult Coho Captured at Iron Gate Dam and Coho Population Estimate Based on Spawning Surveys of Tributaries from Bogus Creek to Portuguese Creek (does not include the Scott or Shasta rivers)

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 joint biological opinion on Reclamation's Klamath Project for 2013-2023 (2013 BiOp) includes provisions for more 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 below 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.

Flows downstream of Iron Gate Dam generally remained at or near biological opinion minimum target flows from July 2018 through January 2019. The lone exception to this was a short pulse in late August, when flows briefly approached 2,000 cfs, initiated to support the Ceremonial Boat Dance downstream of Iron Gate Dam (Figure 5).

February 2019 brought a shift in weather patterns that generated substantial snowfall in the upper basin. By the beginning of March, snow water equivalent had exceeded the median in the upper basin (Figure 6), alleviating the building drought fears.

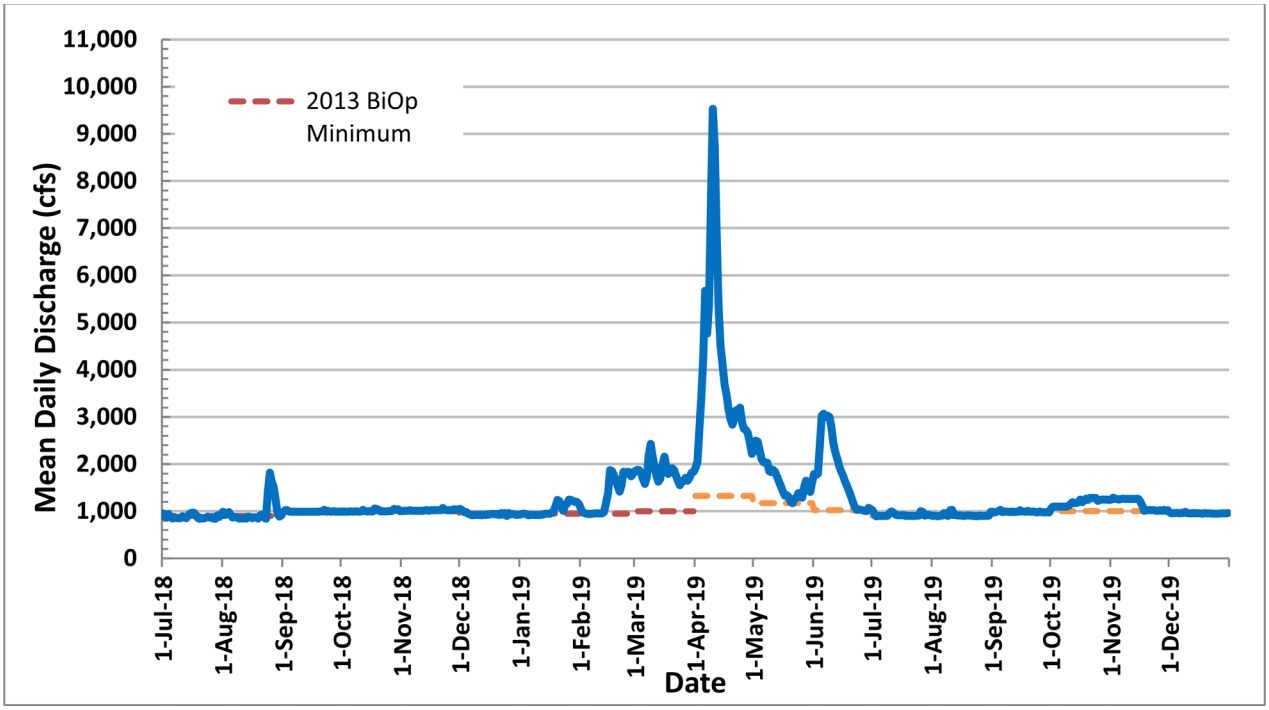

Figure 5. Mean Daily Discharge in the Klamath River Downstream of Iron Gate Dam (USGS Gage No. 11516530)

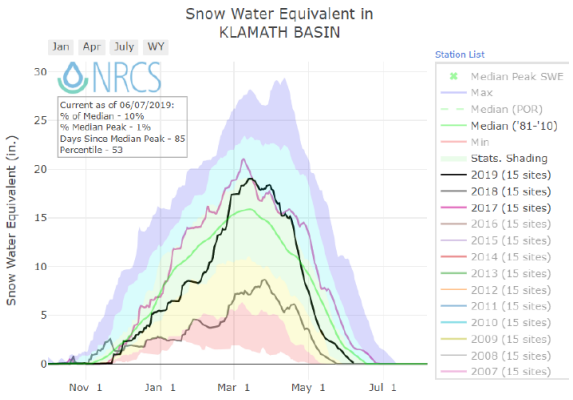

Figure 6. Snow Water Equivalent in the Klamath Basin, November 2018 - July 2019[13]

Snowmelt in the spring of 2019 started in late March but was most dramatic in early April when a warm storm brought high elevation rain. Rain on snow, coupled with management of Upper Klamath Lake for flood control, generated a seasonal peak mean daily discharge at Iron Gate Dam of 9,530 cfs on April 10, 2019.

[13] Graph from https://www.nrcs.usda.gov/Internet/WCIS/basinCharts/POR/WTEQ/OR/KLAMATH%20BASIN.html

Approximately 9,500 cfs of Flow at Iron Gate Dam on April 10, 2019 at 8:30 AM
(Photo: PacifiCorp)

In response to litigation[14] and reinitiated consultation, new coordinated biological opinions on Reclamation's Klamath Project for 2019-2024 were released in April 2019 by USFWS [15]and NMFS[16] for the listed species under their respective jurisdictions. 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.

According to the thresholds in the 2019 NMFS BiOp, a disease dilution flow was not required in 2019. However, increasing levels of *Ceratonova shasta* along with outmigrating Chinook (especially releases of Iron Gate Hatchery-raised Chinook smolts) and Coho Salmon in early June 2019 prompted stakeholders to request this flow release regardless of the requirements in the 2019 NMFS BiOp. As a result, Reclamation initiated a disease dilution flow starting on June 4, 2019, that brought flows downstream of Iron Gate Dam up to about 3,000 cfs for 5 days before gradually ramping down to baseflow levels (Figure 5). From July 2019 through December 2019, flows downstream of Iron Gate Dam generally remained at or near biological opinion minimum target flows (Figure 5).

Other elements of the 2019 NMFS BiOp allow for delivery of opportunistic surface flushing flows in average to wet years as hydrologic conditions permit. This surface flushing flow was effectively achieved without special action in 2019 by the rain-on-snow event in early April. The proposed Project operations in the 2019 NMFS BiOp also include an additional 20,000 AF to be release in May or June when the EWA is greater than 400,000 AF as of April 1.

The beginning of the 2019-20 water year was below median in contrast to the wetter year experienced in 2018-19 (Figure 7).

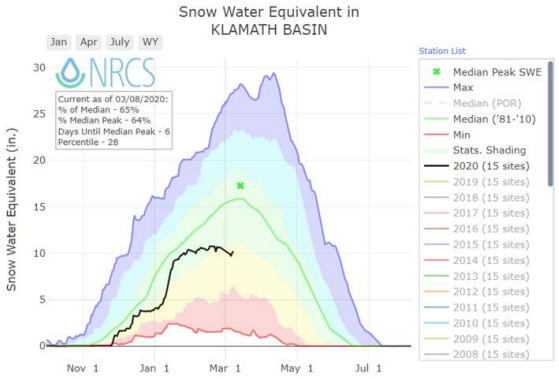

Figure 7. Snow Water Equivalent in the Klamath Basin, November 2019 – March 2020[17]

[14] Yurok Tribe v. Bureau of Reclamation, No. 16-cv-6863 and Hoopa Valley Tribe v Bureau of Reclamation. No. 16-cv-4294.

[15] 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.

[16] 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.

[17] Graph from https://www.nrcs.usda.gov/Internet/WCIS/basinCharts/POR/WTEQ/OR/KLAMATH%20BASIN.html

The 2019 NMFS BiOp was legally challenged because it was found that the analysis relied on erroneous data. As of late in 2019, Reclamation was working 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. Consultation with the Services has been reinitiated and work on new BiOps is underway.

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, 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 polychaetes
- Measure the response of selected polychaete 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)

Polychaete Tubes on a Boulder in the Klamath River

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 Oregon State University (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 BLM roads, BLM conducted a 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 has been added to nine sites in the Klamath River below J.C. Boyle Dam (Figure 8).

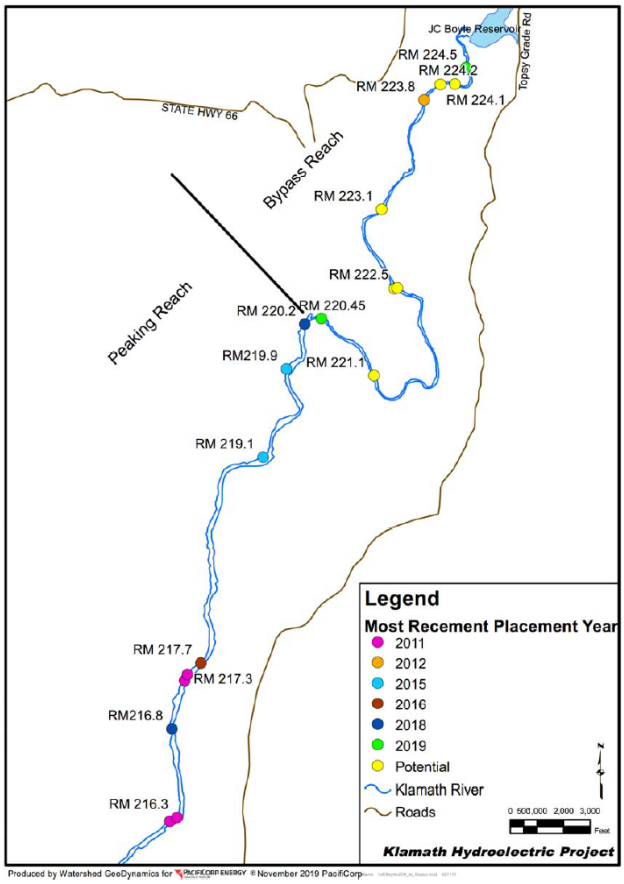

Figure 8. Gravel Placement Locations Downstream of J.C. Boyle Dam from 2011-2019

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 July 2018 and December 2019 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 2019 Study Plan

Finalized in January of 2019, the Klamath *Hydroelectric Project Interim Measure 11 Study Activities for 2019* (the 2019 Study Plan), outlined five studies that would be funded by PacifiCorp to focus on water quality improvements in the Klamath River primarily through nutrient reduction. These projects include:

1. Development of a Water Budget and an Assessment of Nutrient Loading from Two Agricultural Operations, Phase 2
2. Evaluation of the Iron Gate Intake Barrier Curtain System for Water Quality Improvement of Powerhouse Releases
3. Assessment of Irrigation Water Conservation Opportunities for Water Quality Improvement in the Upper Klamath Basin
4. Agency/Barnes Lake Restoration Project - Water Quality Evaluation
5. Design and Installation of a Biochar Filtration System to Improve Water Quality in Upper Klamath Lake

Details of each study or pilot project outlined in the 2019 Study Plan and its current implementation status as of December 2019 are provided in the sections that follow.

5.10.2 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. In addition, the landowners hired a consultant to produce a report about the existing wetlands on the Caledonia and Running Y farms. Flow data are being obtained from inlets and outlets of the two farms to allow nutrient loads to be calculated.

Phase 2, will involve water quality and flow data collection as well as data analysis and development of the nutrient and water budget. The following actions were accomplished in late 2018 and 2019:

- Flow meters were installed on incoming ditches and outflow pipes in December and January.
- ODA monitored water quality throughout winter flood events.
- Wetland water quality monitoring began in late spring.
- Farms released their irrigation plans and have incorporated extensive tailwater reuse into those plans.
- Consideration was given to new areas for wetland installation/water retention.
- Consideration was given to soil nutrient and salinity testing to understand the impact of tailwater reuse.
- Application was submitted to the Oregon Watershed Enhancement Board (OWEB) for technical assistance funding in 2020 to develop designs for water quality treatment options based on the results of this study.

5.10.3. Evaluation of Intake Barrier Systems for Water Quality Improvement from Iron Gate Powerhouse Releases[18]

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. During 2015-2019, annual studies have been conducted to continue evaluation of 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 is underway. Work in 2019 has built on previous years of data collection and continues to inform management and operation of the system.

One strategy for improving water quality in the Klamath River downstream of Iron Gate Dam involves reducing the amount of cyanobacteria transported to the river from Iron Gate Reservoir. Seasonal cyanobacteria blooms in Iron Gate Reservoir typically occur in near-surface waters of the photic zone where light and nutrients are available. The penstock intake for Iron Gate Powerhouse is open from the surface to the reservoir bottom at about 35 feet. Thus, the intake tower entrains water from the full depth of the water column at the location of the intake. Withdrawal of water from the photic zone can result in releases of cyanobacteria to the Klamath River downstream.

PacifiCorp has been investigating ways to isolate the surface waters of Iron Gate Reservoir since installing the first curtain on the log boom in 2009.[19] This was followed by testing a cover that was installed over the upper portion of the intake structure in 2011.[20] In 2014, a curtain was temporarily installed in the current location for a short period of time as a proof of concept exercise. In 2015, the existing curtain was installed.

Iron Gate Reservoir on August 14, 2019, Showing Algae Upstream of Curtain and Clearer Water Downstream

The purpose of the curtain is to improve the quality of near-surface waters downstream of the curtain in the Iron Gate Reservoir prior to intake entrainment. In the summer, the intake barrier curtain isolates warmer, less dense near-surface waters that contain most of the cyanobacteria, while withdrawing cooler, denser, and deeper waters from the reservoir for release to the Klamath River downstream (Figure 9).

Since 2015, studies have shown that the curtain reduces the release of near-surface waters with higher levels of cyanobacteria.

[18] Miao, E., and M. Deas. 2014. Assessment of an Intake Barrier for Water Quality Control at Iron Gate Reservoir – 2013 Study Results. Prepared for PacifiCorp Energy, prepared by Watercourse Engineering, Inc. April.

[19] Deas, M. L. and E. Miao. 2010. Exploratory velocity measurements in Iron Gate Reservoir with an acoustic doppler current profiler. Prepared for PacifiCorp. July. 14 pp.

[20] Watercourse Engineering, Inc. (Watercourse). 2013. Appendix B *in* 2012 Assessment of an intake cover for water quality control at Iron Gate Reservoir. Prepared for PacifiCorp. July.

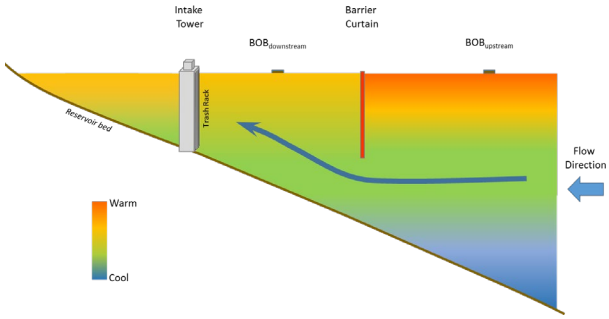

Figure 9. Conceptual Profile View of Thermal Conditions in Iron Gate Reservoir Showing the Location of the Basic Observation Buoys, Curtain, and Intake Tower

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

The focus of 2018 and 2019 data collection was to better understand the barrier and dam algal reduction and specifically, the factors that influence the curtain's effectiveness. High, medium, and low effectiveness periods were able to be defined based on epilimnetic stratification stability, the curtain depth, and other factors.

A comprehensive analysis (still in preparation as of December 2019) of all data collected from 2015 through 2018 indicates that the curtain significantly reduces the concentration of algae downstream of the curtain under periods of high-curtain effectiveness. Following from this, the analysis indicates that the curtain reduces algae loads downstream of Iron Gate Dam, too. The statistics for reduction in algae loading downstream of Iron Gate Dam are less strong, primarily because of a small sample size. Collectively, the data analysis indicates that the curtain 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.

In 2019, dissolved oxygen levels downstream of Iron Gate were studied to gain an understanding of how quickly natural reaeration is occurring after water is released from Iron Gate Dam. Analysis of these data is underway, but preliminary results indicate that water released from Iron Gate Dam reaerates within a couple of miles downstream of the dam.

5.10.4 Irrigation Efficiency Opportunities Evaluation, Phase 1

The goal of this study was to prepare high-level assessment of irrigation water conservation opportunities in the Klamath Basin that provide benefits of both water quantity management and water quality improvement. In the first phase of this effort, completed in late spring and summer of 2019, initial scoping actions were taken to better understand what relevant data are available, what coordination is already happening between stakeholders in the basin in regard to irrigation efficiency, and what projects may have already been envisioned or undertaken. As part of this effort, the following tasks were completed:

- Created a fact sheet and initial question list for basin stakeholders.
- Conducted interviews with a subset of identified stakeholders to gather data, understand specific perspective and challenges, and refine the initial contact list.
- Compiled interview notes and reference materials obtained from stakeholders.
- Summarized and presented the findings to the IMIC.

This study found that cost-benefit data were lacking on much of the irrigation efficiency work that had been completed in the basin to date. Some implemented projects have cost data, and some water quality improvement data, but rarely does a project have both. Recommendations to the IMIC included a

possible Phase 2 effort to compile the available cost and water quality data to better inform project selection under the IM 11 Priority List of Projects (PLP) funding category as well as the inclusion of cost reporting and water quality monitoring requirements in IM 11 funded projects.

The study found that projects within this PLP category that focus on discharges directly to Upper Klamath Lake/Klamath River are qualitatively understood to have the greatest water quality benefit with the least impact on tailwater reuse already in place. Some irrigation efficiency projects currently identified and pursued by stakeholders lack funding for pre-implementation actions (studies/permitting) or are constrained by the geographic scope of available grant opportunities. It was also suggested that IM 11 PLP grants be structured flexibly to avoid geographic constraints and to be best leveraged with other available funding in the basin.

5.10.5 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 NEPA process for the full wetland restoration design.

During the 2018-2019 Implementation Report update period, TU has collaborated with project partners to understand how the water quality review can best inform larger-scale restoration in the vicinity of the project. Initial nutrient removal estimates for the Agency-Barnes area have been generated. Once the project alternatives are selected, TU will coordinate evaluation of those alternatives from a water quality improvement perspective.

5.10.6 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 the species. 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 filter 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 conducts laboratory testing to assess the effectiveness and lifespan of different filtration media options. Phase 2 includes a site-specific design of a pilot filtration system. Phase 3 implements and tests a pilot system on a farm located adjacent to Upper Klamath Lake.

As of December 2019, a contract had been completed between PacifiCorp and the Klamath Watershed Partnership, a site visit was conducted on November 5 and 6, 2019, local wood waste was collected for use in making the biochar, rock quarry and water samples were collected, laboratory work was undertaken to inform design and the media mix, and discussions were begun with landowners to select a pilot facility.

5.10.7 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 very well with the PLPs (Section 5.10.9). Because of this connection with the PLPs, PacifiCorp has been providing IM 11 funds to help support this work since 2017. During 2018-2019, partners received a draft final plan that will be reviewed and finalized before being distributed to the public. They also submitted an OWEB stakeholder engagement grant application to support action plan implementation in 2020.

5.10.8 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 in 2018-2019 is diffuse source treatment wetlands (DSTWs). These are small wetlands that are constructed in specific locations where they can capture runoff, increase transit time, and where vegetation can 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. To date, site selection has been made, DSTWs have been designed, and pre-implementation monitoring is underway.

5.10.9 Development of a Priority List of Projects[21]

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. The second half of IM 11 discusses the development of a PLP that could be implemented following the KRRC's acceptance of a FERC surrender order.

In the fall of 2016, SWRCB suggested that the IMIC begin to develop a PLP and not wait for the KRRC to accept the surrender order or for FERC to issue the surrender order. This was a reasonable request in part because it allowed a practical and structured approach to developing the PLP. The first phase of work included a focused subgroup of the IMIC and PacifiCorp which determined that four types of projects,

[21] CH2M. 2017. Interim Measures Implementation Committee: Interim Measure 11 – Development of a priority list of projects: Phase 1 Final Report. Prepared for PacifiCorp. June. 56 pp.

when considered collectively, would result in water quality improvement. These included (in no particular order) DSTWs, Natural Wetlands Restoration, Riparian Fencing and Grazing Management, and Irrigation Efficiency and Water Management.

In the second phase, PacifiCorp continued to work with the IMIC subgroup to refine the list of project categories, allocate funding to the selected list, and develop a conceptual governance structure for implementation of the PLP. PacifiCorp completed documentation of the second phase of the PLP and refined the conceptual governance structure.

In the third phase, completed in 2018-2019, PacifiCorp and the IMIC collaborated to select a fiscal agent. The fiscal agent is the organization that actually holds the IM 11 funds, solicits projects, and administers funds to selected projects. A questionnaire was distributed to candidate fiscal agents, a subgroup of those was interviewed by the IMIC on the phone, and a final decision was made based on consensus with the IMIC following IMIC interviews of the top two candidates. Ultimately, OWEB was selected to be the fiscal agent. The Phase 2 governance structure and draft request for proposals were revised to reflect this selection. The third phase of the PLP was completed and sent to the IMIC for review on June 12, 2019. No comments were received from the IMIC and the PLP Phase 3 Report is considered final.

The KHSA requires approval of the final PLP by SWRCB, NCRWQCB, and ODEQ. These organizations are coordinating on approval processes. Once that is complete, 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:

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

Gaging data for the Spencer Creek gage are available at the following website:

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.

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.

PacifiCorp has now completed 11 years (as of December 2019) 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 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 2018 and 2019, the frequency of and locations for baseline nutrient sampling generally did not change from the 2017 program, nor did the constituents sampled. The baseline program sampling for phytoplankton in 2018 and 2019 continued to occur monthly from May-October and only the Link River Dam site and Klamath below Iron Gate Dam were sampled more frequently.

Similarly, there were no changes to the 2018 or 2019 public health sampling program compared to the 2017 program. 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. Although fewer advisories were issued for Upper Klamath Lake in 2018 and 2019 (three and two, respectively), the advisories remained in place from August to October or November.

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, 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 KHSA in 2016, formation of the KRRC, and filing of the application to transfer ownership to the KRRC, there is renewed

interest in determining the future of Iron Gate Hatchery. PacifiCorp continues to work with CDFW, NMFS, KRRC, and other stakeholders to evaluate other locations, changes in fish production goals, and solutions to the water supply challenges that could allow for the continued production of hatchery fish after the removal of Iron Gate Dam.

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. The objective of the measures was to reduce damage to sensitive resources caused by unauthorized use of off-highway vehicles.
- 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. In 2018, BLM graded and took other maintenance actions on 4.5 miles the John C. Boyle Road/Copco Big Bend Road (road 40-6E-1.2). Additionally, BLM graded and conducted maintenance on approximately 6 miles of the Topsy Grade Road (3137) from Highway 66 to the Topsy Campground and continuing south along the Topsy Grade Road to the BLM property line.
- 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.