

**UNITED STATES OF AMERICA  
BEFORE THE  
FEDERAL ENERGY REGULATORY COMMISSION**

**Klamath River Renewal Corporation  
PacifiCorp**

**Project No. 14803**

**AMENDED APPLICATION FOR SURRENDER OF LICENSE FOR  
MAJOR PROJECT AND REMOVAL OF PROJECT WORKS AND  
REQUEST FOR EXPEDITED REVIEW**

**EXHIBIT A.  
PROJECT DESCRIPTION**

**I. Project Works.**

The Project is described in the Order Amending License. In that order, the Commission approved a revised Exhibit M for the Project.<sup>29</sup> Exhibit M is incorporated herein by this reference as the description of the Project Works.

**II. Lands of the United States.**

**Federal Lands Currently Occupied by the Lower Klamath Project:** The federal lands listed below are included within the historic boundary of the Klamath Project, FERC No. 2082. Table A-1 describes only those federal lands that are currently within the Project boundary of the Project. Acreages are approximations and are based upon data submitted by PacifiCorp in the New License Application.

**Federal Lands  
Table A-1**

<b>Meridian</b>	<b>Township/Range/ Section</b>	<b>Owner</b>	<b>Area (acres)</b>	<b>Project</b>
Willamette	40S /6E/1	BLM	17.0	J.C. Boyle
Willamette	40S/6E/12	BLM	25.5	J.C. Boyle
Willamette	40S/6E/13	BLM	31.8	J.C. Boyle
Willamette	40S/6E/14	BLM	5.7	J.C. Boyle
<b>Total J.C. Boyle</b>			<b>82</b>	<b>J.C. Boyle</b>
Mt. Diablo	48N/4W/34	BLM	0.7	Copco
<b>Total Copco</b>			<b>0.7</b>	<b>Copco</b>
Mt. Diablo	47N/5W/4	BLM	23.9	Iron Gate
Mt. Diablo	47N/5W/4	BLM	39.8	Iron Gate
<b>Total Iron Gate</b>		<b>BLM</b>	<b>63.7</b>	<b>Iron Gate</b>
<b>Total Lower Klamath Project</b>		<b>BLM</b>	<b>146.4</b>	<b>All</b>

<sup>29</sup> Order Amending License at ¶ 13.

### **III. Definite Decommissioning Plan.**

The Proposed Action is described in the Definite Decommissioning Plan which is comprised of a narrative plan (**Exhibit A-1**) and 60% design specifications (**Exhibit A-2**). The Proposed Action is to accomplish the physical removal of the Lower Klamath Project and achieve a free-flowing condition and volitional fish passage, site remediation and restoration, and measures to avoid or minimize adverse downstream impacts. To create a free-flowing river to allow volitional fish passage, the Proposed Action includes the deconstruction of the J.C. Boyle Dam and Powerhouse, Copco No. 1 Dam and Powerhouse, Copco No. 2 Dam and Powerhouse, and Iron Gate Dam and Powerhouse, as well as associated features. Associated features vary by development, but generally include powerhouse intake structures, embankments, and sidewalls, penstocks and supports, decks, piers, gatehouses, fish ladders and holding facilities, pipes and pipe cradles, spillway gates and structures, diversion control structures, aprons, sills, tailrace channels, footbridges, powerhouse equipment, distribution lines, transmission lines, switchyards, original cofferdam, portions of the Iron Gate Fish Hatchery, residential facilities, and warehouses. Facility removal will be completed within an approximately 20-month period.

The removal schedule includes a 9-month period of site preparation and partial drawdown at Copco No. 1. To access the dams for deconstruction, the Renewal Corporation will perform a controlled reservoir drawdown using both existing and modified infrastructure for approximately four to six months depending on water year type. Dam demolition will occur over approximately six to eight months using multiple techniques, including blasting and hydraulic excavators. In addition, road maintenance, improvements, and rehabilitation; culvert replacements; and bridge protection, strengthening, or replacement will occur at numerous locations to support construction activities. The Proposed Action also involves the relocation of the City of Yreka water conveyance pipeline, Fall Creek Hatchery improvements, as well as the removal of recreation facilities adjacent to the reservoirs.

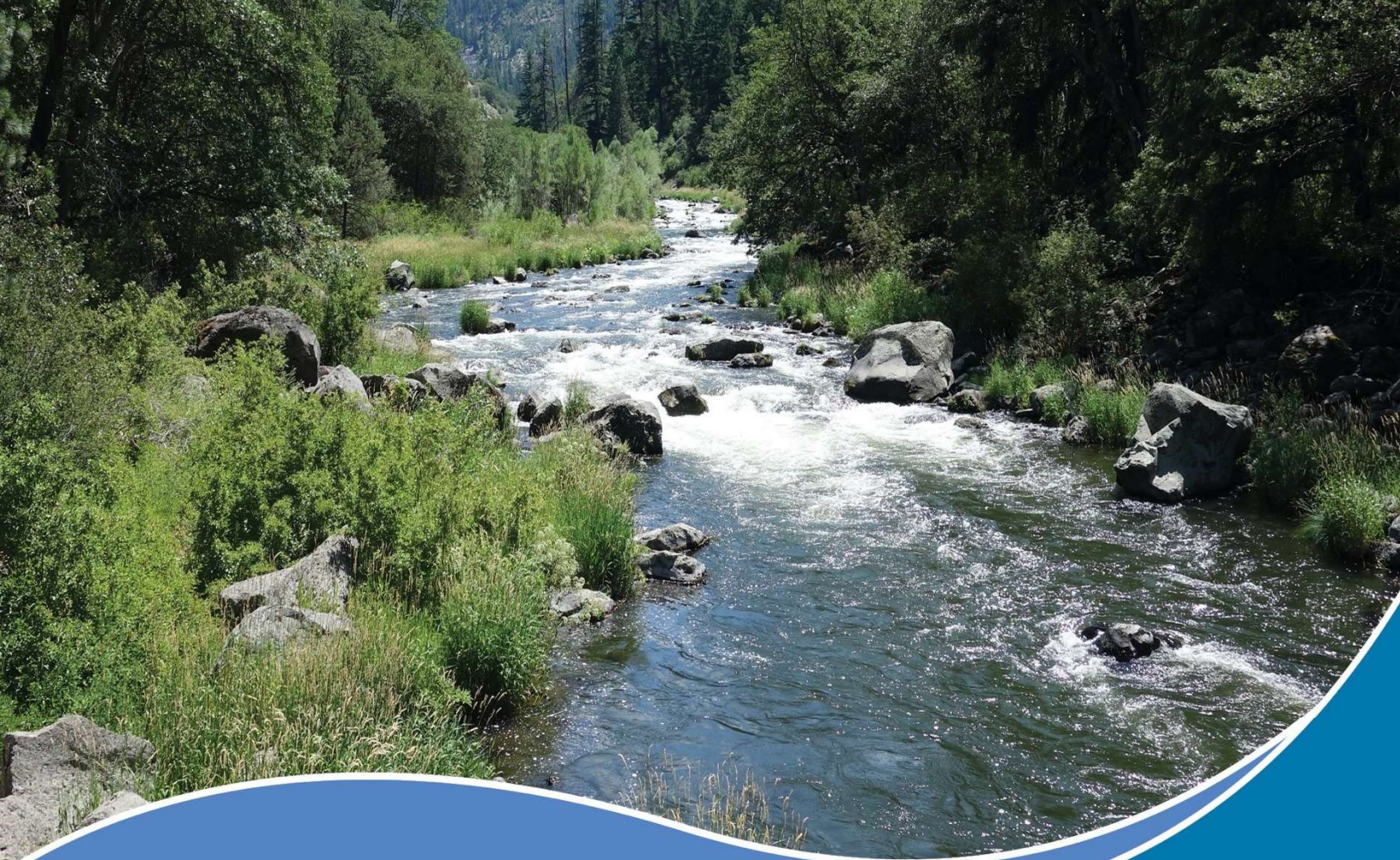
To meet the Proposed Action objective for volitional fish passage, a restoration program will be implemented in the previously inundated areas in the former reservoir footprints, on the mainstem of the Klamath River, and on high-priority tributaries within the original Project reservoirs. Such restoration will involve assisted sediment evacuation and residual sediment stabilization; tributary reconnection, selective post-drawdown grading to provide volitional fish passage, revegetating through native plantings; and enhancing aquatic habitat. The Proposed Action includes management measures as listed in Table 3-1 of **Exhibit E-1**. These measures are drawn from the Final EIR, Mitigation Monitoring and Reporting Plan (MMRP), the SWRCB 401 Water Quality Certification and the ODEQ 401 Water Quality Certification. Table 3-2 of **Exhibit E-1** summarizes management plans that will accompany the Definite Decommissioning Plan or be developed as described in **Exhibit E-1**.

The Definite Decommissioning Plan was prepared at the direction of, and exclusively for, the Renewal Corporation in support of its September 2016 License Surrender Application and this Amended Surrender Application. PacifiCorp provided technical support to this Amended Surrender Application; however, PacifiCorp has not been involved in the preparation or technical review of this Definite Decommissioning Plan. PacifiCorp makes no representations or warranties, express or implied, about the accuracy, suitability, or soundness of this Definite Decommissioning Plan. All statements, views, opinions, interpretations, and analyses in this Definite Decommissioning Plan are solely and exclusively attributable to the Renewal Corporation and are based on facts and information that are known to the Renewal Corporation

**Exhibit A-1**

**Definite Decommissioning Plan**

**November 2020**



# Lower Klamath Project

**Exhibit A-1 Definite Decommissioning Plan  
Amended Surrender Application  
FERC No. 14803**

**November 2020**

  
**KLAMATH  
RIVER RENEWAL  
CORPORATION**

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# ACRONYMS AND ABBREVIATIONS

ARMP	Aquatic Resources Management Plan
BMP	best management practices
BOC	Lower Klamath Project Independent Board of Consultants
CalFire	California Department of Forestry and Fire Protection
Caltrans	California Department of Transportation
CDFG	California Department of Fish and Game (now CDFW)
CDFW	California Department of Fish and Wildlife
CEQA	California Environmental Quality Act
CESA	California Endangered Species Act
cfs	cubic feet per second
CHP	California Highway Patrol
CMP	Construction Management Plan
cy	cubic yard
DDP	Definite Decommissioning Plan
DSOD	Division of Safety of Dams (CA)
EL	elevation
ESA	Endangered Species Act
ESCP	Erosion and Sediment Control Plan
EIR	Environmental Impact Report
EIS	Environmental Impact Statement
ESU	Evolutionarily Significant Unit
ft	foot or feet
GMP	Guaranteed Maximum Price
FERC	Federal Energy Regulatory Commission
FEIR	Final Environmental Impact Report (CA)
FCH	Falls Creek Hatchery
HMOP	Hatchery Management and Operations Plan
HMP	Hazard Mitigation Plan
HPMP	Historic Properties Management Plan
HSP	Health and Safety Plan
IEV	Invasive Exotic Vegetation
IHOP	Interim Hydro Operations Plan
KHP	Klamath Hydroelectric Project, FERC No. 2082
KHSA	April 6, 2016 Amended Klamath Hydroelectric Settlement Agreement
kV	kilovolt
MOA	Memorandum of Agreement

MOU	Memorandum of Understanding
MSL	Mean Sea Level
MUTCD	Manual on Uniform Traffic Control Devices
MV	Medium Voltage
MW	megawatt
NCRWQCB	North Coast Region Water Quality Control Board
NPDES	National Pollutant Discharge Elimination System
ODEQ	Oregon Department of Environmental Quality
ODF	Oregon Department of Forestry
ODFW	Oregon Department of Fish and Wildlife
ODOT	Oregon Department of Transportation
ODSL	Oregon Division of State Lands
PFM	Potential Failure Mode
PFMA	Potential Failure Modes Analysis
Project	Lower Klamath Project, FERC No. 14803
Renewal Corporation	Klamath River Renewal Corporation
RAMP	Reservoir Area Management Plan
RDDP	Reservoir Drawdown& Diversion Plan
RFP	Recreation Facilities Plan
RM	River Mile
SDRP	Sediment Deposit Remediation Plan
SHARP	Spawning Habitat Availability Report and Plan
SONCC	Southern Oregon Northern California Coast
SPCCP	Spill Prevention, Control, and Countermeasure Plan
SWRCB	California State Water Resources Control Board
TWMP	Terrestrial and Wildlife Management Plan
TCR	traditional cultural resources
TMP	Traffic Management Plan
USGS	United States Geological Survey
WDHMP	Waste Disposal and Hazardous Materials Plan
WQMP	Water Quality Management Plan
WSEL	Water Surface Elevation
WSMP	Water Supply Management Plan

A decorative banner with a wavy, ribbon-like shape. It features a dark blue outer layer and a lighter blue inner layer, separated by a thin white line. The banner curves upwards at both ends.

# **Chapter 1: Introduction**

# 1 INTRODUCTION

## 1.1 Purpose of the Definite Decommissioning Plan

The Lower Klamath River Project (Lower Klamath Project) (FERC No. 14803) consists of four hydroelectric developments on the Klamath River: J.C. Boyle, Copco No. 1, Copco No. 2, and Iron Gate (Figure 1-1). The Klamath River Renewal Corporation (Renewal Corporation) has applied to the Federal Energy Regulatory Commission (FERC) to surrender the license for the Lower Klamath Project for the purpose of implementing the Klamath River Hydroelectric Settlement (KHSA). The Definite Decommissioning Plan (DDP) is filed as Exhibit A-1 of the Amended Surrender Application. This DDP is the Renewal Corporation's comprehensive plan to physically remove the Lower Klamath Project and achieve a free-flowing condition and volitional fish passage, site remediation and restoration, and avoidance of adverse downstream impacts.

This DDP describes how the Renewal Corporation will implement, upon a license surrender order, the activities associated with the Proposed Action. Exhibit A-2 presents 60% design specifications to implement the Proposed Action. This DDP includes a narrative discussion of those 60% design specifications as well as the results of value engineering that will be presented in our 90% Design submittal, which was submitted September 18, 2020 to the Lower Klamath Project Board of Independent Consultants (BOC) for its informal review.

Concurrent with the filing of its Amended Surrender Application, the Renewal Corporation requested formal review of the 90% Design Specifications by the BOC, FERC and the California Division of Safety of Dams (DSOD). The Amended Surrender Application will be updated (as needed) on February 26, 2021 based on the 90% Design Specifications and any comments received from the BOC, FERC and DSOD.

## 1.2 Proposed Action

To create a free-flowing river to allow volitional fish passage, the Proposed Action includes the deconstruction of the J.C. Boyle Dam and Powerhouse, Copco No. 1 Dam and Powerhouse, Copco No. 2 Dam and Powerhouse, and Iron Gate Dam and Powerhouse, as well as associated features. Associated features vary by development, but generally include powerhouse intake structures, embankments, and sidewalls, penstocks and supports, decks, piers, gatehouses, fish ladders and holding facilities, pipes and pipe cradles, spillway gates and structures, diversion control structures, aprons, sills, tailrace channels, footbridges, powerhouse equipment, distribution lines, transmission lines, switchyards, original cofferdam, portions of the Iron Gate Fish Hatchery, residential facilities, and warehouses.

The removal will be completed within an approximately 20-month period. The removal schedule includes a 9-month period of site preparation and partial drawdown at Copco No. 1. To access the dams for deconstruction, the Renewal Corporation will perform a controlled reservoir drawdown using both existing and modified infrastructure for approximately four to six months depending on water year type. Dam demolition will occur

over approximately six to eight months using multiple techniques, including contained blasting and hydraulic excavators.

Road maintenance, improvements, and rehabilitation; culvert replacements; and bridge protection, strengthening, or replacement will occur at numerous locations within the Lower Klamath Project Limits of Work<sup>1</sup> to support construction activities. The Proposed Action involves the relocation of the Yreka water conveyance pipeline, Fall Creek Hatchery improvements, as well as the removal of recreation facilities adjacent to the reservoirs.

To meet the Project objective for volitional fish passage, a restoration program will be implemented in the previously inundated areas in the former reservoir footprints, on the mainstem of the Klamath River, and on high-priority tributaries within the original Project reservoirs. Such restoration will involve assisted sediment evacuation and residual sediment stabilization; tributary reconnection, selective post-drawdown grading to provide volitional fish passage, revegetating through native plantings; and enhancing aquatic habitat.

The DDP describes the Proposed Action in three phases.

Phase 1. Pre-Drawdown includes all activities up to the initiation of drawdown.

Phase 2. Drawdown includes all activities during the initial drawdown which will occur approximately from January 1- March 15 and the final reservoir drawdown which will occur when the water surface elevation is as the historic coffer dam otherwise considered the Klamath River historic channel. This phase is immediately prior to the physical removal of the facilities included in the Proposed Action

Phase 3. Post-Drawdown. Phase 3A: Post Drawdown Facility Removal includes all activities associated with removing the physical facilities. Phase 3B: Post-Drawdown Site Restoration and Ancillary Site Improvements includes all activities in the Proposed Action occurring post-facility removal

Phase 1 and Phase 2 are summarized in Chapter 2. These activities conclude with the full drawdown of the reservoirs and preparation for the physical facility removal and subsequent restoration. Phase 3A is summarized in Chapter 3 and includes the physical removal of the facilities from the river and in-channel grading. Phase 3B is summarized in Chapter 4 and includes the site restoration and other ancillary work (e.g., recreation sites, Yreka water line, and fish hatchery activities) associated with the Proposed Action. Chapter 5 provides the proposed schedule for the decommissioning of the Lower Klamath Project from pre-drawdown activities (Phase 1) through site restoration (Phase 3B).

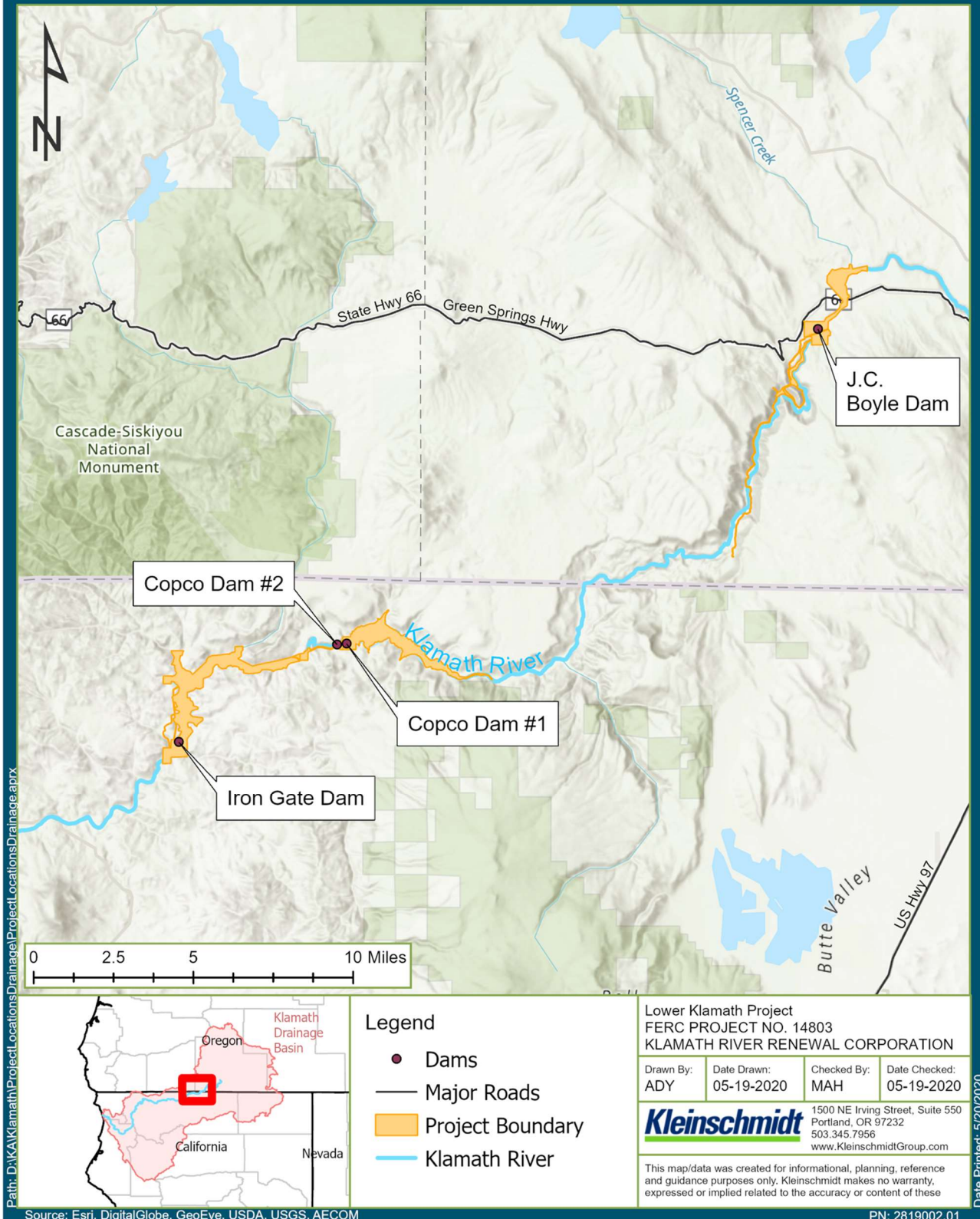
Chapter 6 *Management Plan and Measures* summarizes the Renewal Corporation's management plans and the specific proposed measures and monitoring and restoration activities, as applicable, for each phase of the Lower Klamath Project removal and restoration. This DDP summarizes the narrative and specifications in the 60% Design Report and 60% Design Drawings, which are Exhibit A-2 of the Amended Surrender Application.

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<sup>1</sup> The Limits of Work is a geographic area that encompasses the activities in the Proposed Action and may or may not expand beyond the FERC boundary associated with the Lower Klamath Project.

The DDP describes a scope of work that is “shovel ready” and under contract and provides FERC with a complete application and decommissioning plan on which to grant regulatory approval for the license surrender and Proposed Action.

# Project Location



**FIGURE 1-1 LOCATION OF LOWER KLAMATH PROJECT**



### **1.2.1 Summary of Source Documents**

The source documents for this DDP include the 60% Design Report and 60% Design Drawings (Exhibit A-2). The DDP is further informed by the Definite Plan Report (KRRC 2018), the State of California Water Resources Control Board's (SWRCB) Final Environmental Impact Report and California Environmental Quality Act Findings and Statements (SWRCB 2020a, 2020b), and the State of Oregon Department of Environmental Quality's (ODEQ) Evaluation and Findings Report (ODEQ 2018). FERC's Final Environmental Impact Statement for relicensing (FERC 2007), as well as PacifiCorp's implementation reports for KHSA interim measures (Exhibit B-1)<sup>2</sup>, are the primary source document for baseline conditions. Exhibit E provides summary level effects analyses on environmental, social, and recreational resources, along with a summary of environmental measures and management plans associated with the Proposed Action.

Since this is a progressive design-build project, the Renewal Corporation has continuously refined the engineering designs. In addition, the Lower Klamath Project has been guided by a Board of Consultants appointed by FERC (FERC Letter Order, May 22, 2018). This progressive approach will result in modifications of the 60% design (Exhibit A-2) to support the development of the Guaranteed Maximum Price (GMP) with the construction contractor. Therefore, the Renewal Corporation anticipates variances from the 60% design. These have been footnoted in their representative sections below (see Section 1.3). In summary, the changes occur at Copco 1 with the installation of only one adit at the base of the dam and at Iron Gate with the change from significant tunnel rehabilitation to only making minor gate improvements and modifications to the outlet tunnel. The change at Iron Gate results in the change at Copco 1. The Iron Gate change is necessary as the uppermost intake gate for the tunnel cannot accommodate high flow velocities; therefore, extension tunnel reinforcement is not needed. The Renewal Corporation will file 90% design with FERC that will incorporate these changes.

## **1.3 Summary of Existing Facilities**

The Lower Klamath Project is described in FERC's Order Amending License and Deferring Consideration of Transfer Application (March 15, 2018), 162 FERC ¶ 61,236 (2018) ("Order Amending License"). In that order, FERC approved a revised Exhibit M for the Lower Klamath Project. Exhibit M (as approved by the Order Amending License) is incorporated herein by this reference as the description of the of the Lower Klamath Project works.

### **1.3.1 J.C. Boyle**

The J.C. Boyle development is located between river mile (RM) 224.7 (dam) and RM 220.4 (powerhouse) on the Klamath River in Oregon (PacifiCorp 2004). The development includes the dam and intake structure, reservoirs, water conveyance system, scour hole, and the powerhouse and substation. The J.C. Boyle Dam is a 68-foot-tall concrete and earth fill dam that is approximately 700-foot-long. The dam impounds approximately 3495 acre-feet of water, at a reservoir EL. 3,796 ft in a narrow reservoir with a surface area of approximately 420 acres (FERC 2018). A concrete pool and weir fish ladder (approximately 569-feet-long with

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<sup>2</sup> Exhibit B-1 is PacifiCorp's most recent KHSA Implementation Report (April 2020). Past KHSA Implementation Reports are available for reference at: <https://www.pacificorp.com/energy/hydro/klamath-river/khsa-implementation.html>.

63 pools) is located along the abutment wall between the embankment and concrete sections to provide upstream fish passage at the dam (PacifiCorp 2004). J.C. Boyle Reservoir supplies water through a concrete conveyance system comprised of a 600-foot siphon and pipeline, a 2-mile-long concrete power canal, a 1,660-foot long low-pressure tunnel and two 956-foot-long by 10.5-foot—diameter surface mounted high-pressure steel penstocks. The conveyance system extends from the to a powerhouse containing two units with an authorized capacity of 98 megawatts (MW) (FERC 2018). There is also an eroded scour hole downstream of the forebay structure. The development includes a switchyard, substation, and transmission lines (Figure 1-2).

The recreation facilities at J.C. Boyle include the Topsy Campground and boat launch, Pioneer Park east and west units and boat launches, Spring Island whitewater boating launch, and numerous dispersed shoreline recreations sites (Figure 1-3).



Credit: River Design Group in KRRC 2018

**PHOTO 1 OVERVIEW OF J.C. BOYLE DEVELOPMENT**



Source: KRRC 2018

**PHOTO 2 J.C. BOYLE POWERHOUSE**



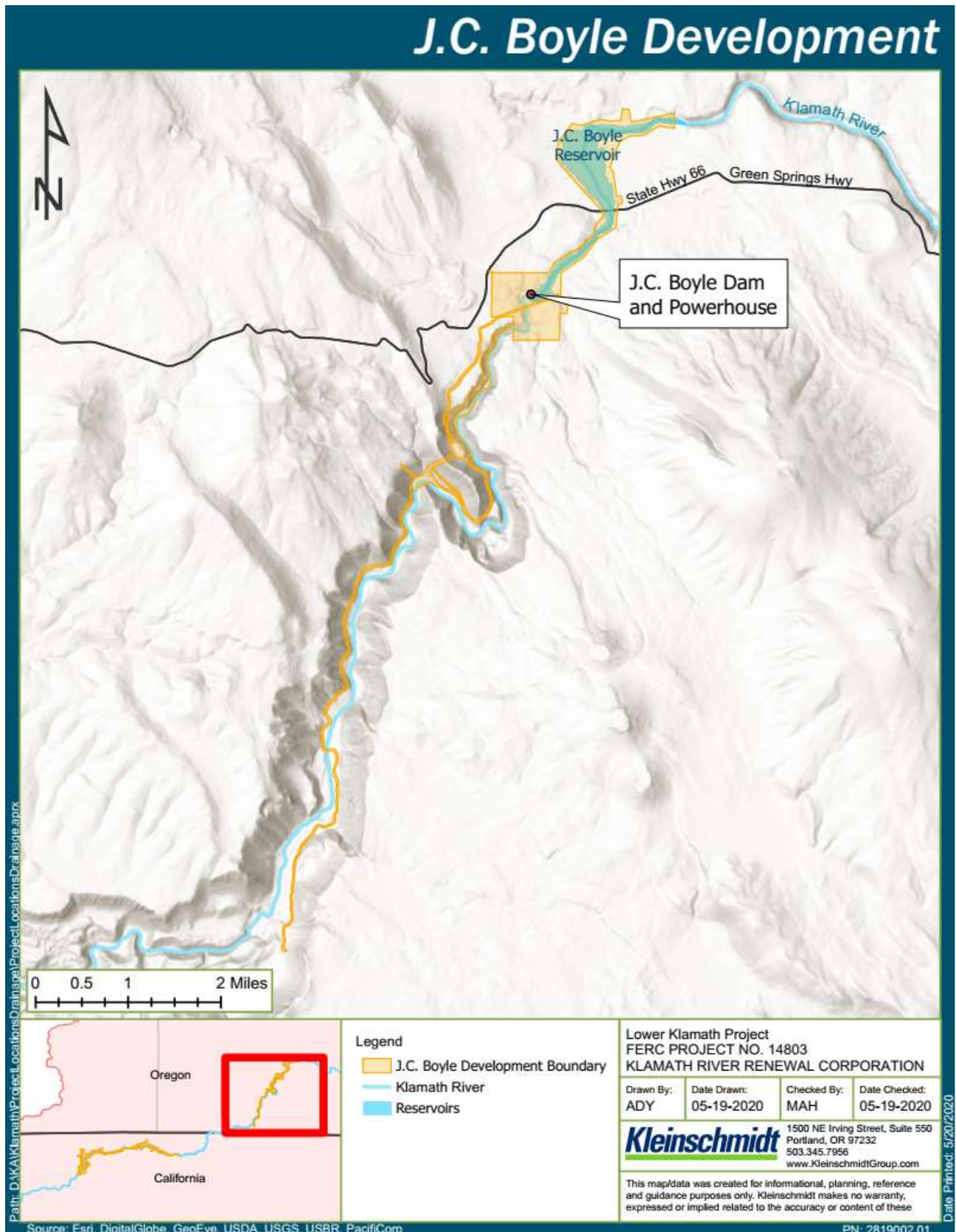
Source: KRRC 2018

**PHOTO 3 J.C. BOYLE PENSTOCKS**

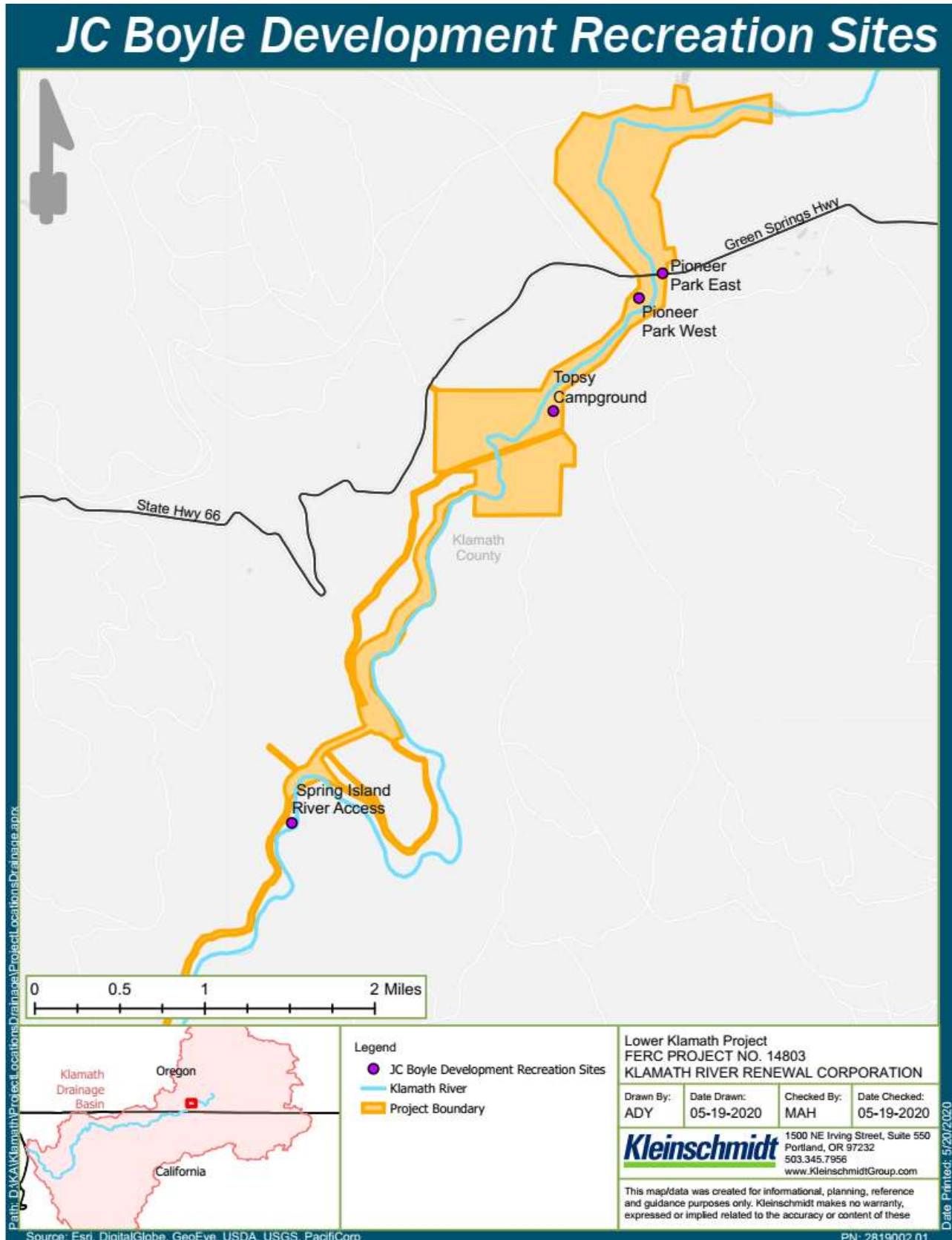


Source: KRRC 2018

**PHOTO 4 J.C. BOYLE FOREBAY OVERFLOW CHUTE  
AND UPPER PORTION OF SCOUR HOLE**



**FIGURE 1-2 J.C. BOYLE DEVELOPMENT EXISTING FACILITIES**



**FIGURE 1-3 J.C. BOYLE DEVELOPMENT RECREATION SITES**

### 1.3.2 Copco No. 1

The Copco No. 1 dam and associated facilities are located on the Klamath River between RM 204 and RM 198 in Siskiyou County, California. The Copco No. 1 hydroelectric facilities consist of a 230-foot-high (measured from the lowest point of the foundation excavation to the spillway crest) by 415-foot-long dam with a spillway section containing 13 Tainter gates and an abandoned and concrete-plugged diversion tunnel and concrete inlet control structure. The reservoir is 1,000 surface acres and contains about 33,724 acre-feet of total storage capacity at elevation 2,607.5 (FERC 2018). The two 10-foot-diameter (reducing to 8-foot-diameter) steel penstocks feed Unit No. 1 in the powerhouse. The right intake houses four vertical-lift gates. A single, 14-foot-diameter (reducing to two 8-foot-diameter) steel penstock closet to the river feeds Unit No. 2. The powerhouse contains two units at an authorized capacity of 20 MW. The development also contains a switchyard, substation, and transmission lines (FERC 2018) (Figure 1 4). The recreation facilities at Copco No. 1 include Mallard and Copco Cove with boat launches (Figure 1 5).



Source: KRRC 2018

**PHOTO 5 COPCO NO. 1 DAM AND POWERHOUSE**



Source: KRRC 2018

**PHOTO 6 COPCO NO. 1 DIVERSION TUNNEL  
DOWNSTREAM PORTAL**



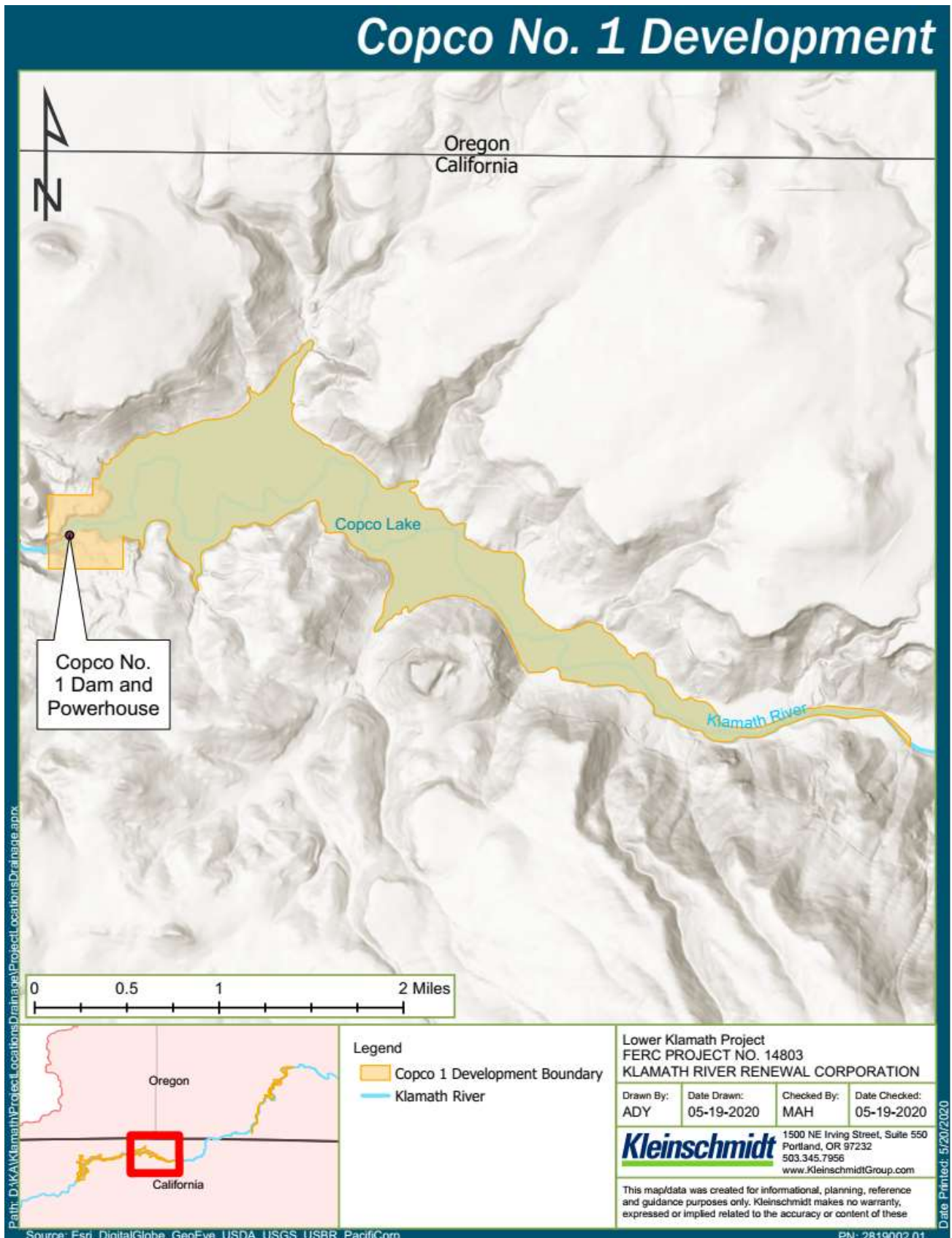
Source: KRRC 2018

**PHOTO 7 COPCO No. 1 10-FT (LEFT AND MIDDLE)  
414-FT (RIGHT) PENSTOCKS**



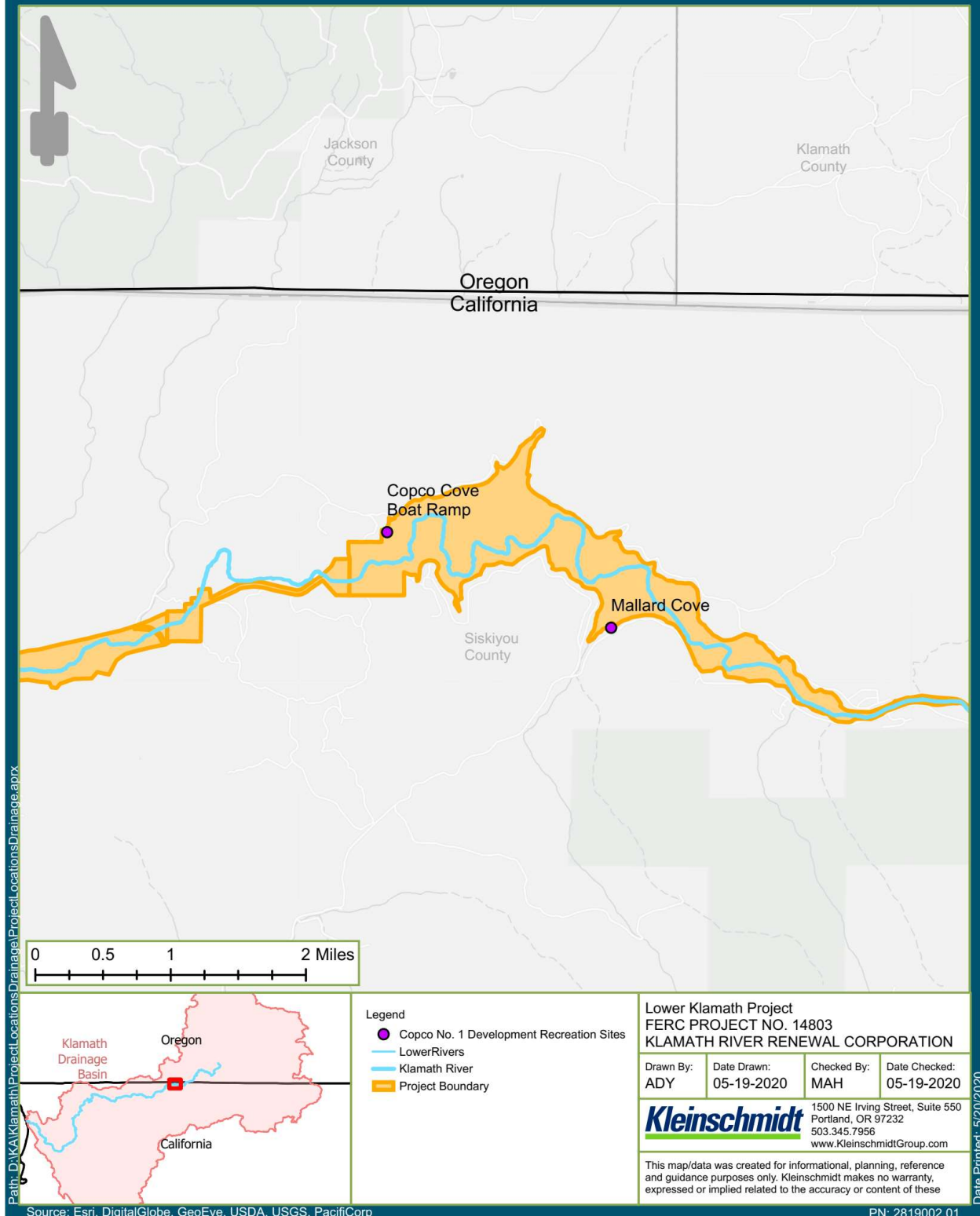
Source: KRRC 2018

**PHOTO 8 COPCO No 1 POWERHOUSE**



**FIGURE 1-4 COPCO NO. 1 EXISTING FACILITIES**

# Copco No. 1 Development Recreation Sites



**FIGURE 1-5 COPCO NO. 1 DEVELOPMENT RECREATION SITES**



### 1.3.3 Copco No. 2

The Copco No. 2 development powerhouse is located immediately downstream of Copco No. 1 at RM 198.3 in California. The Copco No. 2 reservoir is small (approximately 40-acres), having a storage capacity of 73 acre-feet at EL. 2,483 ft) and is located immediately downstream of Copco No. 1 dam. The Copco No. 2 dam is a 33-foot-tall concrete gravity diversion dam with a 132-foot-long earth fill embankment section at the right abutment. The development also includes a 145 foot long overflow spillway with five 26- by 11-foot radial (Tainter) gates, and a 4,863-foot-long water conveyance system with a 2,440-foot concrete lined tunnel, 1,313-foot wood-stave penstock, and a second 1,110-feet of concrete lined tunnel and two steel penstocks approximately 375-feet-long, and a surge tank (FERC 2018). The Copco No. 2 Powerhouse has two units, and an authorized capacity of 27 MW (FERC 2018). The Copco No. 2 development also includes a switchyard, substation, and transmission lines. The bypass reach is approximately 1.5 miles long (Figure 1-6).

The Copco 2 development does not contain recreation facilities accessible by the public (PacifiCorp 2004).



Source: KRRRC 2018

**PHOTO 9 COPCO No. 2 DAM  
FROM DOWNSTREAM SIDE**



Source: KRRRC 2018

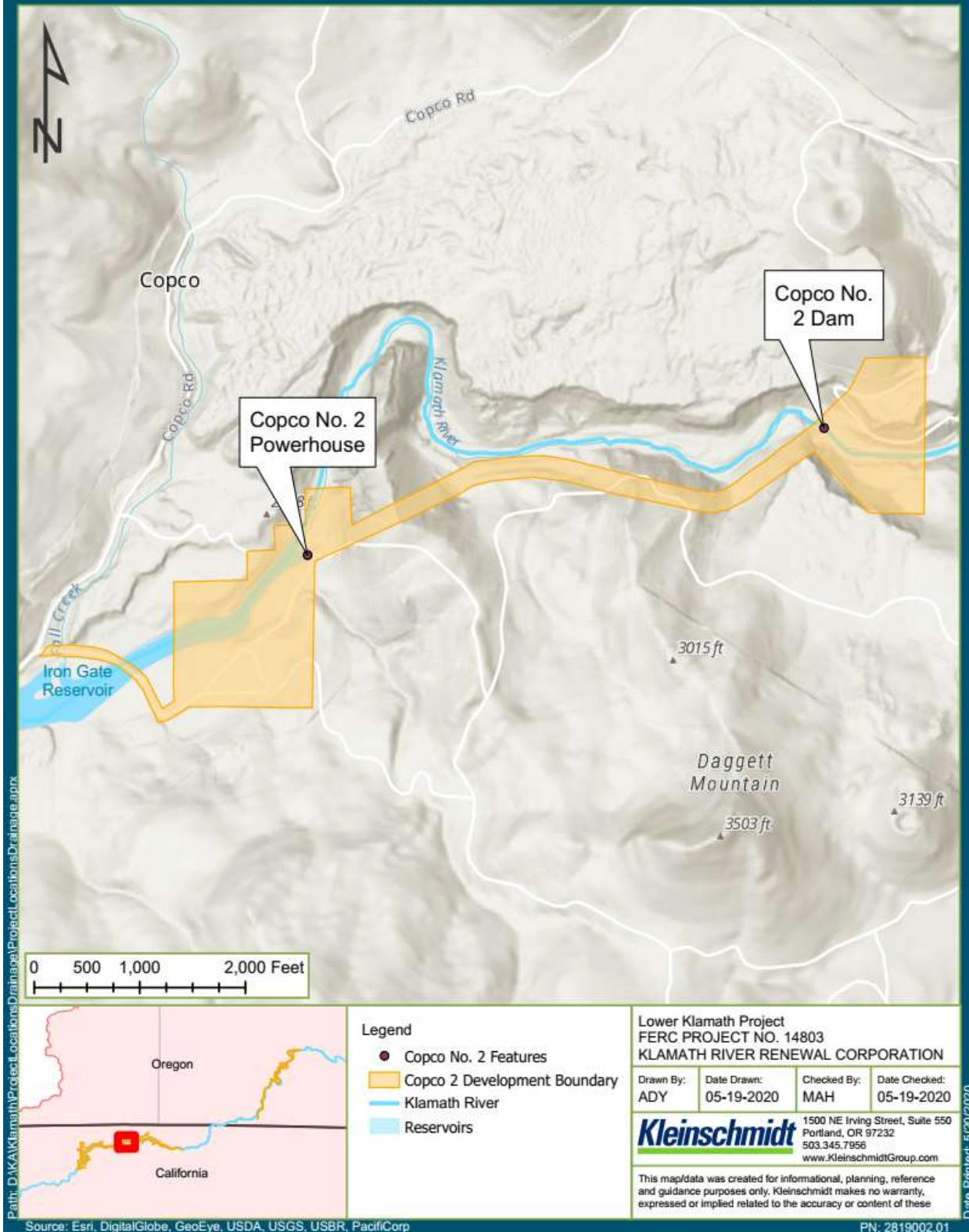
**PHOTO 10 COPCO No. 2 POWERHOUSE**



Source: KRRRC 2018

**PHOTO 11 COPCO No. 2 WOOD-STAVE PENSTOCK**

# Copco No. 2 Development



**FIGURE 1-6 COPCO NO. 2 DEVELOPMENT EXISTING FACILITIES**

### 1.3.4 Iron Gate

The Iron Gate facilities comprise the farthest downstream Lower Klamath Project development in California located between RM 196.8 (dam) and RM 190.0 (powerhouse). The dam and associated facilities consist of an approximately 944 surface-acre reservoir with 58,794-acre-feet of storage capacity at elevation 2,328.0 (FERC 2018). The dam has a height of 189 feet from the rock foundation to the dam crest at elevation 2,343.0 feet mean sea level (msl). Iron Gate also has fish trapping and holding facilities located on the random fill area at the dam toe. The top of the random fill area is at elevation 2,189.0 feet msl. High (elevation 2,310.0 feet msl) and low-level (EL. 2,250 ft msl) intakes for the fish facility water are incorporated into the dam. In 2003, PacifiCorp modified Iron Gate Dam to raise the dam crest elevation from EL. 2,343-ft msl to El. 2348-ft msl. The modifications included construction of a sheetpile wall extension along the dam crest, anchored into the existing dam structure. Additional riprap materials were placed on the upstream face of the dam to protect those areas inundated by higher reservoir elevations. This work included shotcrete protection at the top of the spillway and spillway chute (PacifiCorp 2004).

The spillway crest is 727 feet long and consists of a concrete ogee and slab placed over the excavated rock ridge. The upper part of the channel is partly lined with concrete. At the end of the chute, a flip-bucket terminal structure is located approximately 2,150-feet downstream of the toe of the dam (PacifiCorp 2004). The Iron Gate Powerhouse has one unit with an authorized capacity of 18 MW, a switchyard, substation, and transmission lines. The powerhouse is located at the base of the dam on the left bank.

The Iron Gate development also includes the Iron Gate fish hatchery, which raises steelhead, coho salmon, and Chinook salmon, and includes a fish trapping and holding facility. The hatchery complex includes an office, incubator building, rearing ponds, fish ladder with trap, visitor information center, and employee residences. Up to 50 cubic feet per second (cfs) is diverted from the Iron Gate reservoir to supply the 32 raceways and fish ladder. The hatchery is operated by the California Department of Fish and Wildlife (CDFW) (PacifiCorp 2004).

Recreation facilities at Iron Gate include the Fall Creek day-use area and boat launch, campgrounds, and other boat launch areas and dispersed shoreline sites (Figure 1-7).



Source: KRRRC 2018

**PHOTO 12 IRON GATE FISH HOLDING TANKS AND  
SPAWNING BUILDING**



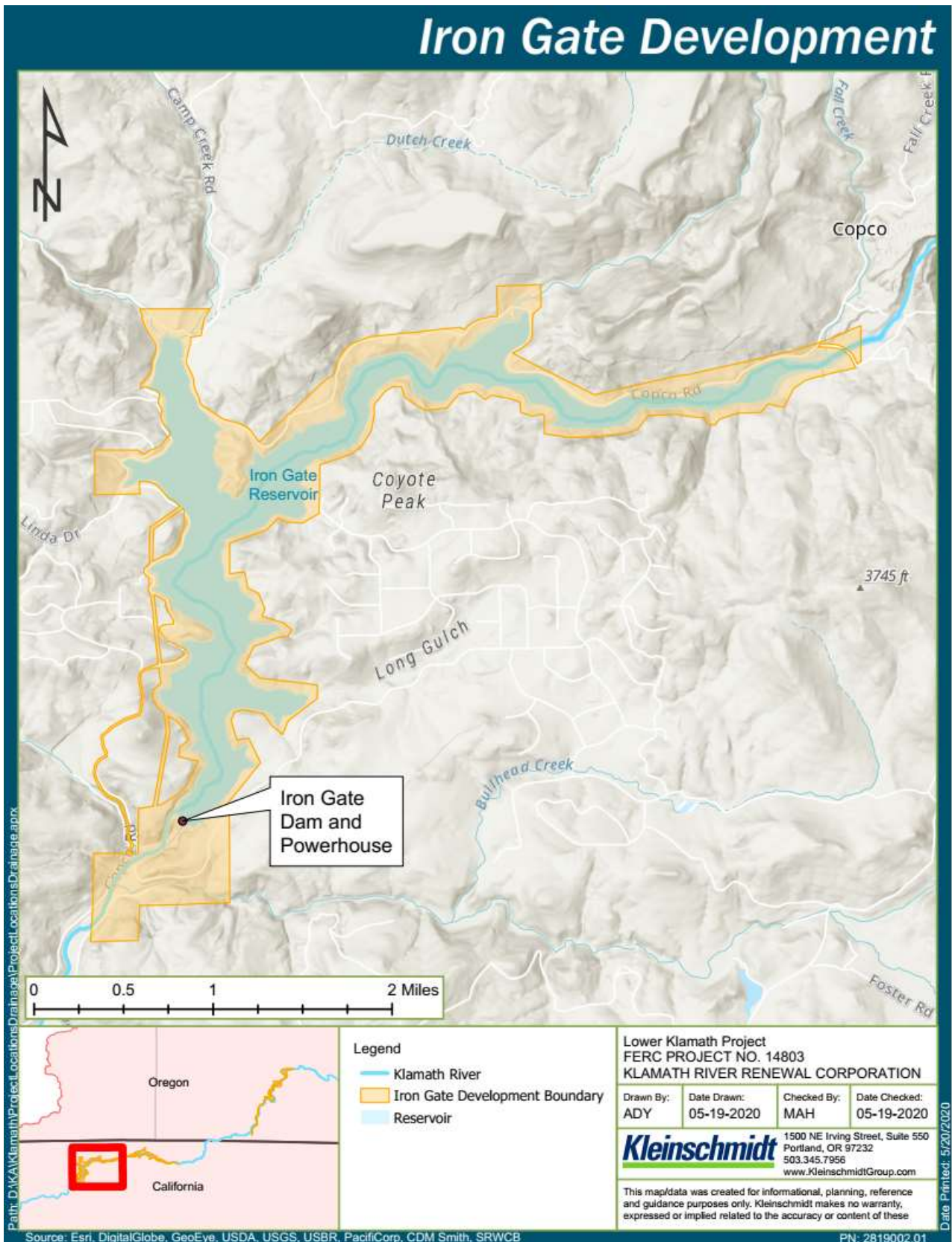
Source: KRRRC 2018

**PHOTO 13 IRON GATE POWERHOUSE**



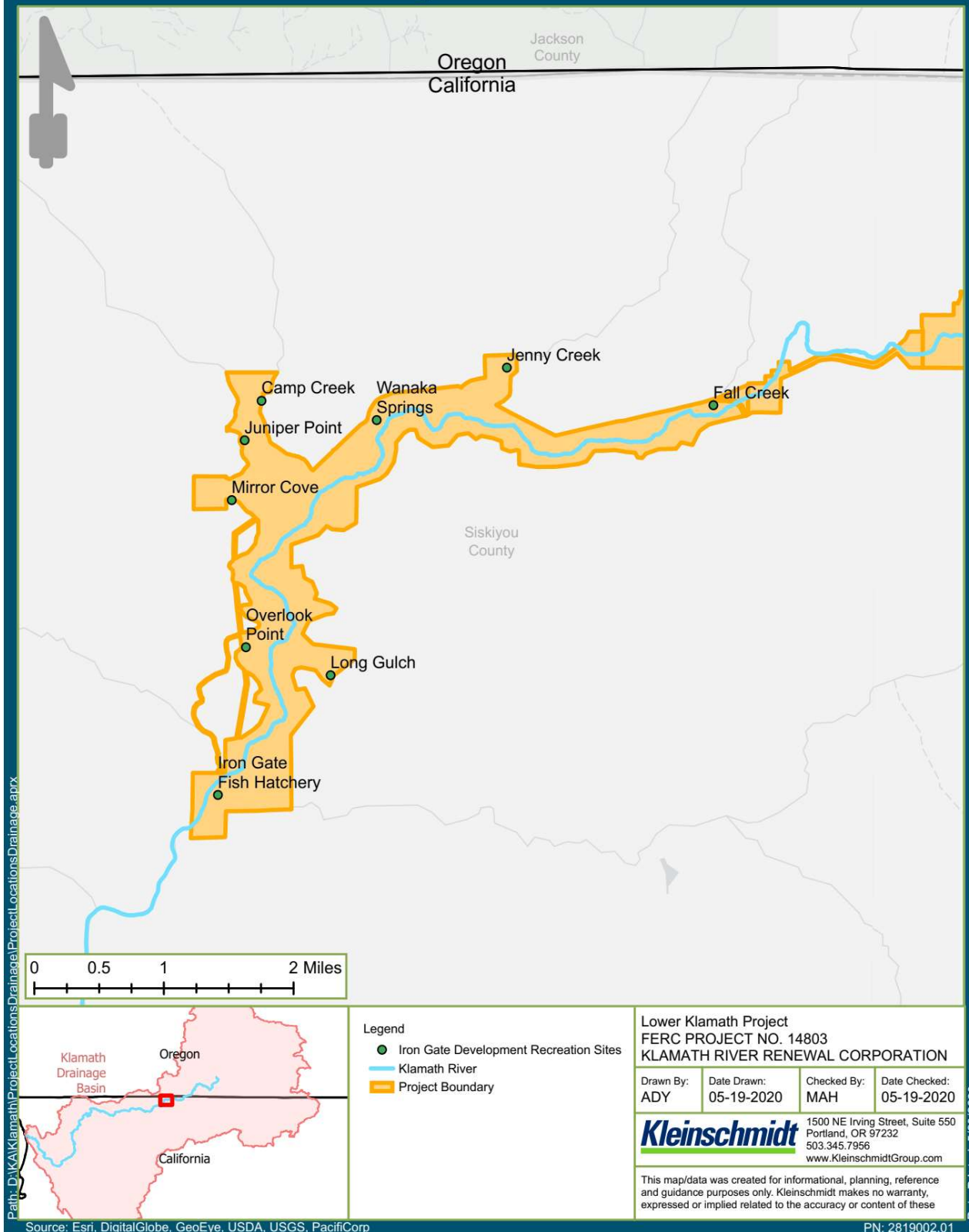
Source: KRRRC 2018

**PHOTO 14 IRON GATE DAM, SPILLWAY (LEFT), AND  
POWERHOUSE (RIGHT)**



**FIGURE 1-7 IRON GATE DEVELOPMENT**

# Iron Gate Development Recreation Sites



**FIGURE 1-8 IRON GATE RECREATION SITES**

## **1.4 Regulatory and Compliance Requirements**

A detailed discussion of environmental statutory and regulatory compliance is provided in Section 2 of Exhibit E of the Amended Surrender Application and is not duplicated here. The regulatory and compliance requirements applicable to the DDP include the FERC Dam safety requirements, California Division of Safety of Dams requirements, and the Renewal Corporation's Memoranda of Understandings (MOU) with various parties. The approach to the Management Plan development and approval process is also included in this section. These MOUs include measures that are incorporated into Management Plans (See Chapter 6) summarized in this DDP.

### **1.4.1 FERC Dam Safety**

Three of the four developments (J.C. Boyle, Copco No. 1, and Iron Gate) of the Lower Klamath Project are classified as High Hazard by FERC and have Potential Failure Modes Analysis (PFMA) assessments as part of their dam safety documentation. Copco No. 2 is classified as Low Hazard and does not require PFMA dam safety documentation.

As part of the 30% preliminary design process for the Proposed Action, the Renewal Corporation facilitated an initial informal PFMA<sup>3</sup> on December 5, 2019, to identify Potential Failure Modes (PFMs) that should be considered during final design. The PFMs were not, at that time, fully developed.

The Renewal Corporation will conduct a supplemental PFMA which will identify PFMs in a comprehensive approach, combining the removal of all four projects developments to evaluate PFM points of initiation, failure mechanism, consequences, and potential mitigation. The supplemental PMFA session will include participants from FERC, the Renewal Corporation, PacifiCorp, state dam safety organizations, Board of Consultants (BOC), owner's engineer, contractor, and the design engineer. This PFMA is tentatively scheduled for December 2020.

The PFMs and potential mitigating measures identified during the PFMA session will be considered in the final design and incorporated, as applicable, into the management plans.

### **1.4.2 California Division of Safety of Dams**

Under California Water Code, Part 1 and 3 of Division 3, Part 1, Chapter 5. Applications, Section 6225-6230 requires the Renewal Corporation to seek approval from Division of Safety of Dams (DSOD) for the removal of the Copco 1, Copco 2, and Iron Gate dams of the Lower Klamath Project. The Renewal Corporation has filed draft applications with the DSOD. The final applications will include the 90% design report and drawings

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<sup>3</sup> The initial informal PFMA included the selected contractor, design engineer, Board of Consultants (BOC), PacifiCorp, and the Renewal Corporation.

demonstrating DSOD dam safety standards have been met. The Renewal Corporation has met with DSOD staff on multiple occasions to establish application contents and timelines.

### 1.4.3 Memoranda of Understandings

The Renewal Corporation is actively working with state and local agencies to enter into Memoranda of Understandings (MOUs), pursuant to FERC's good neighbor approach.<sup>4</sup> These MOUs address the state and local regulations relevant to implementation of the DDP and are discussed in greater detail below. The DDP incorporates the MOU requirements to be implemented by the Renewal Corporation as part of the Proposed Action.

- **State of Oregon:** The Renewal Corporation is in final negotiations for an MOU with the above referenced Oregon Agencies. The MOU establishes the procedures to be followed by the Oregon Agencies and the Renewal Corporation to address matters that fall under the statutory requirements of the respective state agencies. The DDP has incorporated the requirements of this MOU and these requirements will be implemented by the Proposed Action. The MOU will be filed with FERC when it is finalized.
- **CDFW:** The Renewal Corporation and CDFW entered into executed an MOU on September 18, 2020. The DDP incorporates the requirements of this MOU and these requirements will be implemented by the Proposed Action. The CDFW MOU is appended as Attachment F to the Amended Initial Statement.
- **Siskiyou County, California:** The Renewal Corporation is finalizing the terms of an MOU with Siskiyou County, California. The MOU will address matters, such as roads, bridges, and traffic, that fall under the purview of Siskiyou County Code Title 7 – Public Works Chapter 3 (Department of Public Works). The DDP incorporates the requirements of this MOU and these requirements will be implemented by the Proposed Action.
- **Del Norte County, California:** The Renewal Corporation is finalizing the terms of an MOU with Del Norte County, California. The MOU will establish sediment monitoring measures and related minimization proposals for any sediment impacts to Crescent City Harbor as a result of the Proposed Action. The DDP incorporates the requirements of this MOU and these requirements will be implemented by the Proposed Action.
- **Klamath County, Oregon:** The Renewal Corporation and Klamath County Oregon entered into an MOU on March 26, 2019. The MOU establishes the procedures to be followed by the parties to implement the Proposed Action in compliance with Klamath County Code Chapter 70, Article 71 (vehicular access). The DDP incorporates the requirements of this MOU and these requirements will be implemented by the Proposed Action. The Klamath County MOU is appended as Attachment E to the Amended Initial Statement.

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<sup>4</sup> Per FERC Order 115 FERC P 61194 (2006), "Federal preemption does not necessarily mean that the Commission will not elect to require [the licensee] to comply with those of the Counties' requirements that the Commission concludes will not interfere with the company's ability to carry out the Commission's orders. [The Commission prefers] for our licensees to be good citizens of the communities in which projects are located, and thus to comply with state and local requirements, where possible."

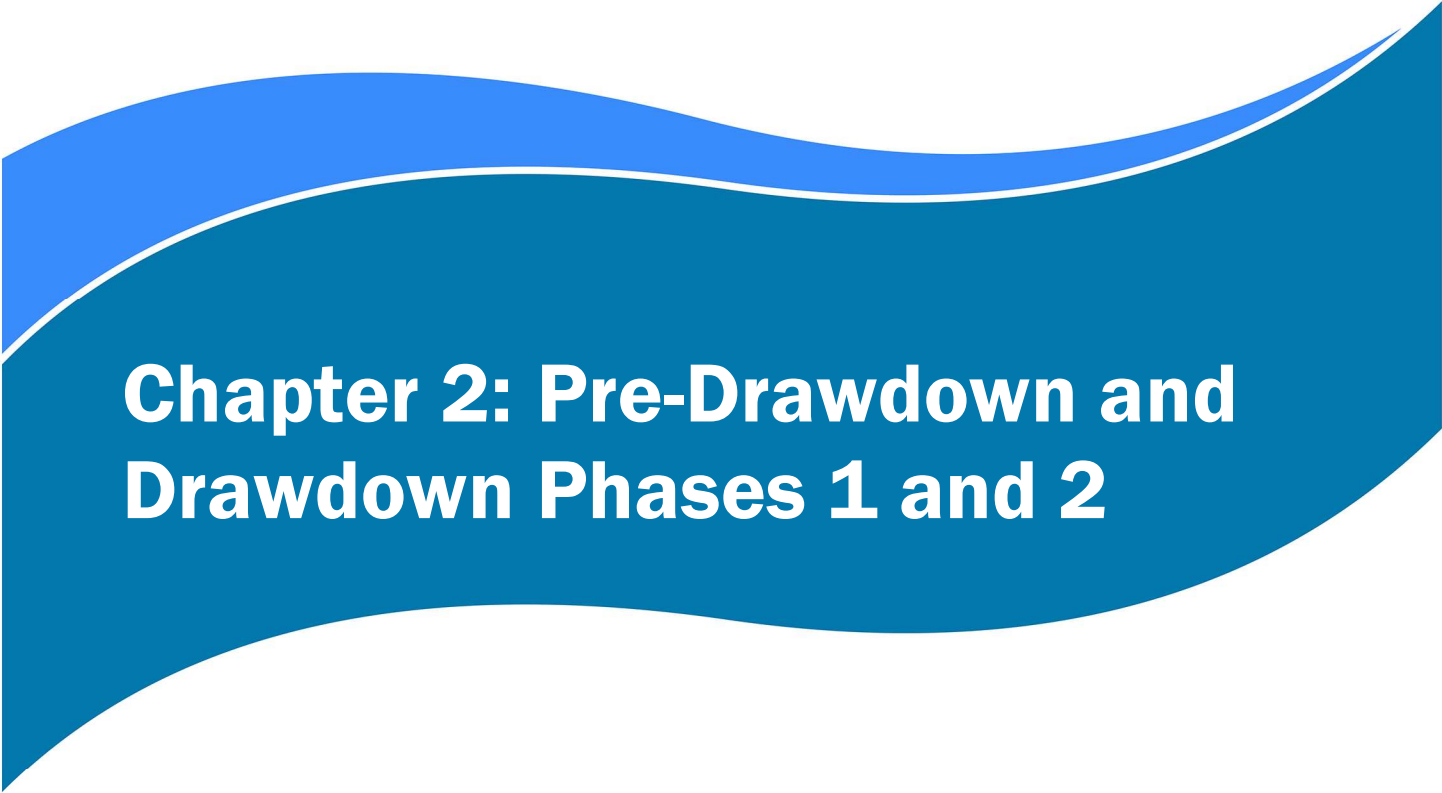


#### **1.4.4 Relationship of Management Plans and Proposed Measures**

The Renewal Corporation is preparing 16 Management Plans<sup>5</sup> for FERC’s review. The Management Plans show the proposed measures to implement the Proposed Action pursuant to a license surrender order. These Management Plans are currently being developed in consultation with federal, state and county governments and tribes. The state MOUs (CDFW and Oregon) identify the 16 Management Plans as described in the Amended Surrender Application as the means for meeting their regulatory and statutory interests. The County MOUs contain specific subplan elements that also will be developed in consultation with the respective County government agency. For example, the Klamath and Siskiyou County MOUs address transportation related elements. These County interests will be a chapter in the Construction Plan.

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<sup>5</sup> The management plans identified in the SWRCB and ODEQ CWA 401s have been accounted for in the 16 Management Plans.

A decorative banner with a wavy, ribbon-like shape. It features a light blue top layer and a darker blue bottom layer. The text is centered in the darker blue section.

## **Chapter 2: Pre-Drawdown and Drawdown Phases 1 and 2**

## **2 PRE-DRAWDOWN (PHASE 1) AND DRAWDOWN PHASES (PHASE 2)**

### **2.1 Overview**

As discussed in Section 1.2, Phase 1 and Phase 2 of the Proposed Action involves activities up to the final reservoir drawdown including those activities that occur during the final reservoir drawdown immediately prior to the physical removal of the facilities. Each development is described for pre-drawdown/drawdown activities related to 1) *Construction and Site Access*; 2) *Powerhouse and Water Conveyance Modifications*; and 3) *Reservoir Drawdown Stages*. For each development, a reference is provided to the location in the 60% Design Report and 60% drawings (Exhibit A-2) that correspond to the activities summarized herein.

#### **2.1.1 J.C. Boyle**

The J.C. Boyle pre-drawdown and drawdown activities are presented below and thoroughly described in the 60% Design Report in Sections 2.2 through 2.3 and in the drawings listed in Table 2.1 of 60% Design Report. Figure 2-1, Figure 2-2, and Figure 2-3 provide locations of the proposed activities at the J.C. Boyle development.

**60% Design Drawing Numbers:** C1000-C1005; C1050, C1051; C1060; C1220-C1221; C1310.

##### **2.1.1.1 Construction and Site Access**

1. The existing water diversion structures, existing cofferdam, and access roads are suitable for the proposed decommissioning; therefore, no pre-drawdown activities are necessary for construction and site access at J.C. Boyle.

##### **2.1.1.2 Powerhouse and Water Conveyance Modifications**

1. The existing water conveyance structures are suitable for the proposed decommissioning. The use of water conveyance structures is described in the reservoir drawdown stages below (Section 2.1.1.3).

##### **2.1.1.3 Reservoir Drawdown Stages**

There are four stages of reservoir drawdown at J.C. Boyle and the timing of these stages depend on inflows to the J.C. Boyle Reservoir. Specific details regarding reservoir drawdown is provided in the Draft Reservoir Drawdown and Diversion Plan and are summarized below. The initial drawdown will occur approximately by January 1 of the drawdown year and be completed approximately by March 15 of the drawdown year. The drawdown stages will take between approximately 1-14 days, based on steady state inflows between the dry and wet year limits.

#### **2.1.1.3.1 Stage 1 Drawdown**

1. Use spillway gates to lower the reservoir to spillway crest or as inflows allows; power intake is closed.

#### **2.1.1.3.2 Stage 2 Drawdown**

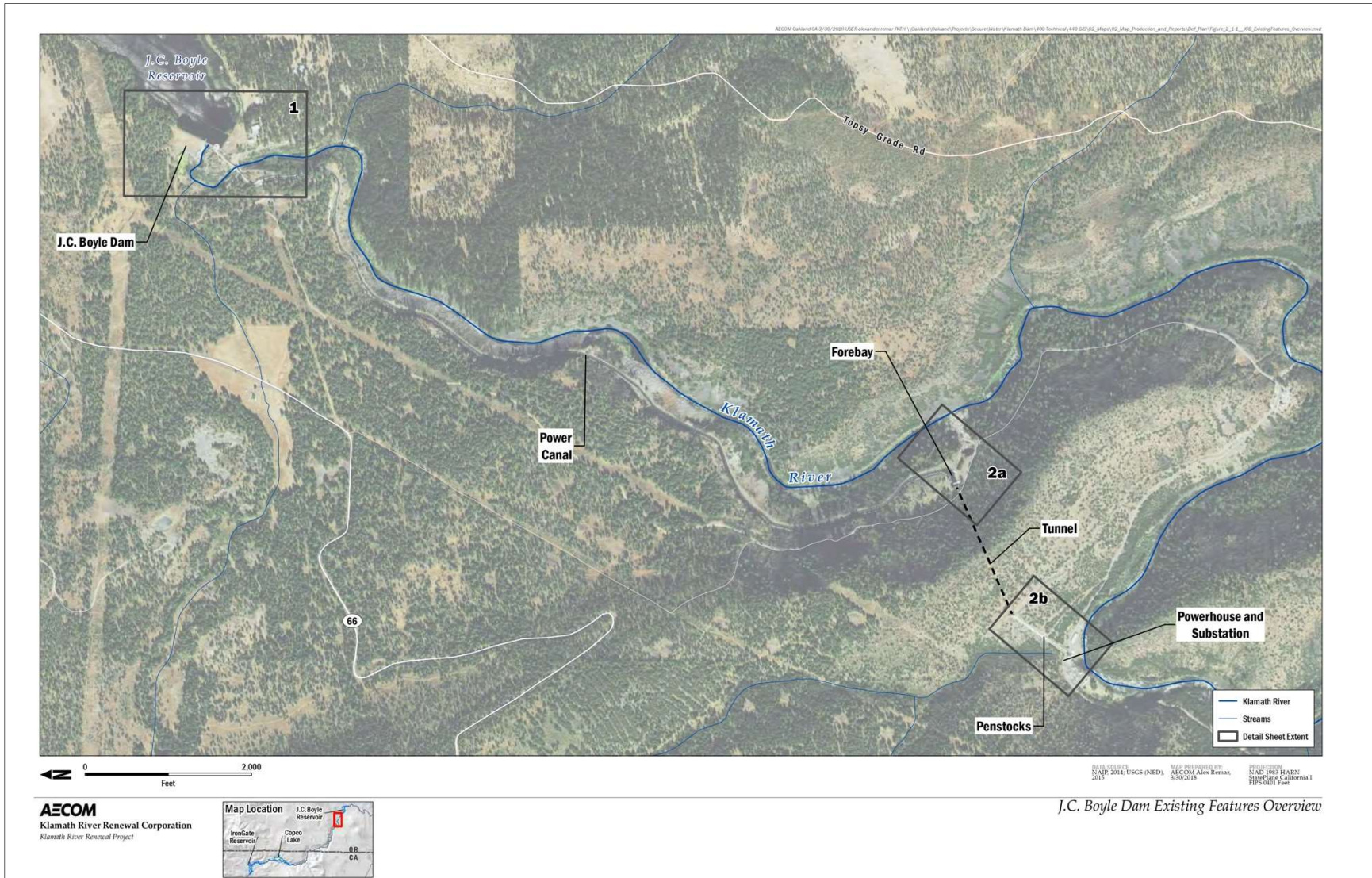
1. Use power intake culverts and the spillway if inflows exceed wet year limit (i.e., inflow greater than 2,200 cfs); diversion culverts remain closed.
2. Stage 2 is complete once water surface elevations are stable below the spillway invert and reservoir outflows pass through the power intake only (between EL. 3,777.7 ft and EL. 3,784.8 ft).
3. Charge two diversion culvert stoplogs with explosives over a period of 24 hours before initiating Stage

#### **2.1.1.3.3 Stage 3 Drawdown**

1. Remove the culvert stoplog in Diversion Culvert #1 using controlled blasting to initiate Stage 3 drawdown.
2. Use the power intake until flows are less than 1,800 cfs.
3. Stage 3 will continue until drawdown rate is stabilized between EL. 3,765.0 ft and EL. 3,775.0 ft before initiation of Stage 4.

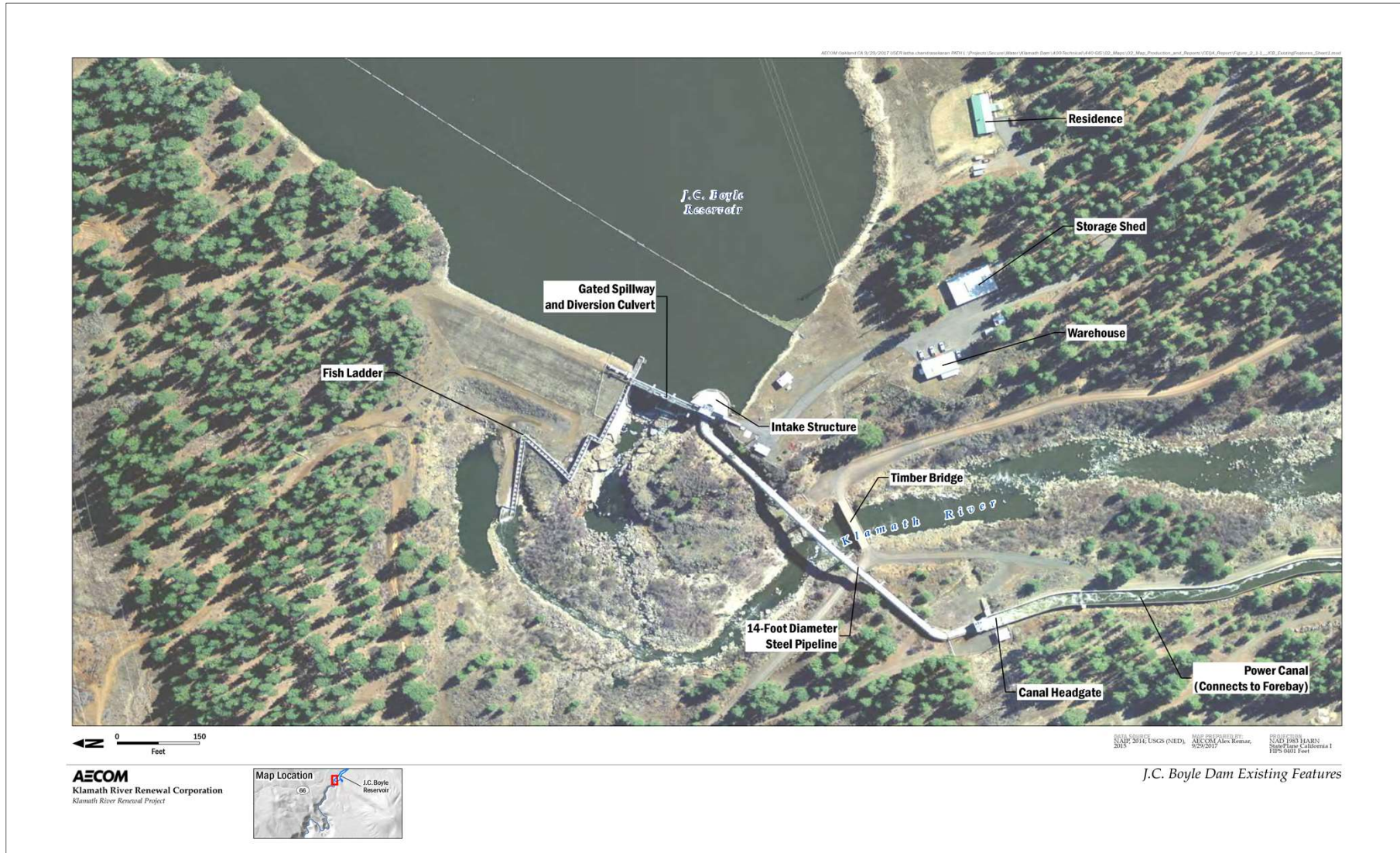
#### **2.1.1.3.4 Stage 4 Drawdown**

1. Remove the culvert stoplog in Diversion Culvert #2 using controlled blasting to initiate Stage 4 drawdown.
2. Close the power intake during this drawdown stage (if not closed during Stage 3).



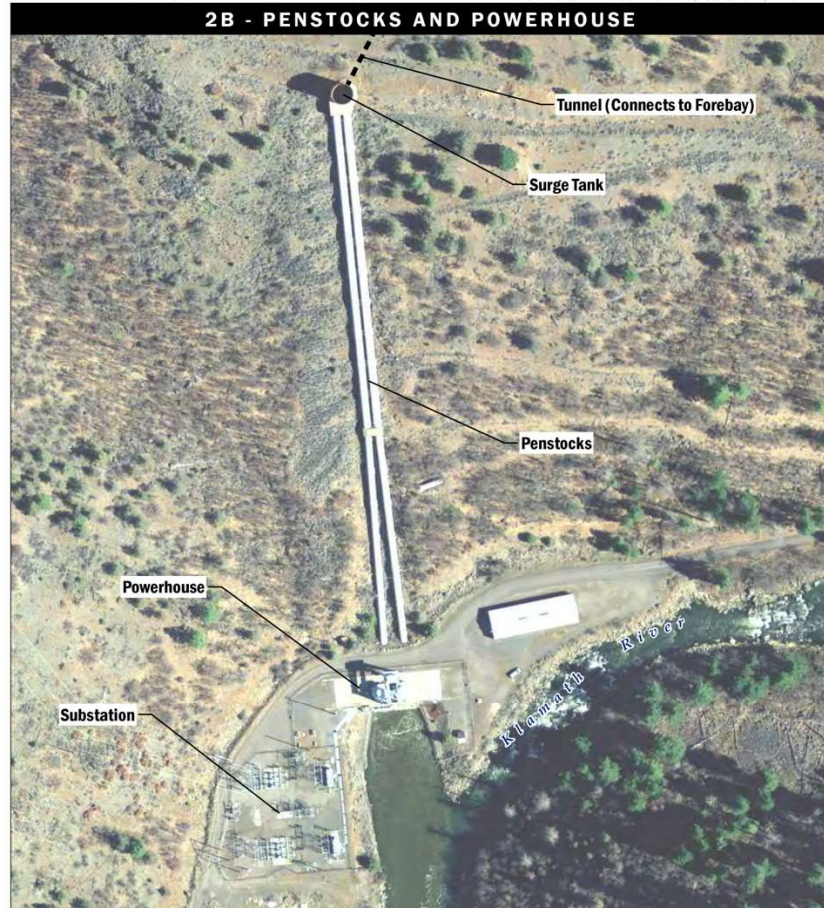
Source: AECOM as cited in Kiewit 2020b

**FIGURE 2-1 J.C. BOYLE DAM EXISTING FEATURES OVERVIEW**



Source: AECOM as cited in Kiewit 2020b

**FIGURE 2-2 J.C. BOYLE DAM EXISTING FEATURES IN PROPOSED ACTION**



0 150 Feet

**AECOM**  
Klamath River Renewal Corporation  
Klamath River Renewal Project



DATA SOURCE: NAD 83 (2011) USGS (NED) 2017  
MAP PREPARED BY: AECOM Alex Roman 9/29/2017  
CITY OF HAIN: NAD 83 HAIN State Plane California 1 FIPS 4803 Feet

J.C. Boyle Dam Existing Features

Source: AECOM as cited in Kiewit 2020b

**FIGURE 2-3**

**J.C. BOYLE DAM FOREBAY, SPILLWAY, PENSTOCK, AND POWERHOUSE IN PROPOSED ACTION**

## 2.1.2 Copco No. 1

The Copco No. 1 pre-drawdown and drawdown activities are presented below and thoroughly described in the 60% Design Report in Sections 3.2 through 3.3 and in the drawings listed in Table 3.1 of 60% Design Report. Figure 2-4, Figure 2-5, and Figure 2-6 provide locations of the proposed activities at the Copco No. 1 development. There are specific engineering modifications that differ from 60% design represented as value engineering (VE) related to changes at the Iron Gate tunnel that resulted in changes at Copco No. 1. Those elements are identified below where applicable.

### Status in Exhibit A-2

### Drawing #s

Applicable 60% Design Drawings:

C2000, C2001, C2255, C2256, C2257, C2258, C2270, C2275, C2280, C2300, C2305, C2400, C2405

Deleted 60% Drawings:

C2050, C2501, C2550, C2551

60% to be updated @ 90% from VE:

C2060, C2061, C2100, C2101, C2160, C2175, C2200, C2201, C2205, C2210, C2211, C2215, C2225, C2226, C2230, C2250, C2350, C2410, C2411, C2500, C2502, C2503, C2505, C2510, C2511

### 2.1.2.1 Construction and Site Access

1. Construct or improve the roads needed for construction access according to Section 7.0 of Appendix C1 of the 60% Design Report (Kiewit 2020a).
2. Develop access to the downstream left abutment and spillway plunge pool via a river crossing, including a temporary bridge designed to allow flow passage from Copco No. 1 to the Copco No. 2 headpond.
3. Develop access to the base of the dam/spillway via a work platform at the base of the spillway (at the plunge pool).
  - a. Modify the work platform by placing fill over the steel outlet pipes once the pipes have been installed (Section 2.1.2.2).

### 2.1.2.2 Powerhouse and Water Conveyance Modifications

1. Construct one outlet on the left abutment-side of the dam with an upstream invert EL. 2,494.5 ft by tunneling through the concrete dam. This element differs from 60% design as a value engineering action. Two outlets are shown on the 60% design.
  - a. Leave a concrete plug on the upstream end of each outlet tunnel to maintain the separation of the reservoir from downstream prior to drawdown initiation.
  - b. Embed a steel pipe in the outlet tunnel and that extends into the plunge pool.
2. Dredge upstream in the approach channel to the low-level outlet and in the approach channel to the existing diversion tunnel to ensure outlets are unobstructed and to facilitate passage of flow and sediment during and after drawdown.



- a. Dredging will occur during the allowable in-river work period in the pre-drawdown year. In-river removal may not begin until June 15, per Appendix A8 Table 1.1 of the 60% Design Report (Kiewit 2020a).
3. Modify reservoir operations from normal operations during the pre-drawdown construction period.
  - a. Maintain reservoir at EL. 2,597.1 ft or below using the powerhouse to pass reservoir inflows and maintain the targeted freeboard of 7.9 feet from normal maximum EL. 2,605.0 ft.
  - b. Lock out the spillway gates for safety prior to the pre-drawdown work downstream of the spillway.
  - c. During flood conditions, operate the reservoir as described in Section 3.2.5.3 of the 60% Design Report (Kiewit 2020a).

### **2.1.2.3 Reservoir Drawdown Stages**

Drawdown will be initiated on November 1 of the pre-drawdown year while Stage 2 drawdown will not commence until January 1. The drawdown stages will take between approximately 10-20 days, based on steady state inflows between the dry and wet year limits.

#### **2.1.2.3.1 Stage 1 Drawdown**

1. Limit pre-drawdown year reservoir release to the powerhouse and spillway until the water surface area reaches the spillway crest, which is the minimum operating pool, between November 1 to December 31.
2. Lower the reservoir to EL. 2,592.0 ft.

#### **2.1.2.3.2 Stage 2 Drawdown**

1. Complete initial drawdown Stage 2 between January 1 to March 15 of drawdown year.
2. Open the low-level outlet concrete plug to initiate drawdown.
3. Target a drawdown rate of 5-feet per day until El. 2,545.0 ft is achieved.

#### **2.1.2.3.3 Stage 3 Drawdown**

1. Begin drawdown when the target drawdown rates in Stage 2 match those presented in Appendix A.10 Table 1.1 of the 60% Design Report (Exhibit A-2).
2. Once the elevation reaches approximately 2,530.0 ft the existing intake structure will be demolished, and the diversion tunnel plug will be opened.

### **2.1.3 Copco No. 2**

The Copco No. 2 pre-drawdown and drawdown activities are represented below and thoroughly described in the 60% Design Report as follows: Figure 2-7 provides the location of the proposed activities at the Copco No. 2 development.

**60% Design Drawings:** C3000-C3004; C3060; C3200; C3210, C3211; C3216; C3220; C2510; C3520; C3530-C3534; S3000.

### **2.1.3.1 Construction and Site Access**

1. Develop temporary access to the left bank of the diversion dam for spillway modifications.
2. Develop a temporary access track on the right bank to access the spillway apron to support dam removal.
3. Develop temporary access road on existing roadway to remove the existing diversion dam.

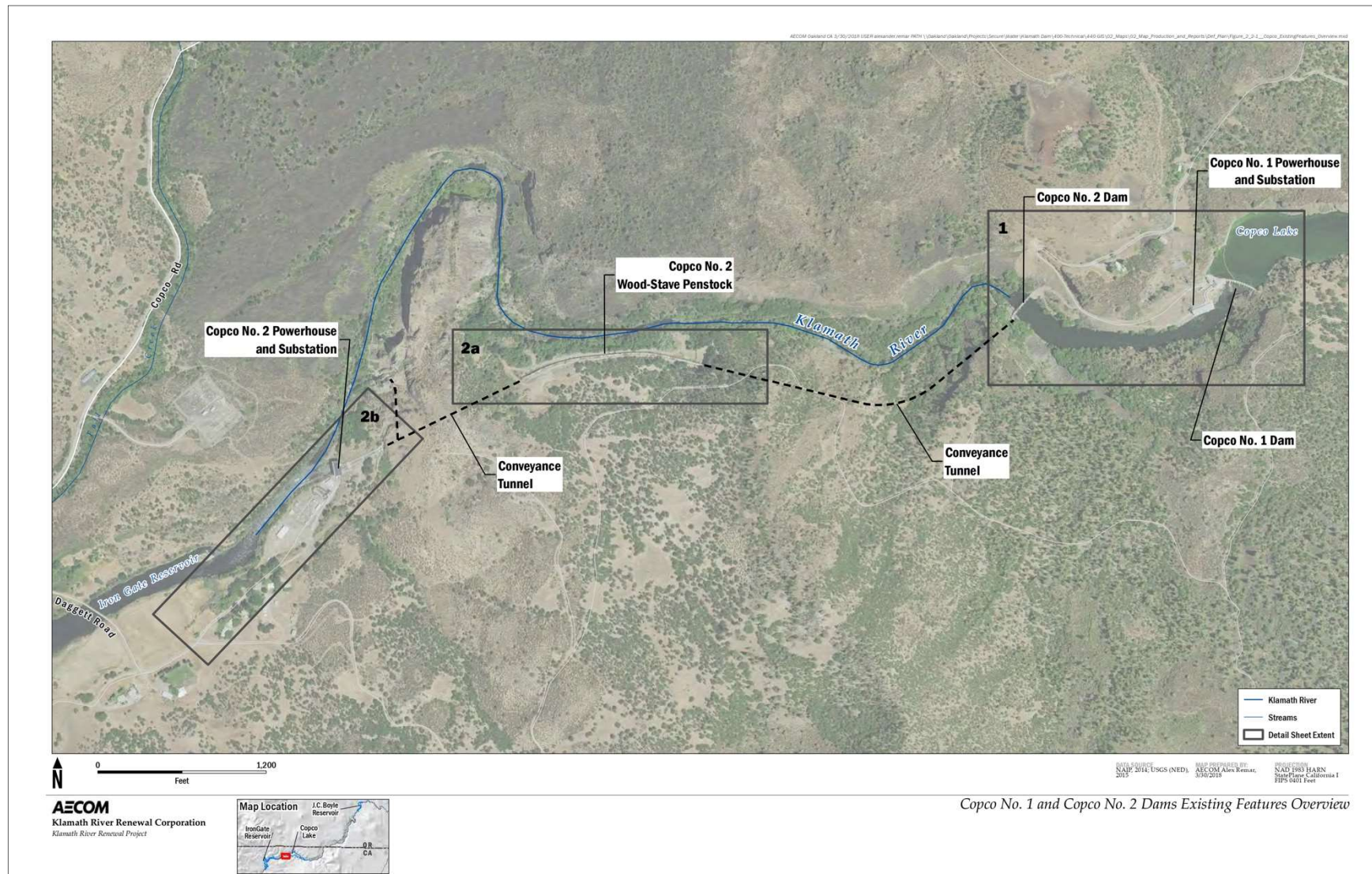
### **2.1.3.2 Powerhouse and Water Conveyance Modifications**

1. Modify Spillway Bay No. 1 and excavate the downstream channel to facilitate the drawdown once construction and site access (Section 2.1.3.1) improvements are complete. Remove downstream Spillway Bay No. 1 to EL. 2,459.5 ft for a width of 26 feet, leaving the 17-foot-thick plug at the upstream end for removal during drawdown.
  - a. Remove downstream historic cofferdam.
  - b. Temporarily excavate material in the channel downstream of Spillway Bay No. 1 to reduce flooding of the work area during decommissioning.
  - c. Dispose of all approved materials at the approved on-site disposal location.

### **2.1.3.3 Reservoir Drawdown Stages**

There are no restrictions on rate of drawdown in the Copco No. 2 Reservoir, except that the timing of the drawdown will occur between January 1 and March 15 of the drawdown year.

1. Open the spillway gates and use the powerhouse (capacity 2,676 cfs) to drawdown the reservoir during January (average monthly flow of 2,000 cfs).
2. Remove the plug in Spillway Bay No. 1 to EL. 2,459.5 ft via blasting or mechanical removal(s).
3. After (2), permanently close the intake caterpillar gate and install concrete plug in the intake tunnel inlet.



Source AECOM as cited in Kiewit 2020b

**FIGURE 2-4 COPCO NO. 1 AND COPCO NO. 2 DEVELOPMENTS OVERVIEW**



Source AECOM as cited in Kiewit 2020b

**FIGURE 2-5 COPCO NO. 1 AND COPCO NO. 2 DEVELOPMENTS' FEATURES IN PROPOSED ACTION**



Source AECOM as cited in Kiewit 2020b

**FIGURE 2-6**

**COPCO NO. 2 WOOD STAVE PENSTOCK AND POWERHOUSE IN PROPOSED ACTION**

## 2.1.4 Iron Gate

The information below represents the 60% plan for Iron Gate and elements that have progressed since the development of 60% related to value and advanced engineering. Figure 2-7, Figure 2-8, and Figure 2-9 provide locations of the proposed activities at the Iron Gate development. The Iron Gate tunnel engineering intake modifications and rehabilitation have advanced from the 60% Design contained in Exhibit A-2. The 90% design plan and drawings will represent this advancement. Those elements are noted in the appropriate sections below, as well as in the referenced 60% Design Sheets.

### Status in Exhibit A-2

### Drawing #s

Applicable 60% Design Drawings:	C4000; C4001-4002; C4175, C4500-C4515
Deleted 60% Iron Gate Tunnel Drawings:	C4115-19, C4143, C4160
60% Iron Gate Tunnel Drawings to be updated @ 90%:	C4050-52 C4100, 4105, 4110, 4111, 4112, C4140, 4141, 4142, 4145, 4146, 4150, C4170, C4171

### 2.1.4.1 Construction and Site Access

1. Construct access to the tunnel across the downstream base of the dam and the base of the spillway.
2. Construct access to the intake gate with a work platform between the embankment crest and the overflow spillway
  - a. Remove sheet pile flood protection wall on dam crest only as necessary to obtain construction vehicle and crane access.
  - b. Lower reservoir to a maximum EL. 2,324.0 ft to accommodate installation of the work platform.
  - c. Construct work platform using fill to EL. 2,340.5 ft for use in the hoist and gate modifications in the gate shaft.
  - d. Improve access road to spillway on right bank.
  - e. Construct access road along left bank at approximate elevation 2,243.0 ft.

### 2.1.4.2 Water Conveyance Modifications

1. Partially line Diversion Tunnel and remove weir at the outlet.

### 2.1.4.3 Reservoir Drawdown Stages

The reservoir drawdown at Iron Gate depends on inflows to the Iron Gate Reservoir. Specific details regarding reservoir drawdown will be provided in the Reservoir Drawdown and Diversion Plan and summarized below. The beginning of drawdown will occur approximately by January 1 of the drawdown year and initial drawdown completed approximately by March 15. The final drawdown will be completed based on water year type. It is anticipated for an average water year, the final drawdown to occur in June.

1. Open power intake gate to powerhouse
2. Open the diversion tunnel gate to control reservoir drawdown

- a. observe target maximum drawdown rate of 5 feet per day
- b. utilize the diversion tunnel gate to achieve stable water elevations in the reservoir, which are anticipated to be between elevations 2,200 feet and 2,230 feet for the 25<sup>th</sup> and 75<sup>th</sup> percentile flow conditions, respectively, at the end of the initial drawdown period (mid-March)

## **2.2 Ancillary Pre-Drawdown Site Improvements**

As part of the larger dam decommissioning effort, the Renewal Corporation will undertake the following improvements to fisheries and water supply, as detailed in Exhibit A-2 and Kiewit 2020a and 2020b. The ancillary pre-drawdown improvements include:

- Installation of the Yreka water supply line
- Move fish hatchery operation to Falls Creek Fish Hatchery

Additional summary details on each of these facilities is provided in the following sections.

### **2.2.1 Yreka Water Supply Line**

The Yreka water supply line traverses the upper end of Iron Gate Reservoir. As a measure within the Proposed Action, the Renewal Corporation has reached agreement with the City of Yreka to advance the alternative of constructing a new segment of buried pipeline in the immediate vicinity of the existing waterline crossing. The new section of the pipeline will tie into the existing buried pipeline at either end. The pipeline will be temporarily routed across the Daggett Road Bridge until the new pipeline is constructed following drawdown. Following drawdown, a trench will be dug across the Klamath River for the construction of the new pipeline. The trench will be dug behind a cofferdam and will be constructed in two stages to allow the river to be routed around the work zone. The Renewal Corporation is in the final evaluation phase of this alternative subject to the City of Yreka's approval of final design. Final design will be included in the 90% Design Report for FERC's approval.

### **2.2.2 Fish Hatcheries**

The existing Iron Gate Hatchery facilities are part of the Lower Klamath Project, and they are operated by CDFW. Pursuant to KHSA, the Renewal Corporation has consulted with CDFW regarding hatchery facilities. With the removal of Iron Gate Dam, the Renewal Corporation will remove the water intake and fish capture, holding, and spawning facilities of the Iron Gate Hatchery. The functions and goals of the existing Iron Gate Hatchery will be replaced by the reopening and operation of the Fall Creek Hatchery (FCH) by CDFW until the license surrender is effective.

The Renewal Corporation will demolish the existing fish collection facility located at the toe of the Iron Gate Dam. The Renewal Corporation proposes to upgrade the plumbing and reconstruct the FCH to be operated by CDFW. The FCH will be located on PacifiCorp lands outside of the boundaries respectively of the Lower Klamath Project or the Klamath Project, P-2082. The Renewal Corporation, PacifiCorp, and CDFW will enter into a lease or similar legal arrangement for this purpose, to assure that Renewal Corporation (as future licensee) has

adequate control over the lands and waters associated with this facility for compliance with the applicable condition of the license surrender order.

### **2.2.2.1 Existing Iron Gate Hatchery Facility and Operations**

Iron Gate Hatchery was constructed in 1962 to mitigate for lost anadromous salmonid spawning and rearing habitat between Copco No. 2 Dam and Iron Gate Dam. The Iron Gate Hatchery is approximately 0.5 mile downstream of Iron Gate Dam, adjacent to the Bogus Creek tributary. The main hatchery complex includes an office, incubator building, rearing/raceway ponds, fish ladder with trap, settling ponds, visitor information center, and four employee residences. The collection facility is at Iron Gate Dam and includes a fish ladder consisting of twenty 10-foot weir-pools that terminate in a trap, a spawning building, and six 30-foot circular holding ponds.

The Iron Gate Hatchery operates with a gravity-fed, flow-through system that has five discharge points into the Klamath River. The Iron Gate Hatchery obtains its water supply from Iron Gate Reservoir. Two subsurface influent points at a depth of approximately 17 feet and 70 feet, respectively, deliver water to Iron Gate Hatchery. Up to 50 cfs are diverted from the Iron Gate Reservoir to supply the 32 raceways and fish ladder.

The existing spawning facility discharges through the main ladder and steelhead return line. An overflow line drains excess water from the aeration tower. The hatchery facility also has a discharge at the tailrace that supplies the auxiliary ladder or fish discharge pipe, and two flow-through settling ponds for hatchery effluent treatment that converge to a single discharge point.

The historical mitigation goals include a release of 6,000,000 Chinook salmon (5,100,000 fingerlings and 900,000 yearlings), 75,000 coho salmon yearlings, and 200,000 steelhead yearlings, annually. The Southern Oregon Northern California Coast (SONCC) coho salmon Evolutionarily Significant Unit (ESU), which includes coho salmon produced at Iron Gate Hatchery, is listed as threatened under the California Endangered Species Act (CESA) and the ESA.

The Renewal Corporation will demolish the existing fish collection facility at the toe of Iron Gate Dam and the water supply intake and associated infrastructure along with the dam and hydropower developments as part of the Proposed Action.

### **2.2.2.2 Existing Fall Creek Hatchery**

California Oregon Power Company built the Fall Creek Hatchery in 1919 as compensation for loss of spawning grounds due to the construction of Copco No. 1 Dam. Six of the original rearing ponds remain (two above Copco Road and four below the road). CDFW last used these ponds from 1979 through 2003 to raise approximately 180,000 Chinook salmon yearlings, which they released into the Klamath River at Iron Gate Hatchery. Although the raceways remain and CDFW continues to run water through them, they have not produced fish since 2003, when CDFW moved all mitigation fish production to Iron Gate Hatchery. There are two existing diversion structures (Diversion A and Diversion B). Diversion A is the primary diversion for the water supply and Diversion B is the secondary under current and future operating conditions. The facility retained its water rights but needs substantial renovation to become operational.



### **2.2.2.3 Fish Hatchery Plan**

A Fish Hatchery Plan is being developed in consultation with NMFS and CDFW to guide hatchery operations for the 8-year period following dam removal, as stated in the KHSA. The plan specifies the removal of the Iron Gate Hatchery and improvements and modifications for the re-opening of the FCH.

To implement the proposed Fish Hatchery Plan, hatchery operations will be functional prior to drawdown of the Iron Gate Reservoir. The Fish Hatchery Plan will be implemented in a manner that is consistent with the North Coast Regional Water Quality Control Board (NCRWQCB) “Policy in Support of Restoration in the North Coast Region.” The plan also requires CDFW to employ best management practices to minimize discharges during hatchery operations.

### **2.2.2.4 Transfer of Production at Iron Gate Hatchery**

Due to water quality concerns regarding Bogus Creek supply, production of Chinook and coho was transferred to the FCH due to the high quality of Fall Creek water. Therefore, once the improvements at FCH have been completed and production can be initiated prior to dam drawdown, Iron Gate Hatchery will be shut down. No further production will occur at Iron Gate Hatchery once dam drawdown is initiated.

### **2.2.2.5 Improvements at Fall Creek Hatchery**

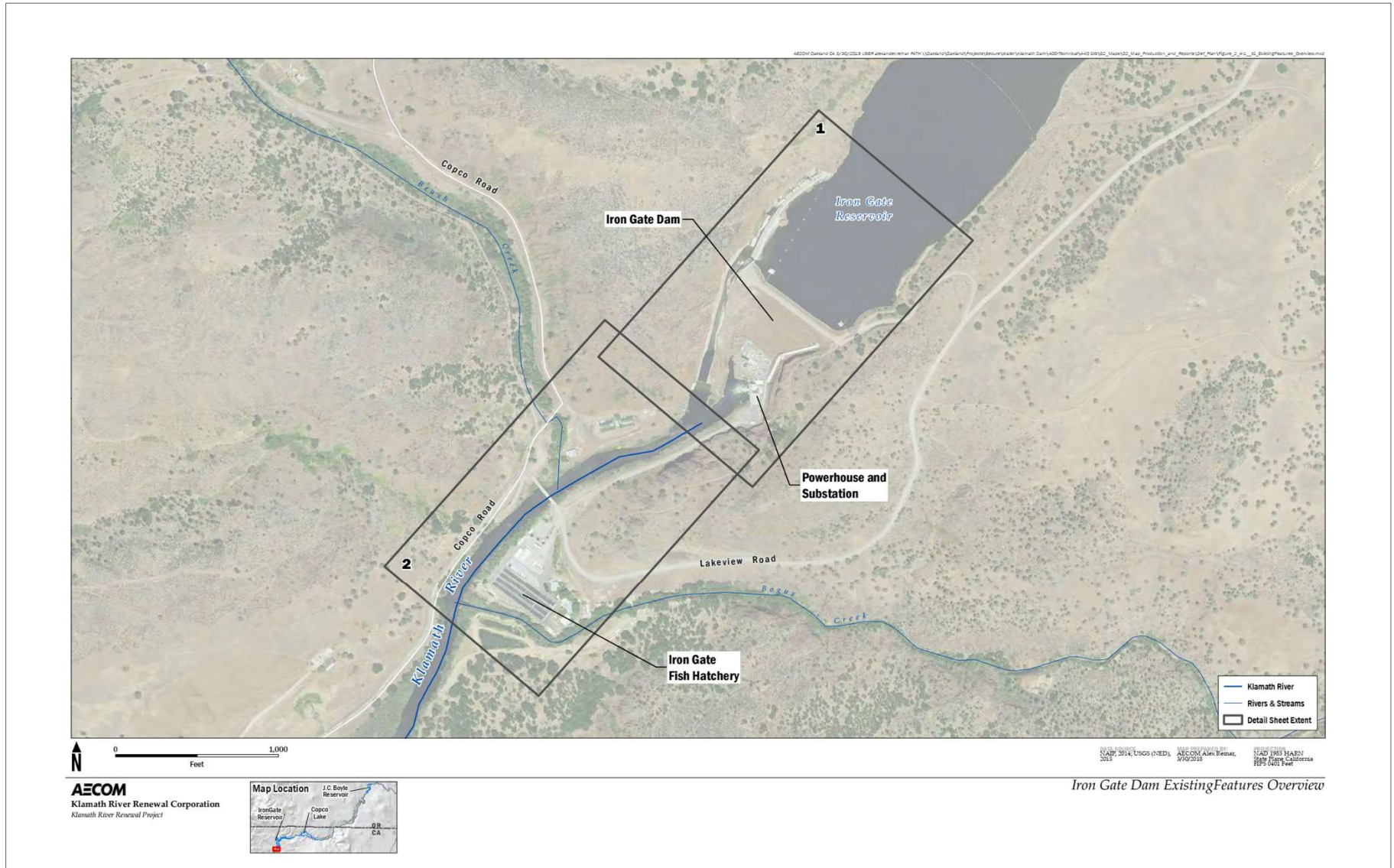
To raise yearling coho and sub-yearling and yearling Chinook salmon, the FCH facility will be upgraded by modifying plumbing to accommodate the installation of rearing vessels (rearing ponds or raceways). The new hatchery facility will be constructed within the existing FCH footprint. The intake structure, coho rearing building, Chinook raceways, Chinook incubation building, spawning building, and adult holding will be located on the eastern side of the creek. Use of these spaces will require coordination and concurrence with PacifiCorp. Non-consumptive water diversion from Fall Creek will support hatchery operations using a combination of the existing CDFW water right on Fall Creek and riparian rights; and the water will return to the creek at the fish ladder on the eastern side of Fall Creek, minimizing adverse effects to Fall Creek aquatic resources. The Fall Creek Hatchery 50% design are included in Exhibit A-2.

To protect the quality of the City of Yreka’s water supply and prevent fish pathogen introduction into the hatchery, fish will not be allowed upstream of either Diversion A or B. As part of the FCH, Diversion A and B will be modified to include a sloped apron downstream to serve as a velocity barrier. The combined high-velocity apron and the jump required to pass upstream of Diversion A and B will effectively bar passage to both juvenile and adult anadromous fish for the anticipated creek flow range expected during juvenile fish release, adult migration, and up to larger flood events. To support spawning activities at the site,

A removable fish exclusion picket barrier will be constructed with the fish ladder that will guide fish to the fish ladder entrance pool and ultimately up to the trap. The fish barrier will consist of a set of aluminum pickets with 1-inch-maximum clear spacing that will be installed on a permanent concrete sill. CDFW staff will install and removed the temporary pickets each year at the beginning and end of the trapping season. The concrete sill will have side walls and a 6-inch-tall curb across the bottom that the picket panels will be able to seal against, forming a continuous barrier across the stream. The sill and removable pickets will be oriented at an angle of approximately 30 degrees to the stream transect, such that an anadromous fish

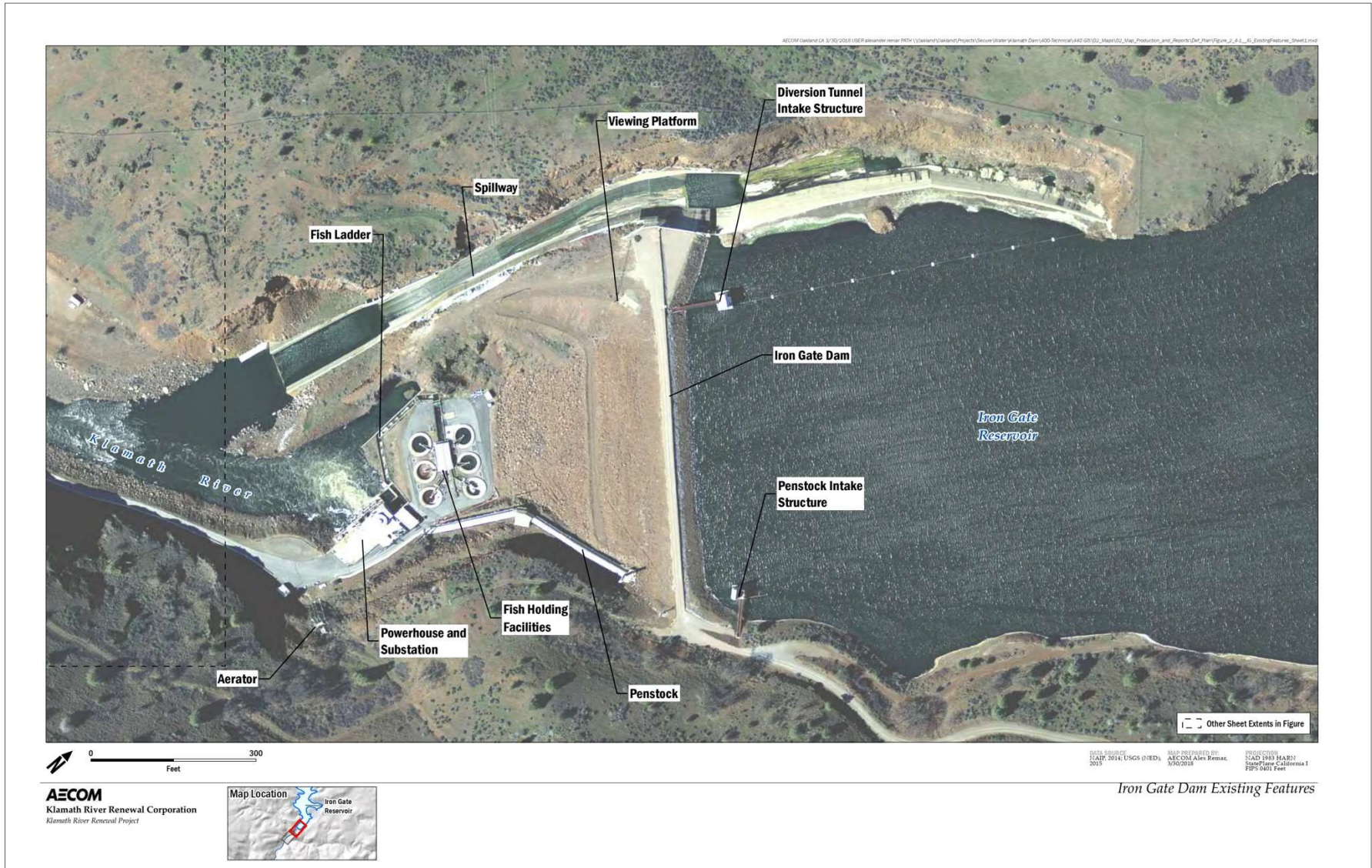
moving upstream will encounter the barrier and be directed toward the stream's east bank, where the fish ladder entrance pool is situated.

The Renewal Corporation and CDFW will perform hydraulic analysis to assess depths and velocities in Fall Creek, which CDFW and NMFS will use to determine threshold criteria for resident and migrating Chinook and coho salmon.



Source AECOM as cited in Kiewit 2020b

**FIGURE 2-7 IRON GATE DAM EXISTING FEATURES OVERVIEW**



Source AECOM as cited in Kiewit 2020b

**FIGURE 2-8 IRON GATE DAM EXISTING FEATURES IN PROPOSED ACTION**



Source AECOM as cited in Kiewit 2020b

**FIGURE 2-9 IRON GATE DAM – IRON GATE FISH HATCHERY**



**Chapter 3: Post-Drawdown  
Facility Removal Phase 3A**

# 3 POST-DRAWDOWN FACILITY REMOVAL (PHASE 3A)

## 3.1 Overview

As discussed in Section 1.2, Phase 3A *Post-Drawdown Facility Removal* includes the physical removal of the facilities from the river and in-channel grading. Each of the developments are described for activities related to 1) *Dam Removal and Volitional Fish Passage Channel Construction*; 2) *Water Conveyance Decommissioning*; 3) *Powerhouse, Substation, and Ancillary Facilities Removal*. For Iron Gate, a fourth category is included to describe *Fish Hatchery Decommissioning Activities*.

For each development, a reference is provided to the location in the 60% Design Report and 60% drawings (Exhibit A-2) that correspond to the activities summarized herein.

### 3.1.1 J.C. Boyle

The J.C. Boyle activities for post-drawdown facility removal are presented below and thoroughly described in the 60% Design Report in Sections 2.4 through 2.5 and in the drawings listed in Table 2.1 of 60% Design Report. For all construction activities disposal of materials will be in accordance with the Waste Disposal and Hazardous Management Plan.

**60% Design Drawings:** C1000-C1005; C1050, C1051; C1060, C1061; C1220-C1222; C1230-C1232; C1240, C1241; C1300, C1301; C1310; C1320-C1323; C1330-C1333; C1340-C1343; C1350-C1352; C1400-C1402; C1410, C1411; C1500, C1501; C1510-C1512; S1000.

#### 3.1.1.1 Dam Removal and Volitional Fish Passage Channel Construction

1. Construct or improve the following roads for construction access, according to Section 7.0 of Appendix B1 of 60% Design Report (Exhibit A-2) and Klamath MOU:
  - a. Left Abutment Access Road (temporary).
  - b. J.C. Boyle Powerhouse Road realignment (permanent; not required if Scour Hole Option 2 is selected).
  - c. Penstock Access Roads (reconstruction).
2. Remove dam and intake concrete from the top of the dam down.
  - a. Load demolished concrete into vehicles on the crest of the embankment dam for removal from the site.
  - b. Remove spillway gates and hoisting equipment to allow spillways to pass flood flows.
  - c. Beginning mid-June of the post drawdown year, remove the spillway and intake concrete to EL. 3,773.8 ft.
3. After removal of the spillway concrete of the post-drawdown year:

- a. Remove power intake concrete to EL. 3,785.2 ft.
  - b. Remove fish ladder.
  - c. Remove concrete cutoff wall.
  - d. Bury the remaining spillway and intake concrete to final grade using excavated embankment fill after removing the embankment dam.
4. Do not begin earthfill embankment removal until mid-June of post-drawdown.
    - a. In-river embankment removal may not begin until July, per Appendix A8 Table 1.1 (60% Design Report in Exhibit A-2).
    - b. Leave an upstream portion of the earthfill embankment in place to serve as a work platform to remove the downstream portion of the embankment. Leave the crest of the work platform at EL. 3,769.3 ft.
  5. Work platform final removal will excavate the river channel footprint to EL. 3,740.0 ft.
    - a. Remove the work platform no earlier than August 1 and no later than September 1.
    - b. Visually inspect the existing cofferdam directing flow to the diversion culverts prior to removing the work platform.
    - c. Include Erosion Protection and Bedding for volitional fish passage per 60% Design Drawings (Exhibit A-2) with the work platform removal.
  6. Remove the existing cofferdam located upstream of the embankment dam centerline and the sediment accumulated upstream and downstream of the cofferdam.
    - a. Removal will begin no later than September 15.

### **3.1.1.2 Water Conveyance Decommissioning**

1. Remove the 14-foot diameter low pressure pipeline connecting the power canal intake to the power canal, including its supports and foundations.
  - a. Remove concrete structures to an elevation at least even level with adjacent bedrock.
  - b. Remove all other features associated with the pipeline.
2. Close the power canal intake before beginning Stage 3 or 4 of the drawdown process.
  - a. Drain the canal to allow for decommissioning of the system and its components.
  - b. Leave unreinforced concrete placed directly on the face of the slope in the single-walled canal sections in place.
  - c. Place reinforced concrete wall sections on the canal invert slab and bury them in place using material sourced locally or from the embankment dam removal.
    - i. Alternatively, demolish reinforced concrete wall sections and haul the concrete to the scour hole located at the downstream end of the power canal.
  - d. Provide rock-lined swales and drainage outlets at topographic low points along the canal to convey natural flows across the former canal.
  - e. Place cover material at three locations to allow animals to cross the decommissioned power canal.
  - f. Remove all forebay components, including trash racks, spillway, spillway gate house, and associated buildings and equipment.
  - g. Bury the tunnel portal inlet opening following removal of the water conveyance infrastructure.



- h. Barricade the tunnel outlet portal with a steel barrier, natural ventilation, and drainage holes. If possible, to construct in a manner that accounts for public safety, the barricade will be made bat friendly.
        - i. Leave the Power Canal Access Road in place for future use by stakeholders.
3. Fill the scour hole located downstream from the power canal spillway with concrete debris from the canal and other areas of the Lower Klamath Project.
  - a. Fill the scour hole to EL. 3,728.0 ft or EL. 3,750.0 ft (determine elevation in final design).
  - b. Do not allow the maximum slope of the filled scour hole to exceed 1.5H:1V.
  - c. Place material in the scour hole from the top of the hole.
  - d. Flatten the side slopes of the scour hole to 1.5H:1V to meet the top of the fill at EL. 3,728.0 ft (if that is determined to be the final design elevation in [3][a]).
  - e. Do not remove rock material that eroded from the scour hole and deposited next to the river.
  - f. Build rock lined swales around the forebay to direct runoff away from the scour hole.
4. Remove and dispose the steel penstocks between the tunnels and powerhouse off-site.
  - a. Demolish and remove the surge tank.
  - b. Demolish concrete anchors to allow removal of the penstock.
  - c. Bury the penstock bedding and remaining portions of the anchors with available overburden soils.

### **3.1.1.3 Powerhouse, Substation, and Ancillary Facilities Removal**

1. Remove the powerhouse and all associated structures.
  - a. Remove and dispose of mechanical and electrical equipment located in the powerhouse, switchyard, and ancillary facilities as described in Section 2.5.2 of the 60% Design Report (Exhibit A-2) and the project's technical specifications.
  - b. Remove equipment and waste materials from the powerhouse at any point during the drawdown year after the water conveyance system is isolated and drained.
  - c. Fill the tailrace to allow the powerhouse to be demolished during the drawdown year.
  - d. Leave powerhouse concrete at EL. 3,340.0 ft and lower in place and bury with a minimum of 3-feet of fill.
  - e. Remove project dependent transmission and distribution lines.
2. Removal of JC Boyle village.
  - a. Decommission water wells.
  - b. Demolish all buildings and associated utilities.
  - c. Remove structures and utilities down to the foundation.
  - d. Leave buried utilities in place.
  - e. Dispose of building waste material at offsite disposal sites.
  - f. Grade surrounding ground to cover remaining foundations and promote down-slope drainage

### **3.1.2 Copco No. 1**

The Copco No. 1 activities for post-drawdown facility removal are presented below and thoroughly described in the 60% Design Report in Sections 3.4 through 3.5 and in the drawings listed in Table 3.1 of the 60% Design

Report. For all construction activities, disposal of materials will be in accordance with the Waste Disposal and Hazardous Management Plan.

**60% Design Drawings:** C2000, C2001; C2010; C2050; C2060, C2061; C2100; C2101; C2175; C2210, C2211; C2250, C2255-C2258; C2270, C2271, C2275; C2280; C2300; C2305; C2350; C2400, C2405; C2410, C2411, C2500-C2505; C2510, C2511; C2550, C2551; S2000.

### **3.1.2.1 Dam Removal and Volitional Fish Passage Channel Construction**

1. Inspect the temporary bridge for the Left Bank Access Road and the work platform for possible damage resulting from drawdown activities and repair the bridge as needed.
2. Complete the existing diversion tunnel once in-river work is allowed, per Appendix A8 Table 1.1 of the 60% Design Report.
  - a. Begin construction by opening a hole through the concrete plug, via access from the downstream tunnel portal, and dewater the upstream portion of the tunnel. Remove the plug after the tunnel has dewatered.
  - b. Demolish the tunnel inlet and intake by blasting; remove debris from the reservoir.
3. Remove the concrete dam following the opening of the existing diversion tunnel.
  - a. Remove the dam from the top moving down.
  - b. Demolish the concrete dam and remove debris from the site via the work platform to the right embankment.
  - c. Complete the concrete removal in the dry until the dam is lowered to EL. 2,515.0 ft.
  - d. Remove the concrete foundation during the months of August or September, when flows are lowest, to EL. 2,472.1 ft.
4. Establish volitional fish passage channel after the dam foundation is removed.
  - a. Excavate any material either upstream or downstream of the dam to achieve grading recommended by the restoration engineering team.
  - b. Line the channel with erosion protection material, per Appendix C1.1 of the 60% Design Report.
  - c. Remove the diversion tunnel cofferdam after removal of the dam foundation and the volitional fish passage channel is established.

### **3.1.2.2 Water Conveyance Decommissioning**

1. Dewater the penstocks during the drawdown stages.
  - a. Remove penstocks after dewatering and dispose of at an approved off-site location.
  - b. Block the Penstock #3 tunnel portal with a concrete plug after removing penstock.

### **3.1.2.3 Powerhouse, Substation, and Ancillary Facilities Removal**

1. Remove the powerhouse, switchyard, transmission lines, and ancillary structures that do not require river access.
  - a. Demolish the powerhouse to the ground-level of the adjacent structure during the in-river work period of the drawdown year. Remove concrete to EL. 2,488.0 ft.
  - b. Backfill voids in the powerhouse with coarse fill and concrete rubble.
  - c. Fill the tailrace channel with coarse fill and concrete rubble.

- d. Remove ancillary buildings and structures.
- e. Remove project dependent transmission and distribution lines.

### **3.1.3 Copco No. 2**

The Copco No. 2 activities for post-drawdown facility removal are presented below and thoroughly described in the 60% Design Report in Sections 3.4 through 3.5 and in the drawings listed in Table 3.1 of 60% Design Report. For all construction activities, disposal of materials will be in accordance with the Waste Disposal and Hazardous Management Plan.

**60% Design Drawings:** C3000-C3004; C3060, C3061; C3200-C3202; C3220, C3221; C3232, C3234, C3235; C3240; C3252; C3300, C3303; C3310; C3330-C3332; C3334; C3340; C3350; C3360; C3400, C3401; C3420; C3520; C2530-C3534; C3700; S3000.

#### **3.1.3.1 Dam Removal and Volitional Fish Passage Channel Construction**

1. Remove the Copco No. 2 Dam and embankment.
  - a. Construct a temporary work platform below the spillway to EL. 2,465.6 ft.
  - b. Demolish the concrete spillway apron, ogee crest, both abutment wing walls, and a portion of the intake structure to EL. 2,453.5 ft or native soils if encountered above this elevation.
  - c. Leave portions of infrastructure (e.g., intake structure, earth fill embankment, and gunite wall) that are below the proposed final grades to be buried in place if they are not at risk of exposure by scour.
2. Construct the volitional fish passage channel.
  - a. Grade the restored channel to achieve the design slope along approximately 1,000 feet -of channel in the former dam and existing diversion dam vicinity.
  - b. Install riprap erosion protection (Type E7, class VII) on the stream banks to stabilize the soils in the vicinity of the dam.
3. Remove the existing diversion dam.
  - a. Install temporary fill (Type E12 fish spawning gravel) to access the dam.
  - b. Remove the diversion dam to design grades.
  - c. Remove the temporary fill used to access the dam.

#### **3.1.3.2 Water Conveyance Decommissioning**

1. Decommission water conveyance system.
  - a. Commence decommissioning any time after the caterpillar gate has been permanently closed and the concrete tunnel plug installed (Section 2.1.3.3), which will permanently drain the conveyance system.
  - b. Demolish intake structure above final grade to ensure no concrete is visible in the restored condition.
  - c. Cover intake and installed concrete tunnel plug with erosion resistant backfill.
  - d. Demolish wood-stave penstock and backfill to blend with existing grades.

- i. Remove timber treated with creosote and dispose of regulated waste at an approved facility.
  - ii. Demolish concrete and steel to at least 2 ft below proposed final grades.
  - iii. Lay demolished concrete, steel cradles, and steel bands down in place and bury with general fill.
2. Demolish both steel penstocks.
  - a. Remove steel pipe, support members, couplings and attached hardware, and dispose of off-site.
  - b. Demolish concrete anchors for penstock to spring line of penstock or 2-feet below proposed final grade, whichever is higher.
    - i. Leave buried concrete in place.
  - c. Backfill with local materials to restore to original grades.
3. Install galvanized steel barriers, drainage holes, and allowance for natural ventilation at the Tunnel 1 outlet, Tunnel 2 inlet, Tunnel 2 outlet, surge vent, and overflow spillway outlet portals. If possible, to construct in a manner that accounts for public safety, the barricade will be made bat friendly.

### **3.1.3.3 Powerhouse, Substation, and Ancillary Facilities Removal**

1. Decommission the powerhouse and ancillary components, including the Copco Village.
  - a. Remove all mechanical and electrical equipment and any hazardous waste materials from the powerhouse, switchyard, Copco Village, and ancillary facilities.
    - i. Dispose of hazardous waste materials at an approved off-site facility.
    - ii. This activity is not dependent on river flows and can be completed any time after the water conveyance system has been isolated and drained.
2. Demolish powerhouse to adjacent ground level after all mechanical and electrical equipment and any hazardous waste materials have been removed.
  - a. Demolish powerhouse concrete to EL. 2,344.5 ft.
  - b. Backfill powerhouse voids with concrete rubble and general fill materials as feasible.
  - c. Demolish right tailrace wing wall and bury in the tailrace.
  - d. Fill tailrace with concrete rubble.
  - e. Grade fill in tailrace to include floodplain bench at EL. 2,336.5 ft and top concrete with 4-feet of Type E8 bedding material to design grades at maximum EL. 2,350.0 ft to provide erosion protection on this riverbank.
  - f. Cover powerhouse excavation and fill with 2-feet of Type E9 general fill.
3. Removal of Copco Village.
  - g. Decommission water wells.
  - h. Demolish all buildings and associated utilities.
  - i. Remove structures and utilities down to the foundation.
  - j. Leave buried utilities in place.
  - k. Dispose of building waste material at offsite disposal sites.
  - l. Grade surrounding ground to cover remaining foundations and promote down-slope drainage
4. Disconnect and decommission the Copco No. 2 tie to the hydropower plant and electrical connections to Iron Gate Dam.

- a. Coordinate all demolition work inside the substation with PacifiCorp prior to the onset of construction activities.
- b. Coordinate with PacifiCorp on all outages.
- c. Remove all below- and above-grade conduit, wire protection and controls, and appurtenances associated with demolition of the substation equipment; and remove transmission lines and support structures.

### 3.1.4 Iron Gate

Iron Gate Post-Drawdown Facility Removal design have advanced from the 60% Design contained in Exhibit A-2. The 90% design plan and drawings will represent this advancement. The information below represents the 60% plan for Iron Gate

**60% Design Drawings:** C4160; C4170, C4171; C4200-C4202; C4210, C4211, C4215-C4221; C4232; C4235; C4300, C4301; C4400-C4405; C4420-C4422; C4501; C4511; S4000.

#### 3.1.4.1 Dam Removal and Volitional Fish Passage Channel Construction

1. Remove the Iron Gate Dam embankment.
  - a. Maintain at least 3 feet of freeboard above the water surface associated with
    - i. the 1 percent chance of exceedance during the assumed period when an accidental breach of the dam would result in downstream flooding.
      - 1 June 1st embankment minimum elevation (Water Surface Elevation [WSEL] +3 ft): 2,334.7 ft.
      - 2 June 16th embankment minimum elevation (WSEL +3 ft): 2,230.7 ft.
      - 3 July 1st embankment minimum elevation (WSEL +3 ft): 2,213.3 ft.
    - ii. The 5 percent chance of exceedance during the assumed period when an accidental breach of the dam would not result in downstream flooding.
      - 1 August and September embankment minimum elevation (WSEL +3 ft): 2,199.4 ft, which is the final embankment elevation prior to breaching.
  - b. Remove dam embankment fill to the bedrock foundation or the final embankment breach elevation.
  - c. Remove remaining sheet pile on dam crest.
  - d. Remove embankment fill in accordance with freeboard requirements.
  - e. Dispose all embankment fill in designated disposal sites.
  - f. Maintain access to the diversion tunnel gate through the final embankment breach.
  - g. Maintain the portion of the embankment at the upstream end of the dam to serve as a worksite protection berm until the final dam breach; once volitional passage is complete, then remove.
  - h. Remove dam embankment fill to bedrock foundation high points (some soil should remain in bedrock depressions) to achieve relatively smooth contours on the finished surface.
  - i. Remove concrete structures until they are flush with the adjacent bedrock, removing any sharp edges on the final surface.
2. After construction of the volitional fish passage described in item 3 below, commence final embankment dam breach once the following criteria are met:
  - a. Prior to the breach at J.C. Boyle Dam.
  - b. Between September 1 and September 30.

- c. Dam embankment reaches the final embankment breach elevation.
  - d. Riprap is installed on the downstream slope of the final upstream embankment to provide erosion protection.
  - e. Water levels in the reservoir are below EL. 2,183.0 ft in the reservoir to provide peak flows of less than 5,000 cfs downstream of the breach.
  - f. In-channel erosion protection materials and bedding are installed downstream of the remaining embankment.
  - g. Volitional fish passage channel is at final grade downstream of the final embankment dam.
  - h. Breach the embankment by notching the embankment below reservoir water surface elevations on the right side of the embankment to provide a controlled release.
  - i. Complete final grading on the left bank and volitional fish passage channel in the wet, during the low flow period.
3. Construct the volitional fish passage channel (prior to final dam breach) to restore channel width and grade to conditions similar to pre-dam conditions and minimize potential fish passage barriers.
    - a. Prior to final embankment dam breach, install stone streambed materials to provide erosion protection. Install protection up to 3-feet above anticipated 1 percent exceedance probable flood elevation.
    - b. Grade the restored channel to achieve the design grades and slope along approximately 1,650 feet of channel in the former dam, powerhouse, and former reservoir areas.

#### **3.1.4.2 Water Conveyance Decommissioning**

1. Spillway decommissioning to commence once dam embankment removal commences.
  - a. Remove all concrete to a minimum of 3-feet below proposed final grade.
  - b. Fill approximately 1,800 feet of spillway with embankment fill to achieve final grade..
  - c. Install riprap erosion protection at toe of spillway fill near the free-flowing Klamath River.
2. Gate shaft decommissioning will begin after gate is locked in the fully open position after the initial embankment excavation commences.
  - a. Maintain access to gate until final embankment breach.
  - b. Remove tower concrete down to dam embankment EL. 2,303.3 ft.
  - c. Continue removal of gate shaft concurrently with dam embankment removal until final breach of embankment.
  - d. Remove and salvage, as desired, hoist and gate materials after final embankment breach.
  - e. Demolish gate shaft to bedrock, approximate EL. 2,254.3 ft.
  - f. Install concrete base for reinforced concrete cap to EL. 2,257.3 ft.
  - g. Install 2-foot thick, 12-foot by 22-foot reinforced concrete slab over the new concrete base on the gate shaft.
  - h. Install cover material (10-foot maximum fill over cover) to make final grades appear natural.
3. Penstock decommissioning to commence once the dam embankment elevation reaches the elevation of the penstock structure.
  - a. Close power intake gate prior to initiating drawdown to dewater penstock.
  - b. Remove the steel pipe, support members, and couplings for disposal off-site.
  - c. Remove concrete to at least adjacent bedrock elevations and any sharp edges removed from the final surface and regrade area to be flush with adjacent ground.

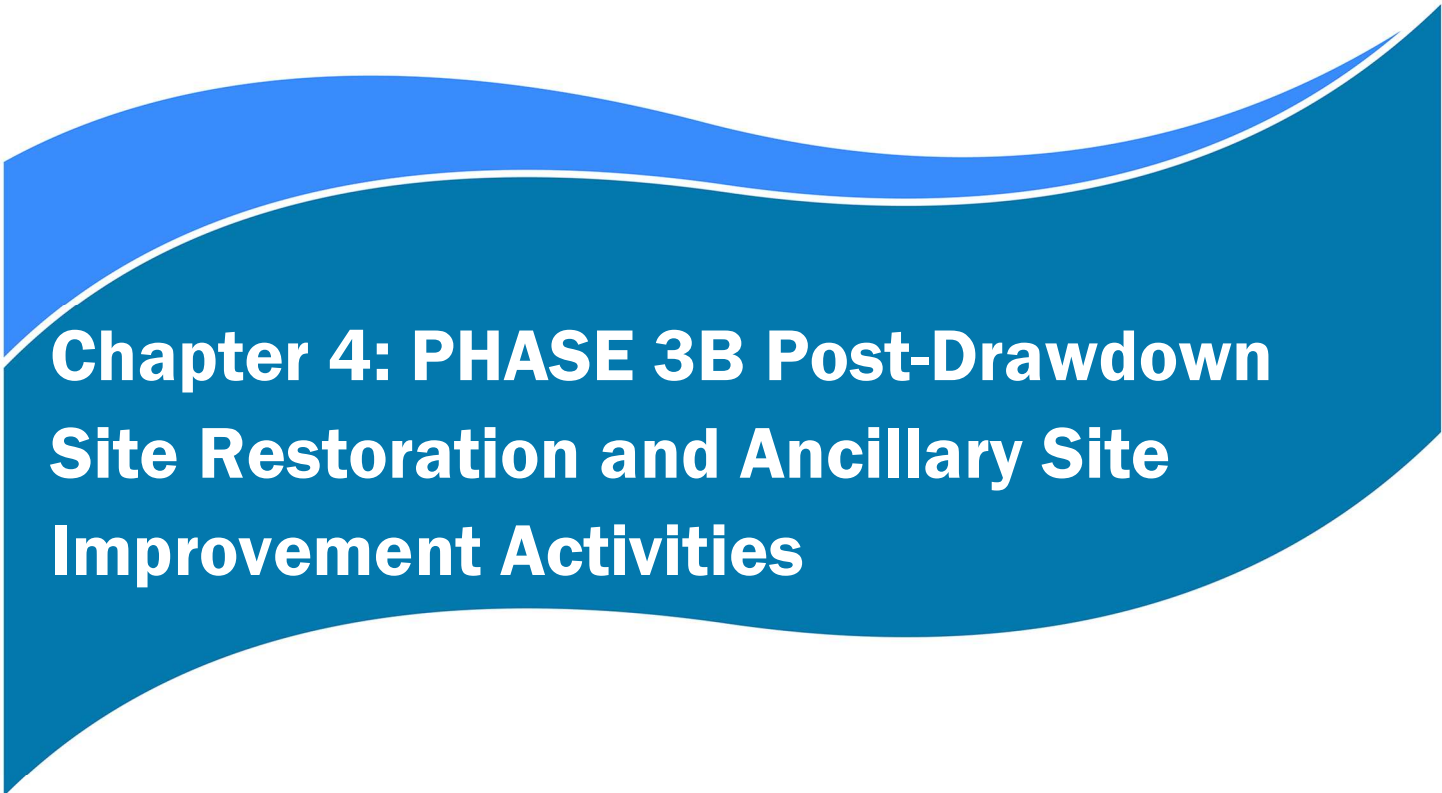
- d. Penstock between the powerhouse and anchor block #3 may be left in-place; area will be used as a spoil area and penstock will be adequately covered.
4. Diversion tunnel decommissioning will begin after final breach of embankment dam occurs.
    - a. Remove grizzly racks and diversion-tunnel intake structure where above proposed final grade.
    - b. Fill intake and outlet of diversion tunnel opening with boulders or concrete rubble stacked to permanently block tunnel opening.
    - c. Cover remaining concrete with embankment material.

### **3.1.4.3 Powerhouse, Substation and Ancillary Facilities Removal**

1. Remove all mechanical and electrical equipment and any hazardous waste materials from the powerhouse, operator's residences, and ancillary facilities at any time during the drawdown year after the water conveyance system has been isolated and drained.
  - a. Flush oil and water supply lines prior to backfill.
  - b. Flush septic system prior to backfill.
  - c. Dispose of hazardous waste consistent with Waste Disposal and Hazardous Waste Management Plan.
2. Demolish powerhouse and tailrace after all mechanical and electrical equipment and any hazardous waste materials have been removed from the facility.
  - a. Demolish powerhouse concrete to EL. 2,186.33 ft (or lower, if required for removal of mechanical equipment), or as revised if the powerhouse will be used as a spoil site.
  - b. In-fill powerhouse with concrete rubble.
  - c. Cap any concrete rubble with a minimum layer of Type E9 general fill to promote positive drainage.
3. Decommission the Iron Gate substation removing all electric and associated auxiliary equipment.
  - a. Remove all below- and above-grade conduit, wiring material, underground cables, exterior lighting, and appurtenances associated with demolition of the substation equipment.
  - b. Leave feeders and conduits to fish ladder and fish hatchery.

### **3.1.4.4 Fish Collection and Holding Facility Decommissioning Activities**

1. Shut off water supply feed (as applicable) and remove four remaining fish holding facilities, fish spawning building, and fish hatchery aerator.
  - a. Remove fish facilities and associated piping (18-inch and 24-inch pipes) prior to beginning dam embankment excavation and prior to removal of fish holding facility, but after final drawdown.
2. Remove concrete structures to adjacent bedrock grades, leaving final concrete surface free of sharp edges.

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## **Chapter 4: PHASE 3B Post-Drawdown Site Restoration and Ancillary Site Improvement Activities**



## **4 PHASE 3B: POST-DRAWDOWN SITE RESTORATION AND ANCILLARY SITE IMPROVEMENT ACTIVITIES**

Post-Drawdown Site Restoration and Ancillary Site Improvements includes all activities in the Proposed Action occurring post-facility removal. After the physical dam removal and the majority of in-water work occurs (Phases 1, 2, and 3A), the Renewal Corporation will implement site restoration activities, including planting, evaluating volitional fish passage barriers that may develop, and invasive exotic vegetation management, to stabilize and restore the river. The details of these activities are described below.

### **4.1 Site Restoration**

Site restoration is the primary activity to support the overall habitat restoration goal for coho salmon, fall-run and spring-run Chinook salmon, winter-run, and summer-run steelhead, redband trout, and Pacific lamprey. Therefore, site restoration will be an active part of all phases of the Proposed Action. The restoration is primarily tied to the removal of the four dams and associated infrastructure, but there will be additional restoration of the former reservoirs as well. To be sensitive to cultural resources and minimize costly restorations in difficult access areas, the restoration will focus on the mainstem of the Klamath River, high priority tributaries, and natural springs and will include the primary restoration areas identified in the following sections. Restoration details will be outlined in detail in the Reservoir Area Management Plan developed in consultation with governmental agencies and tribes.

Given the uncertainty around the location, depth, and volume of sediment that will mobilize, as well as historic channel and tributary geometry, the final restoration of the former reservoirs and associated infrastructure will be based on actual post-removal conditions and the Renewal Corporation's continued consultation with the agencies and other stakeholders. The U.S. Bureau of Reclamation estimated that approximately 50% of the stored sediment in the reservoirs will be eroded during drawdown for a median water year, with a range of 41% to 65% for dry and wet years, respectively (BOR and CDFG 2012). The site restoration effort will include the following activities.

#### **4.1.1 Streams and Floodplain Restoration**

1. Dam removal.
2. Natural sediment evacuation and mechanical sediment removal.
  - a. Focus effort on supplemental sediment evacuation during the January 1 to March 15 drawdown period.
  - b. Reduce the amount of un-natural sediment stored on the historic floodplains.
  - c. Minimize future sediment releases in the Klamath River.

3. Complete geomorphologically-appropriate channel reconstruction to promote volitional fish passage (target of less than a 6-inch change in water surface across obstructions).
4. Streambank and stream bed erosion protection.
5. Installation of boulder clusters and large woody material (approximately 991 wood elements across the four sites) for bank stabilization and fish habitat.
6. Improve hydrologic connectivity to off-channel areas and the floodplain where cost-effective and feasible.

#### **4.1.2 Upland Restoration**

1. Re-grading of the former dam site with natural materials to blend with local topography.
2. Soil erosion controls/BMPs in accordance with regulatory requirements and associated management plans.

#### **4.1.3 Revegetation**

1. Revegetate in three planting zones.
  - a. Wetland planting zone, includes installation of the following vegetation:
    - i. Herbaceous bareroot
    - ii. Sod transplant
    - iii. Cuttings
    - iv. Pole cuttings
    - v. Bareroot shrubs
    - vi. Bareroot trees
    - vii. Salvaged wetland/riparian woody species
    - viii. Salvaged wetland/riparian sod
  - b. Riparian planting zone, includes installation of the following vegetation:
    - i. Cuttings (¼ to 1-inch diameter)
    - ii. Pole Cuttings (1-1/2 to 3-inch diameter)
    - iii. Bareroot shrubs
    - iv. Bareroot trees
    - v. Salvaged wetland/riparian woody species
    - vi. Salvaged wetland/riparian sod
  - c. Upland/Floodplain planting zone, includes installation of the following vegetation:
    - i. Bareroot shrubs all reservoirs
    - ii. Bareroot trees all reservoirs
  - d. Planted riparian corridor average width:
    - i. Klamath River: 50 feet
    - ii. Tributaries: 30 feet

#### **4.1.4 Invasive Exotic Vegetation Management**

1. Control only high-priority invasive exotic vegetation (IEV) species.
2. Commence during pre-removal activities and continue for 2 years after removal (ending in 2023).

3. Develop and implement long-term management and monitoring plan in 2023 to reflect conditions after initial treatments.
4. Primary elements of IEV management (as directed by annual action plan and assessment report).
  - a. Prioritize IEV species for treatment.
  - b. IEV monitoring.
  - c. IEV treatments via physical removal (options for biological or chemical removal).

Additional information regarding site specific restoration activities is summarized below with details contained in Exhibit A-2 (Kiewit 2020a and 2020b).

#### **4.1.5 J.C. Boyle**

Primary restoration areas include Spencer Creek and three unnamed tributaries to the J.C. Boyle Reservoir that will receive riparian seeding and/or planting if needed to reestablish connectivity to the mainstem of the Klamath River.

- Sediment volume estimates for mechanical removal are estimated at 40,400 CY.

#### **4.1.6 Copco No. 1**

Primary restoration areas include Beaver Creek Complex, Deer/Indian Creek, and the spring-fed floodplain/wetland complex.

- Sediment volume estimates for mechanical removal are estimated at 346,400 CY.

#### **4.1.7 Copco No. 2**

Due to the small impoundment and proximity to Copco No. 1, the Renewal Corporation does not propose primary restoration areas at Copco No. 2. The bypass reach below Copco 2 may require vegetation clearing once full river flow is re-established due to the reach only receiving 25 or less cfs for the last 50 or more years.

#### **4.1.8 Iron Gate**

Primary restoration areas include the Klamath River, Jenny Creek, the Camp Creek Complex (Dutch, Camp and Scotch creeks), targeting the confluences with Scotch Creek, an unnamed tributary and mainstem, and Wanaka Springs.

- Sediment volume estimates for mechanical removal are estimated at 387,900 CY.

### **4.2 Ancillary Post-Drawdown Site Improvements**

As part of the larger dam decommissioning effort, the Renewal Corporation will undertake the following improvements to recreation, fisheries, and water supply, as detailed in Exhibit A-2 and Kiewit 2020a and 2020b. The ancillary post-removal site improvements include recreation improvements; additional summary details on these improvements are provided in the following sections.

## 4.2.1 Recreation Modifications and Improvements

The Renewal Corporation is drafting a Recreation Facilities Plan, in coordination with stakeholders including commercial and private boaters, anglers, and tribes. The Renewal Corporation proposes changes to existing recreation sites included in the current license, as shown in Table 4-1. Table 4-1 provides the existing recreation sites and their disposition as part of the Proposed Action.

**TABLE 4-1 EXISTING RECREATION FACILITIES AND PROPOSED ACTIONS**

Site	Action
<b>J.C. Boyle Reservoir Recreation Sites</b>	
Pioneer Park East <sup>1</sup>	Remove
Pioneer Park West	Modify
Topsy Campground	Modify
Sportsman's Park	Unchanged
Spring Island	Unchanged
Klamath River Campground	Unchanged
<b>Copco Lake Recreation Sites</b>	
Mallard Cove	Remove
Copco Cove	Remove
<b>Iron Gate Reservoir Recreation Sites</b>	
Fall Creek Day Use Area	Retain
Fall Creek Trail	Retain
Overlook Point	Remove
Wanaka Springs	Remove
Jenny Creek	Remove
Camp Creek	Remove
Juniper Point	Remove
Mirror Cove	Remove
Long Gulch	Remove
Iron Gate Fish Hatchery	Modify

Source: KRRC 2020c

<sup>1</sup> A split rail fence will be constructed, extending approximately 200-feet from the Highway 66 Bridge abutment to the existing tree line that begins at the eastern edge of the graveled area in order to define and protect the newly restored shoreline area.

Following the effective date of license surrender, the Renewal Corporation will transfer Project lands to the States of California and Oregon (Parcel B lands), or a designee. The Renewal Corporation has consulted with the States to confirm that that, after the effective date for license surrender, they will assume responsibility for operation and maintenance of the sites shown in Table 4-2.

In addition, the Renewal Corporation proposes to construct new sites as may be specified by the States. These sites are not necessary to mitigate the Proposed Action’s impacts on recreation and instead will enhance this beneficial use after license surrender is effective (KRRC 2020c). These enhancement sites are listed in Table 4-2. The Renewal Corporation is currently undertaking further consultation, as well as design work, with the States and stakeholders. The Renewal Corporation proposes to construct sites listed in Table 4-2 as may be specified in a cooperative agreement with the States, including their responsibilities for operation and maintenance of these sites after license surrender is effective.

**TABLE 4-2 POTENTIAL NEW OR MODIFIED RECREATION SITES**

Access Site	Amenities	Expected Recreation Opportunities
Pioneer Park West <sup>6</sup> (Oregon)	Access road improvements, new boat launch and vehicle turnaround, boat launch staging area, parking area, universally accessible vault toilet, garbage facilities, water spigot, kiosk with angler box, paved trail to ADA spaces, picnic areas and river viewing area and informal kiosk	Whitewater boating, fishing, general boating, informal shoreline recreation
Moonshine Falls (Oregon)	Access road improvements, parking area, universally accessible vault toilet, garbage facilities, water spigot, kiosk with angler box, 1 picnic site, river view point with benches, trail to the boat launch, boat launch staging area and vehicle turnaround, boat launch drop off/staging area, boat slide and accompanying ramp to river’s edge, gravel beach	Whitewater boating, fishing, boating, picnicking/day use
Copco Valley (California)	Access improvements, including road, parking area, universally accessible vault toilet, garbage facilities, kiosk with angler box, water spigot, picnic sites, designated dispersed river access sites with gravel connector trail, paved boat ramp, boat launch staging area, hand/launching area/beach	Whitewater boating, fishing, boating, picnicking/day use, informal shoreline recreation
Copco No. 2 Powerhouse (California)	Widened access road, parking area, universally accessible vault toilet, garbage facilities, water spigot, picnic areas, view point with bench, staging area with bench and kiosk with angler box, shoreline trail from boat slide to Daggett Road, boat slide to launch at river edge, boat slide staging area	Whitewater boating, fishing, boating, picnicking/day use, informal shoreline recreation

<sup>6</sup> These sites are a modification of an existing recreation site

Camp Creek (California)	New short access road, parking area, trail leading downslope to riverbank, universally accessible vault toilet, garbage facilities, kiosk with angler box, picnic sites, gravel river access area	Fishing, informal shoreline recreation, picnicking/day use, whitewater boating
Iron Gate* (California)	Parking area, universally accessible vault toilet, garbage facilities, kiosk with angler box, water spigot, picnic sites, trails to picnic sites, re-grade river's edge/beach, improved boat launch, launch staging area	Boating, fishing, informal shoreline recreation

Source: KRRRC 2020c

## 4.3 Monitoring

Management plans (Chapter 6) stipulate monitoring of resources during the Proposed Action. The Renewal Corporation is developing 16 plans Chapter 6, Table 6-2, includes the list of management plans and a brief description. Monitoring details will be provided in each applicable management plan.

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## **Chapter 5: Schedule**

## 5 SCHEDULE

The Renewal Corporation will remove the Lower Klamath Project facilities in parallel during one low-flow construction season (Kiewit 2020a). The following sections include schedules for each development.

### 5.1 J.C. Boyle

The Renewal Corporation will remove and/or construct the J.C. Boyle Facility components per the implementation schedule provided in Appendix P of the 60% Design Report in Exhibit C-1 of the Amended Surrender Application. Table 5-1 presents the primary work activities and the expected start and finish dates.

**TABLE 5-1 J.C. BOYLE WORK ACTIVITIES**

Description	Expected Start	Expected Finish
Pre-Drawdown Work	July 2022	January 2023
Initial Drawdown (reservoirs will partially fill during freshet)	January 1, 2023	March 15, 2023
Post-Drawdown Transmission/Distribution Work	March 2023	May 2023
Post-Drawdown Power Canal Removal	April 2023	August 2023
Post-Drawdown Powerhouse and Penstock Removal	April 2023	October 2023
Post-Drawdown Intake Structure Removal	April 2023	September 2023
Post-Drawdown Embankment Removal	July 2023	September 2023
Post-Drawdown Work Platform Removal	August 2023	September 2023
Post-Drawdown Historic Cofferdam Breach	September 2023	September 2023
Volitional Fish Passage		September 30, 2023
Restoration	January 2022	September 2024

Source: Kiewit 2020a



## 5.2 Copco No. 1

The Renewal Corporation will remove and/or construct the Copco No. 1 facility components per the implementation schedule provided in Appendix P of the 60% Design Report in Exhibit C-1 of the Amended Surrender Application. Table 5-2 presents the primary work activities and the expected start and finish dates.

**TABLE 5-2 COPCO NO. 1 WORK ACTIVITIES**

Description	Expected Start	Expected Finish
Pre-Drawdown Construction Access (Phases 1 and 2)	July 2022	August 2022
Pre-Drawdown Work	July 2022	October 2022
Early Drawdown (Stage 1)	November 2022	December 2022
Initial Drawdown (Stages 2 and 3) (reservoirs will partially fill during freshet)	January 1, 2023	March 15, 2023
Post-Drawdown Transmission/Distribution Work	April 2023	June 2023
Post-Drawdown Diversion Tunnel Reopening	June 2023	June 2023
Post-Drawdown Dam Removal	May 2023	September 2023
Post-Drawdown Powerhouse and Penstock Removal	April 2023	June 2023
Post-Drawdown Diversion Cofferdam Removal	August 2023	September 2023
Volitional Fish Passage		September 30, 2023
Restoration	January 2023	September 2024

Source: Kiewit 2020a

## 5.3 Copco No. 2

The Renewal Corporation will remove and/or construct the Copco No. 2 facility components per the implementation schedule provided in Appendix P of the 60% Design Report in Exhibit C-1 of the Amended Surrender Application. Table 5-3 presents the main work activities and the expected start and finish dates.

**TABLE 5-3 COPCO NO. 2 WORK ACTIVITIES**

Description	Expected Start	Expected Finish
Pre-Drawdown Construction Access	July 2022	October 2022
Pre-Drawdown Dam Removal	July 2022	September 2022
Drawdown (Plug Removal)	January 2023	January 2023
Post-Drawdown Dam Removal	June 2023	September 2023
Post-Drawdown Intake Structure Work	June 2023	September 2023
Post-Drawdown Transmission/Distribution Work	January 2023	September 2023
Post-Drawdown Powerhouse and Penstock Removal	January 2023	October 2023
Post-Drawdown Wood-Stave Penstock Removal	January 2023	October 2023
Volitional Fish Passage		September 30, 2023
Restoration	January 2023	September 2024

Source: Kiewit 2020a

## 5.4 Iron Gate

The Renewal Corporation will remove and/or construct the Iron Gate facility components per the implementation schedule provided in Appendix P of the 60% Design Report in Exhibit C-1 of the Amended Surrender Application. Table 5-4 presents the main work activities and the expected start and finish dates

**TABLE 5-4 IRON GATE WORK ACTIVITIES**

Description	Expected Start	Expected Finish
Pre-Drawdown Construction Access	July 2022	September 2022
Pre-Drawdown Modification	July 2022	October 2022
Pre-Drawdown Tunnel Outlet Grading and Fish Ladder Removal	December 15, 2022	December 31, 2022
Initial Drawdown (reservoirs will partially fill during freshet)	January 1, 2023	March 15, 2023
Post-Drawdown Transmission/Distribution Work	April 2023	April 2023
Post-Drawdown Powerhouse/Penstock/Fish Facility Removal	April 2023	August 2023
Post-Drawdown Embankment Removal	June 2023	August 2023
Post-Drawdown Embankment Breach	August 2023	August 2023
Volitional Fish Passage		September 30, 2023
Restoration	January 2023	September 2024

Source: Kiewit 2020a



## **Chapter 6: Management Plans**

## 6 MANAGEMENT PLANS

The Renewal Corporation will implement many measures incorporated into management plans as part of the Proposed Action for the Lower Klamath Project. The Amended Surrender Application has established 16 Management Plans (Table 6-1) to incorporate the proposed measures that were established from the Oregon and California CWA 401s, the CA FEIR, the state and county MOUs, consultation with the BLM regarding federal lands occupied by the project, and anticipated terms and conditions of the USFWS and NMFS Section 7 Biological Opinion.

**TABLE 6-1 MANAGEMENT PLANS TO BE INCORPORATED INTO PROPOSED MEASURES**

1. Aquatic Resources Management Plan	9. Remaining Facilities Plan
2. Construction Management Plan	10. Reservoir Area Management Plan
3. Erosion and Sediment Control Plan	11. Reservoir Drawdown and Diversion Plan
4. Hatchery Management and Operations Plan	12. Sediment Deposit Remediation Plan
5. Health and Safety Plan	13. Terrestrial and Wildlife Management Plan
6. Historic Properties Management Plan	14. Waste Disposal and Hazardous Materials Plan
7. Interim Hydropower Operations Plan	15. Water Quality Monitoring Management Plan
8. Recreation Facilities Plan	16. Water Supply Management Plan

Each management plan summarized below states the purpose or intent of the plan, indicates any subplans, if applicable, lists the primary elements or measures of the plan, and provides a status and intended schedule. Table 6-2 includes the management plans, the measures, the referring source of the measure and/or plan, and when the plans will be implemented throughout the pre-drawdown and drawdown phases, post-drawdown facility removal, and the post drawdown site restoration and ancillary site improvements.

### 6.1 Aquatic Resources Management Plan

The Aquatic Resources Management Plan (ARMP) incorporates six subplans and associated measures to reduce the potential for and severity of short-term impacts on aquatic species (SWRCB 2020a) as a result of implementing the Proposed Action. Implementing the Proposed Action will ultimately result in a free-flowing river system and provide anadromous fish passage to the tributaries as well as the mainstem Klamath River above the existing dams. As a result, the Renewal Corporation will implement several measures to survey and monitor the fish and new habitat.

The ARMP encompasses all aquatic resource-related plans required by both the SWRCB and ODEQ 401 WQCs, which include the following **subplans**, select details of which are discussed below:

- Spawning Habitat Availability Report and Plan
- Adaptive Management Plan (suckers)
- Fish Presence Monitoring Plan
- Tributary-Mainstem Connectivity Plan

- Monitoring and Adaptive Management Plan
- Juvenile Salmonids and Pacific Lamprey Rescue and Relocation Plan

The Tributary-mainstem Connectivity Plan will monitor and address tributary connectivity and fish passage in previously identified tributaries and all new stream channels previously inundated by the Lower Klamath Project. Reporting for this subplan will include an overall assessment of fish passage in the newly accessible Klamath River and tributaries; and a summary of tributary obstructions that limit fish passage and proposed remedial actions.

A Spawning Habitat Availability Report and Plan will be included in the ARMP. This subplan summarizes the survey of newly accessible anadromous fish spawning habitat and proposes actions to augment spawning habitat in the mainstem Klamath River and its tributaries.

As part of the pre-drawdown phase, the Renewal Corporation will develop parameters to identify, salvage and relocate the following:

- Juvenile salmonids
- Pacific lamprey encountered with the juvenile salmonids
- Lost River and shortnose suckers

The Renewal Corporation will monitor for anadromous fish access, newly created/accessible spawning habitat, tributary connectivity, and water quality at relocation areas. Spawning gravel surveys will also be conducted. The Renewal Corporation will develop a list of anadromous fish species to be surveyed and monitored for during the Post-Drawdown Phases and the timing, frequency, and duration of surveys and the survey methods, and reporting. The ARMP will include an assessment of estimated spawning habitat benefits and proposed actions to improve spawning and rearing habitat.

The ARMP will adhere to relevant state and local regulations such as the ODFW Fish Passage Authorization as required in the Oregon Revised Statutes 509.585 and will be filed with appropriate state, local and federal agencies, including but not limited to:

- USFWS
- ODFW
- CDFW
- NMFS

**Status:** 75% draft plan

**Consulting Agencies:** CA SWRCB, CDFW, ODEQ, NMFS, and USFWS

**Anticipated FERC Filing:** February 2021

## **6.2 Construction Management Plan**

The Construction Management Plan (CMP) is an all-encompassing plan that will include those measures specifically related to the construction phase of the Proposed Action and those measures meant to be

addressed by the selected contractor(s). The CMP will initially be based on the 60% design specifications and will be revised in parallel with the development of the 100% design.

Two **Traffic Management Subplans** will be developed as part of the Construction Management Plan and will include all traffic measures outlined in the **Klamath County MOU and the Siskiyou County**. The subplans will contain specific requirements as outlined in their respective MOU's. These will include in common traffic control drawings, traffic study, and existing conditions report. This subplan will ensure that all local, regional, state, and federal regulatory requirements are met, including but not limited to:

- The latest version of the California Department of Transportation (Caltrans) California Manual on Uniform Traffic Control Devices (MUTCD)
- Caltrans Traffic Management Plan (TMP) Guidelines
- Oregon Department of Transportation (ODOT) Oregon Supplement to the MUTCD
- Federal Highway Administration MUTCD
- ODOT Traffic Control Plans Design Manual
- ODOT TMP Project Level Guidance Manual
- Caltrans Standard Plans and Standard Specifications
- ODOT Highway Design Manual and Standard Specifications

The CMP will ensure that impacts to bicycle and pedestrian traffic are minimized and will include an **Emergency Response Subplan** to ensure emergency services are not disrupted. The CMP will include a work camp to provide adequate lodging for workers to reduce travel time to project sites, to increase worker and public safety, and to adequately plan for Project mobility. All sites considered for temporary worker housing will be within the current FERC Project boundary.

The CMP will also include **best management measures** to be implemented during construction activities and by the contractor(s) to protect and minimize impacts to wildlife, such as:

- Ensuring an on-site biologist/construction monitor with stop-work authority is present during construction related activities. This biologist will conduct daily pre-construction surveys of the areas to be disturbed that day.
- Providing biological resources education and awareness training by a trained (and approved) biologist for all on-site personnel and their supervisors. This training will include, at a minimum: (1) a brief introduction to the special-status species and identifying characteristics, including a short discussion of the biology, life history, habitat requirements, status, and legal protection; (2) measures being taken for the protection of these species and their habitats; and (3) actions to be taken if a special-status species is found within the area during construction activities.
- Maintaining a 20-mile per hour speed limit on all unpaved roads.
- Fencing and exclusion of construction areas (including staging areas and access routes) to reduce the potential for terrestrial species to be impacted by construction.
- Conducting general special-status wildlife surveys prior habitat modification activities (including clearing and grubbing).
- Defining the timing and process for tree and vegetation trimming to avoid nesting season.

**Status:** 75% draft plan

**Consulting Agencies:** CDFW, ODFW, Siskiyou and Klamath County.

**Anticipated FERC Filing:** February 2021

## 6.3 Erosion and Sediment Control Plan

The Erosion and Sediment Control Plan (ESCP) is a best management approach to address potential impacts associated with implementing the Proposed Action. As described in the ODEQ 401 WQC as Condition 8 and Condition 10 of the SWRCB 401 WQC addressing Construction General Permit under National Pollution Discharge Elimination System (NPDES) the Renewal Corporation will establish erosion and sediment control best management practices to minimize pollution from sediment erosion caused by facilities removal and restoration activities.

The Renewal Corporation will obtain NPDES permits for the Proposed Action from Oregon and California which will include a storm water pollution prevention plan. These permits will prescribe all necessary erosion control measures and monitoring. The NPDES best management practices will be incorporated into the ESCP. In addition, the ESCP will address specific ODEQ 401 CWA Condition 8 requirements for the J.C. Boyle facility removal for the J.C. Boyle disposal site, scour hole, recreation site removal, canal removal, and the powerhouse and tailrace.

**Status:** 75% draft plan, NPDES permits and BMPs under development.

**Consulting Agencies:** California SWRCB, California North Coast Regional Water Quality Control Board (NCRWQCB), ODEQ, and Oregon Division of State Lands (ODSL).

**Anticipated FERC Filing:** February 2021

## 6.4 Hatcheries Management and Operations Plan

The Hatcheries Management and Operations Plan (HMOP) will describe the Renewal Corporation's plans to construct, modify, operate, maintain, and facilitate transfer of ownership and continued operation of the Fall Creek and Iron Gate hatcheries. Included will be annual fish production goals, identification of water supplies needed to operate the hatcheries, and the required minimum amount of flow below the diversions. The HMO Plan will outline the minimum flow requirements in Bogus Creek as needed for successful fish migration for Chinook salmon, coho salmon, and steelhead.

**Status:** 90% draft plan

**Consulting Agencies:** CA SWRCB, CDFW, NMFS, and USFWS

**Anticipated FERC Filing:** February 2021

## 6.5 Health and Safety Plan

A site-specific **Health and Safety Plan** (HSP) will address risks, contractor coordination, site security, traffic, and pedestrian management, training requirements, and accident and incident reporting during implementation of the Proposed Action. The Health and Safety Plan will also contain a **Public Safety Plan** specifically tiered to addressing the risk management for the public. This HSP Plan will contain details of the Waste Disposal



Hazardous Materials Plan and the Construction Management Plan to ensure consistency across project activities.

**Status:** 25% draft plan

**Consulting Agencies:** None

**Anticipated FERC Filing:** February 2022

## 6.6 Historic Properties Management Plan

The Historic Properties Management Plan (HPMP) addresses historic and archaeological resources, and includes the **subplans** below

- **Looting and Vandalism Prevention Plan**
- **Inadvertent Discovery Plan**
- **Cultural Resources Monitoring Plan**
- **Tribal Cultural Resources Management Plan**

The HPMP describes the measures to avoid, minimize, or mitigate any of the Proposed Action's potential adverse impacts to traditional cultural resources (TCRs). Implementing the HPMP will include an inventory of known and potential TCRs that could be affected by the Proposed Action, provisions to protect the confidentiality of known TCRs, and a cultural resources training program for all on-site personnel associated with the Proposed Action.

The Looting and Vandalism subplan will be designed to deter looting and vandalism to TCRs associated with the Lower Klamath Project. The Looting and Vandalism subplan will describe measures to achieve this goal in addition to the description of a monitoring program for known TCRs and any unknown areas as identified by the Renewal Corporation, tribal monitors, or others. A training program will be developed on looting and vandalism prevention and site documentation.

The Inadvertent Discovery subplan will include state protocols for reservoir drawdown or restoration activities following an inadvertent discovery; timeline for completing treatment measures and assessing the California Register significance for discovered cultural resources and human burials or remains; details for a training program for inadvertent discovery during construction and dispute resolution procedures in the event that Tribes disagree on which measures to apply to protect TCRs. The Inadvertent Discovery subplan will allow tribal monitors to participate in monitoring during implementation.

Additionally, the HPMP includes provisions to protect and enhance TCRs that are exposed due to the Proposed Action on state and private lands in California, on a long-term basis following surrender of the Lower Klamath Project license. These provisions include funding for monitoring, including supplementing or enhancing law enforcement resources and other measures to be described in the HPMP.

**Status:** Final Draft

**Consulting Agencies:** CA SHPO, OR SHPO, Federally recognized tribes

**Anticipated FERC Filing:** February 2021

## 6.7 Interim Hydropower Operations Plan

If drawdown and dam removal are not initiated within 24 months of issuance of the FERC License Surrender Order, the Interim Hydropower Operations Plan (IHOP) will detail the limitations of short-term interim operation of the hydroelectric facilities until the removal can be implemented. The IHOP will include additional measures to be implemented to protect water quality and fisheries prior to drawdown and dam removal activities.

**Status:** Pending

**Consulting Agencies:** CA SWRCB, North Coast RQWCB, CDFW, ODEQ, NMFS, and USFWS

**Anticipated FERC Filing:** 2024, if necessary

## 6.8 Recreation Facilities Plan

The Proposed Action will remove, make modifications, or construct new recreation facilities during implementation. While these efforts will meet the requirements of the Construction General Permit, a Recreation Facilities Plan (RFP) is under development to describe all activities involving recreation facilities in the Lower Klamath Project area. The recreation facilities described in the Remaining Facilities Plan will not be discussed in the RFP.

The RFP will include a list of all new or modified recreation facilities associated with the Lower Klamath Project and identify any new recreation facilities to be constructed. Additionally, the RFP will provide plans for public education signage, water quality monitoring for fecal coliform, *E.coli*, and microcystin toxin in and around recreation areas; proposed measures to protect water quality, and beneficial uses during implementation of the Proposed Project; and any plans to facilitate transfer of ownership and/or operation of recreation facilities. Additional information will be incorporated for whitewater boat put-in/take-out sites and fishing access sites.

**Status:** 75% draft

**Consulting Agencies:** CA SWRCB, CDFW, California Parks and Recreation, Oregon Parks, BLM, National Park Service

**Anticipated FERC Filing:** February 2021

## 6.9 Remaining Facilities Plan

Implementing the Proposed Action may involve leaving some facilities of the Lower Klamath Project in place. Because these facilities have the potential to impact water quality, the Remaining Facilities Plan will include a list and description of all Project facilities and structures that will remain onsite during implementation of the Proposed Action, including but not limited to those facilities buried in place. Potential water quality impacts associated with these facilities will be analyzed and provisions to ensure that any ongoing measures will be implemented when ownership of the facilities and/or responsibility for operations is transferred to another entity will be discussed in the Remaining Facilities Plan.

**Status:** 75% draft

**Consulting Agencies:** SWRCB and ODEQ

**Anticipated FERC Filing:** February 2021

## 6.10 Reservoir Area Management Plan

The Reservoir Area Management Plan (RAMP) includes all components to be implemented for restoration activities, monitoring, and adaptive management. The RAMP will provide a detailed description of proposed restoration activities and a preliminary map identifying proposed locations for those activities. A list of BMPs or other measures addressing invasive weed management, revegetation, floodplain connectivity, and procedures to stabilize and restore the former reservoir area(s) after removal of the dams will also be included.

The RAMP will include performance criteria for evaluating restoration efforts to meet unobstructed stream continuity, fish passage, sediment stability, invasive toxic vegetation abatement, and native vegetation cover establishment. The plan will include descriptions on the use of native plants to promote soil stabilization, a wetlands presence evaluation (including wetlands in the disposal areas), measures to ensure no net loss of wetland or riparian habitat, floodplain connectivity measures, a monitoring plan for invasive weeds in the restored areas, and a plan for installation of large woody material and the protection of culturally-sensitive plants.

Monitoring activities will include conducting aerial LiDAR reconnaissance surveys to measure sediment stability and estimate the volume of sediment export following the drawdown phases. This will be supplemented annually with visual inspections and physical measurements.

The adaptive management components of the RAMP ensure that in the event that monitoring results show runoff from exposed embankment areas cause erosion, sedimentation, or lower of water quality, the Renewal Corporation will analyze the situation and propose appropriate corrective measures.

**Status:** 75% draft.

**Consulting Agencies:** California SWRCB, California North Coast Regional Water Quality Control Board (NCRWQCB), CDFW, USFWS, NMFS, BLM, ODEQ, and Oregon Division of State Lands (ODSL).

**Anticipated FERC Filing:** February 2021

## 6.11 Reservoir Drawdown and Diversion Plan

The Reservoir Drawdown and Diversion Plan (RDDP) describes all of the proposed drawdown methods, procedures, schedules, and monitoring efforts to be conducted as part implementing the Proposed Action. This Plan will include the following elements:

- Flood frequency evaluation.
- Slope-stability analysis. The RDDP will contain a **subplan**, the **Slope Stability Monitoring Plan** California SWRCB 401 CWA Condition 18. This subplan identifies reservoir slopes and other Lower Klamath Project areas prone to instability and describes site-specific measures to avoid potential slope erosion and response measures if unstable slopes present a public safety concern.
- Drawdown and construction schedule for each of the facilities.
- Detailed description of all of the facilities that will be removed.

- Elements of maintaining compliance with the cofferdam requirements, including a detailed description of cofferdams that will be installed (e.g., locations, timing, direction).
- Anticipated hydropower operations during drawdown.
- Details of anticipated powerhouse operations during drawdown of the reservoirs.
- Sequencing of drawdown activities for all four reservoirs, and how those activities will be implemented.
- Location, schedule, and installation procedures for piezometer wells proposed for the upstream shell and core of J.C. Boyle.
- Monitoring procedures of water levels and pore pressure at these locations.
- Description of all proposed survey monuments and inclinometer installations.
- Visual monitoring schedule for evidence of potential slumping, cracking, or slope failure of dam embankment.
- Monitoring of the J.C. Boyle streamflow gauges below Keno and below J.C. Boyle (ODEQ 2018).
- Procedures for assessment and response to reservoir discharge obstructions caused by physical blockages, mechanical failure, or other conditions that may restrict outflow.
- Embankment stability, slumping, loss of erosion protection procedures.
- Cultural resource discovery procedures.
- Procedures for other events that may directly or indirectly affect the reservoir drawdown schedule.

**Status:** 50% Draft

**Consulting Agencies:** California SWRCB and ODEQ

**Anticipated FERC Filing:** February 2021

## 6.12 Sediment Deposit Remediation Plan

The Sediment Deposit Remediation Plan (SDRP) is part of an adaptive management approach to address potential impacts associated with implementation of the Proposed Action. The SDRP will outline the requirements under California SWRCB 401 WQC Condition 4 and the Del Norte MOU harbor sediment monitoring requirements. As described in the SWRCB 401 WQC, Condition 4, the Renewal Corporation will assess and remediate visibly obvious sediment deposits along the Klamath River from below Iron Gate Dam to the mouth of the Klamath Estuary that may have been deposited on residential or agricultural land during reservoir drawdown activities (SWRCB 2020b) upon notice to the Renewal Corporation by an affected landowner. As part of the sediment assessment, deposits will be characterized as those that require further action and those that do not. For those deposits that require further action, a SDRP will be developed. This plan will include the location, size, quantity, testing methods, results, and proposed remediation actions.

As described in the SWRCB 401 WQC, the Renewal Corporation will assess and remediate visibly obvious sediment deposits on private properties along the Klamath River from below Iron Gate Dam to the mouth of the Klamath Estuary that may have been deposited during reservoir drawdown activities (SWRCB 2020b). As part of the sediment assessment, deposits will be characterized as those that require further action and those that

do not. For those deposits that require further action, a Sediment Deposit Remediation Plan will be developed. This plan will include the location, size, quantity, testing methods, results, and proposed remediation actions.

The Del Norte MOU identifies action by the Renewal Corporation to develop a workplan that assesses the sediment deposition conditions at the Crescent City harbor. The workplan will establish the approach to determine if there are remaining dam sediments that effect navigability. The pre dam removal harbor condition will be established and will be compared to post dam removal conditions, characterized as an impact analysis. If conditions warrant financial assistance for dredging will be provided by the Renewal Corporation to Del Norte County.

**Status:** Final drafting of the Del Norte County work plan.

**Consulting Agencies:** California SWRCB and Del Norte County

**Anticipated FERC Filing:** February 2021.

## 6.13 Terrestrial and Wildlife Management Plan

The Terrestrial and Wildlife Management Plan (TWMP) will describe the measures to be taken to avoid or minimize those potential impacts due to the implementation of the Proposed Action. The TWMP will consist of two **subplans**: The **Amphibian and Reptile Relocation Plan** and the **Bald and Golden Eagle Management Plan**. Measures to protect any potential gray wolf in the area, avoid habitat for willow flycatcher, establish 20-foot buffers around delineated wetlands, avoid special status plants, and bat BPMS will also be included in the TWMP.

Potential impacts to special status amphibians and reptiles, including the potential for stranding western pond turtles during the drawdown phase, and potential impacts from construction and alterations to habitat are anticipated throughout all phases of the Proposed Action. The **Amphibian and Reptile Relocation Subplan** will address these impacts and include surveys and relocation protocols to be developed for these species. Specific attention will be given to the rescue and relocation of western pond turtles at multiple life stages after reservoir drawdown. Provisions will be made to address survey timing and frequency, survey locations, identification, and relocation to areas with suitable habitat and post-relocation survey results.

Construction-related activities have the potential to disturb bald or golden eagles in the Lower Klamath Project area. Measures to minimize potential impacts to bald or golden eagles and their habitat will be described in the **Bald and Golden Eagle Management Subplan**. Survey protocols, nesting buffers and construction timing windows and methods to minimize potential noise-related impacts will be described in this subplan and incorporated into the overall TWMP.

Recommended construction-related measures to protect wildlife will be included in the Construction Management Plan.

**Status:** 75% draft

**Consulting Agencies:** CA SWRCB, CDFW, ODFW, NMFS, and USFWS

**Anticipated FERC Filing:** February 2021

## 6.14 Waste Disposal and Hazardous Materials Management Plan

The waste produced through implementing the Proposed Action will be managed through the development of a Waste Disposal and Hazardous Materials Management (WDHMP) describing the Renewal Corporation and their contractor's efforts to properly manage waste materials associated with Proposed Action and ensure waste material does not enter waterways or impact water quality. Under California SWRQB Conditions 11 and 12, a waste disposal plan for all non-hazardous waste and hazardous wastes are required. Under ODEQ Condition 9 a Waste Disposal and Management Plan is required to address both hazardous and non-hazardous wastes and Condition 10 a Spill Prevention, Control and Countermeasure Plan (SPCC) is required. The WDHMP will address the interests of both state requirements described above.

Hazardous materials could include but are not limited to those materials associated with the structures to be removed and materials necessary for the construction contractor to perform their operations. There are also existing septic tanks associated with the Lower Klamath Project. Implementing the Proposed Action involves the use of heavy machinery and large trucks that contain metals and oils that could inadvertently impact water quality.

The WDHMP will include the following elements:

- Description of on-site disposal, including the proposed locations and associated sizes of sites.
- BMPs to protect water quality for any on-site disposal areas left uncovered through the rainy season.
- Methods and planning for removal of recyclable materials from the project area.
- An inventory of hazardous materials and wastes at each facility and a plan for final disposition of these materials.
- Description of hazardous materials storage, spill prevention, and cleanup measures, including the deployment and maintenance of spill cleanup materials and equipment at each facility/site to contain any spill(s).
- Storage and containment techniques to be utilized in the event of a spill(s).
- Plan and process for the removal and disposal of septic tanks.
- Other information deemed necessary through consultation with relevant agencies and outlined in the SWRCB and ODEQ WQC and not provided in this list.

The WDHMP will detail how elements of the Health and Safety Plan, Emergency Response Plan, and Traffic Management Plan work together to adequately protect water quality with respect to hazardous materials and waste management.

A **Spill Prevention, Control and Countermeasure (SPCC) subplan** will be included with the WDHMP to describe specific BMPs to be implemented throughout the duration of the Proposed Action. The SPCC subplan will be utilized to reduce the potential for releases to waterways during all phases of implementation and include detailed procedures and documentation forms to prevent and respond to potential spills. The SPCC subplan will identify locations of staging and material stockpiles; procedures for checking and maintaining equipment,

vehicles, and machinery to prevent and detect leaks; in addition to areas and locations for equipment and vehicle maintenance and refueling.

**Status:** 50% draft

**Consulting Agencies:** California SWRCB, and ODEQ.

**Anticipated FERC Filing:** February 2021

## 6.15 Water Quality Monitoring and Management Plan

The Water Quality Monitoring and Management Plan (WQMMP) will assess potential water quality impacts relating to implementation of the Proposed Action from the site of J.C. Boyle Dam and Reservoir to the Pacific Ocean. Monitoring data will be used to inform adaptive management actions to correct implementation-related water quality impacts.

The WQMMP will outline water quality parameters for continuous, water grab samples and sediment grab samples. Monitoring will include, but not limited to temperature, dissolved oxygen, pH, conductivity, turbidity, chemical oxygen, aluminum, mercury, and conductivity. The monitoring methods for these parameters, and others will include continuous monitoring (5 parameters), grab samples (15 analytes), visual monitoring, and sediment grab (17 analytes) samples. The WQMMP will describe locations and procedures for analysis and timing and duration of the monitoring during each phase of the Proposed Action. A description of flow monitoring at USGS gauges and data validation procedures will be included.

At a minimum the WQMMP will include (1) a monitoring program to assess Project impacts to water quality; (2) a reporting schedule; (3) adaptive management measures based on water quality monitoring results; and (4) provisions for collection and submittal of water quality data. Additionally, the WQMMP will describe: field sampling and analytical methods; monitoring locations; types of sampling (e.g., continuous, grab) and frequency by the category (as enumerated below); pre-drawdown monitoring; quality assurance plan and quality control measures; sediment load quantification; reporting and adaptive management; and other Project-related monitoring.

The Plan will include a description of all other monitoring efforts being undertaken as part of the Proposed Action, including but not limited to monitoring at recreation facilities, hatcheries, groundwater wells, and sediment deposits.

**Status:** 75% draft

**Consulting Agencies:** California SWRCB, California North Coast Regional Water Quality Control Board (NCRWQCB), CDFW, and ODEQ.

**Anticipated FERC Filing:** February 2021

## 6.16 Water Supply Management Plan

The Water Supply Management Plan (WSMP) will identify and implement measures to protect water supply and beneficial uses throughout implementation of the Proposed Action. The WSMP will address groundwater and points of diversion on the Klamath River as listed in the Electronic Water Rights Information Management

System for active surface water (irrigation) or drinking water diversions. The WSMP will describe the process for contacting all California water rights holders with points of diversion on the Klamath River and follow up steps with those water rights holders interested in working with the Renewal Corporation. Any potential impacts identified by a water rights holder will be investigated by the Renewal Corporation in a manner described in the WSMP and steps will be taken to minimize these impacts.

The WSMP will detail outreach plans to residents and landowners regarding groundwater wells potentially impacted. A process for monitoring groundwater levels throughout the duration of the Proposed Action (pre-, during, and post- drawdown phases) will be defined.

The existing water supply pipeline for the City of Yreka passes under Iron Gate Reservoir and will be relocated prior to implementation of the Proposed Action. The WSMP will describe the process by which the Renewal Corporation will construct a new, fully operational replacement section of pipeline for the City of Yreka during the pre-drawdown phase. Renewal Corporation and Yreka have agreed on a design.

A **Fire Management Plan will be a Subplan** of the WSMP. The FMP is in its final drafting phase. It has been developed in consultation with Cal Fire and Oregon Department of Forestry (ODF). It provides a detailed list of provisions for fire suppression during and after construction, including vehicle access, remote monitoring, and other improvements. Based on extensive modeling, the FMP will reduce existing wildfire risk associated with the project. The first annual Water Supply Management Report will include a list and map of locations where fire trucks and/or helicopters may access the Klamath River and its tributaries for residential fire protection efforts in the Lower Klamath Project boundary.

**Status:** 75% draft.

**Consulting Agencies:** SWRCB, ODEQ, Cal Fire, ODF

**Anticipated FERC Filing:** February 2021



**TABLE 6-2 LOWER KLAMATH PROJECT MEASURES, MANAGEMENT PLAN, AND IMPLEMENTATION PHASE**

Management Plan	Measures	References	Implementation Phase			
			Pre-Drawdown <sup>7</sup> (Phase 1)	Drawdown <sup>8</sup> (Phase 2)	Post-Drawdown <sup>9</sup> (Phase 3A)- Post Drawdown Facility Removal	Post-Drawdown (Phase 3B) – Post Drawdown Site Restoration & Ancillary Site Improvements
Aquatic Resources Management Plan	The Renewal Corporation will develop and implement an Aquatic Resources Management Plan. The plan will include: (1) an assessment of tributary confluences with the Klamath River for connectivity that provides passage for coho salmon, Chinook salmon, steelhead, and Pacific lamprey; (2) Tributary-Mainstem Connectivity Monitoring; spawning gravel surveys and develop a report and to summarize newly accessible anadromous fish habitat and actions to augment the habitats; mainstem salvage of overwintering Juvenile Salmonids and relocation efforts; Rescue and Relocation of Juvenile Salmonids and Pacific Lamprey from Tributary Confluence Areas; in addition to Iron Gate Hatchery Management Aquatic Resource Measures; Suckers Aquatic Resource Measures. This plan will also include maintaining fish passage at all artificial obstructions and the removal or modification of those artificial fish barriers created or affected by the Proposed Action; and a Fish Presence Plan to monitor and survey.	CA WQC Condition 5, 6 OR WQC 4a, b OR Agencies and CDFW MOUs	✓	✓	✓	

<sup>7</sup> Pre-Drawdown includes all activities up to the final reservoir drawdown.

<sup>8</sup> Drawdown includes all activities during the final reservoir drawdown immediately prior to the physical removal of the facilities included in the Proposed Action

<sup>9</sup> Post-Drawdown includes all activities associated with removing the physical facilities and post-removal site restoration and ancillary site improvements

Management Plan	Measures	References	Implementation Phase			
			Pre-Drawdown <sup>7</sup> (Phase 1)	Drawdown <sup>8</sup> (Phase 2)	Post-Drawdown <sup>9</sup> (Phase 3A)- Post Drawdown Facility Removal	Post-Drawdown (Phase 3B) – Post Drawdown Site Restoration & Ancillary Site Improvements
Construction Management Plan	The Renewal Corporation will develop and implement a Construction Management Plan which outlines the requirements for all construction-related permitting. This includes but is not limited to: CA and OR NPDES permits, Construction General Permits and permits required by the Water Quality Monitoring and Protection Plans in addition to a Spill Prevention, Control and Countermeasure Plan. The Renewal Corporation will also implement the air quality measures as they relate to construction, both on-road and off, heavy-duty truck model year engine requirements (2010 or newer unless specified) and dust control measures for general construction and associated blasting. The Construction Management Plan will also include two Traffic Management Subplans that will be developed as part of the Construction Management Plan and will include all traffic measures outlined in the Klamath County MOU and the Siskiyou County MOU. The subplans will contain specific requirements as outlined in their respective MOU's. These will include in common traffic control drawings, traffic study, and existing conditions report. This subplan will ensure that all local, regional, state, and federal regulatory requirements are met. Finally, this plan will Plan for Temporary Worker Housing to identify the location and plans for security and safe temporary housing.	CA WQC Condition 10 OR WQC Condition 4e; 10  Klamath County and Siskiyou County MOUs	✓	✓	✓	✓

Management Plan	Measures	References	Implementation Phase			
			Pre-Drawdown <sup>7</sup> (Phase 1)	Drawdown <sup>8</sup> (Phase 2)	Post-Drawdown <sup>9</sup> (Phase 3A)- Post Drawdown Facility Removal	Post-Drawdown (Phase 3B) – Post Drawdown Site Restoration & Ancillary Site Improvements
Erosion and Sediment Control Plan	The Renewal Corporation will develop and implement an Erosion and Sediment Control Plan to minimize sediment runoff during construction activities. This plan will address erosion and sediment runoff at all dam and powerhouse removal sites, spoil disposal areas, recreation site removal, J.C. Boyle scour hole and restoration activities.	OR 401 Condition. 8 CA 401 Condition 10; 18	✓	✓	✓	✓
Hatchery Management and Operations Plan	The Renewal Corporation will develop and implement a Hatchery Management and Operations Plan which will include plans to construct, modify, operate and maintain, and facilitate transfer of ownership and continued operation of Fall Creek Hatchery; a description of operations at Fall Creek Hatchery; target production numbers for each species; water supply details; practices to be implemented to minimize impacts to water quality; and reporting requirements.	FEIR AQR-3 CA WQC Condition 13			✓	✓
Health and Safety Plan	The Renewal Corporation will develop and implement a Health and Safety Plan to address site-specific risks, contractor coordination, site security, traffic, and pedestrian management, monitoring of health and safety, training requirements, and accident and incident reporting.		✓	✓	✓	

Management Plan	Measures	References	Implementation Phase			
			Pre-Drawdown <sup>7</sup> (Phase 1)	Drawdown <sup>8</sup> (Phase 2)	Post-Drawdown <sup>9</sup> (Phase 3A)- Post Drawdown Facility Removal	Post-Drawdown (Phase 3B) – Post Drawdown Site Restoration & Ancillary Site Improvements
Historic Properties Management Plan	The Renewal Corporation will develop and implement a Historic Properties Management Plan to include the Looting and Vandalism Prevention Plan, Inadvertent Discovery Plan and Monitoring Plan, in addition to the Tribal Cultural Resources Management Program (TCRMP). The TCRMP will also include the Inadvertent Discovery Plan and a description of post-project endowment implementation. This plan also include process for submitting compliance activity reports to the Yurok Tribe, a description and implementation of the Land Easement and Transfer Measures.	FEIR TCR 1, 2, 3, 4, 5, 6, 7 CA WQC Condition 22	✓	✓	✓	
Interim Hydropower Operations Plan	The Renewal Corporation will develop and implement an Interim Hydropower Operations Plan if drawdown is not initiated within 24 months of the Surrender Order. This plan limits continued operation of Project facilities to an incidental, short-term timeframe prior to removal, and implements additional conditions should such interim operation exceed 24 months after issuance of the license surrender order.	CA WQC Condition 20	✓			

Management Plan	Measures	References	Implementation Phase			
			Pre-Drawdown <sup>7</sup> (Phase 1)	Drawdown <sup>8</sup> (Phase 2)	Post-Drawdown <sup>9</sup> (Phase 3A)- Post Drawdown Facility Removal	Post-Drawdown (Phase 3B) – Post Drawdown Site Restoration & Ancillary Site Improvements
Recreation Facilities Plan	The Renewal Corporation will develop and implement a Recreation Facilities Plan. The plan will identify recreation facilities that will be removed and schedule for removal; identify recreation sites to be added, modified, or maintained following dam removal, and proposed schedule; plans for facilitating transfer of ownership and/or operation of Project recreation facilities; and measures to protect water quality.	CA WQC Condition 19	✓	✓	✓	✓
Remaining Facilities Plan	The Renewal Corporation will develop and implement a Remaining Facilities Plan. This Plan will describe all structures and ensure that any remaining facilities do not impair water quality.	CA WQC Condition 7; OR WQC Condition 7	✓	✓	✓	✓
Reservoir Area Management Plan	The Renewal Corporation will develop and implement a Reservoir Area Management Plan. This plan will include a detailed description of proposed restoration activities and a preliminary map identifying proposed locations for restoration activities. The Plan will include a list of BMPs or other measures addressing invasive weed management, floodplain connectivity and procedures to stabilize and restore the former reservoir area(s). This plan will also describe large woody material installation; exclusive use of native plants and the post-drawdown monitoring.	CA WAC Condition 14 OR WQC Condition 6 OR MOU; CDFW MOU	✓	✓	✓	

Management Plan	Measures	References	Implementation Phase			
			Pre-Drawdown <sup>7</sup> (Phase 1)	Drawdown <sup>8</sup> (Phase 2)	Post-Drawdown <sup>9</sup> (Phase 3A)- Post Drawdown Facility Removal	Post-Drawdown (Phase 3B) – Post Drawdown Site Restoration & Ancillary Site Improvements
Reservoir Drawdown and Diversion Plan	The Renewal Corporation will develop and implement a Reservoir Drawdown and Diversion Plan that includes drawdown procedures, drawdown scenarios, reservoir levels, and monitoring and drawdown schedules. This plan also includes Slope Stability Monitoring subplan that identifies reservoir slopes and other Lower Klamath Project areas prone to instability and describes site-specific measures to avoid potential slope erosion and potential associated increases in sedimentation to surface waters during implementation of the Proposed Action The objective of these measures is to ensure soil instability does not result in discharges that violate water quality standards and to protect public and private property, structures, and cultural sites that could be impacted by slope instability.	CA WQC Condition 3, 18 OR WQC Condition 5; FEIR GEO-1	✓	✓	✓	
Sediment Deposit Remediation Plan	The Renewal Corporation will develop and implement a Sediment Deposit Remediation Plan that assesses and remediate (if appropriate) visibly obvious sediment deposits along the Klamath River from below Iron Gate Dam to the mouth of the Klamath Estuary that may have been deposited during reservoir drawdown activities. Sediment testing and remediation is included in this plan.	CA WQC Condition 4 Del Norte MOU	✓	✓	✓	

Management Plan	Measures	References	Implementation Phase			
			Pre-Drawdown <sup>7</sup> (Phase 1)	Drawdown <sup>8</sup> (Phase 2)	Post-Drawdown <sup>9</sup> (Phase 3A)- Post Drawdown Facility Removal	Post-Drawdown (Phase 3B) – Post Drawdown Site Restoration & Ancillary Site Improvements
Terrestrial and Wildlife Management Plan	The Renewal Corporation will develop and implement a Terrestrial and Wildlife Management Plan which will include the Amphibian and Reptile Relocation Plan; the Bald and Golden Eagle Management Plan. Measures to protect any potential gray wolf, willow flycatcher, establish 20-foot buffers around delineated wetlands, avoid special status plants, and bat BPMs will also be included.	CA WQC 16, 17 OR WQC Condition 4c; FEIR TER-1, 2, 3, 4, 6, 7 OR, CDFW MOU	✓	✓		
Waste Disposal and Hazardous Materials Management Plan	The Renewal Corporation will develop and implement a Waste Disposal and Hazardous Materials Management Plan to dispose of both hazardous and non-hazardous waste materials and implement erosion control measures to preclude runoff from acquiring waste materials and conveying those materials to surface waters. The plan will include procedures for proper storage, containment, and response to spills caused by the Proposed Action and the proper removal and disposal of septic tanks.	CA WQC Condition 11, 12 FEIR HZ-1 OR WQC Condition 4d, 9	✓	✓	✓	

Management Plan	Measures	References	Implementation Phase			
			Pre-Drawdown <sup>7</sup> (Phase 1)	Drawdown <sup>8</sup> (Phase 2)	Post-Drawdown <sup>9</sup> (Phase 3A)- Post Drawdown Facility Removal	Post-Drawdown (Phase 3B) – Post Drawdown Site Restoration & Ancillary Site Improvements
Water Quality Monitoring and Management Plan	The Renewal Corporation will develop and implement a Water Quality Monitoring and Management Plan. The plan will specify water quality parameters, monitoring methods, locations, and procedures for analysis for the duration of the Proposed Action. This plan will address all other water quality monitoring efforts being undertaken as part of the Surrender Order, including but not limited to monitoring at recreation facilities, hatcheries, groundwater wells, and sediment deposits. This monitoring program will assess Project impacts to water quality from the site of J.C. Boyle Dam and Reservoir to the Pacific Ocean. The program will use continuous and grab samples, as well as visual observations. Applicable water quality parameters include dissolved oxygen, temperature, turbidity, and sediment deposits, and organic, nitrogen, and metal compounds.	CA WQC Condition 1, 2 OR WQC Condition 2	✓	✓	✓	✓



Management Plan	Measures	References	Implementation Phase			
			Pre-Drawdown <sup>7</sup> (Phase 1)	Drawdown <sup>8</sup> (Phase 2)	Post-Drawdown <sup>9</sup> (Phase 3A)- Post Drawdown Facility Removal	Post-Drawdown (Phase 3B) – Post Drawdown Site Restoration & Ancillary Site Improvements
Water Supply Management Plan	The Renewal Corporation will develop and implement a Water Supply Monitoring and Management Plan. This Plan will identify measures to reduce impacts on communities who rely on the Klamath River for their drinking water supply and irrigation water. It will include addressing potential impacts on groundwater wells, irrigation intakes, drinking water diversions from the Klamath River, and City of Yreka water line replacement. The Plan will describe the disposition of all water rights associated with the Proposed Action. Finally, this plan includes a Fire Management Plan will be a Subplan of the WSMP. The FMP is in its final drafting phase. It has been developed in consultation with CalFire and Oregon Department of Forestry (ODF). It provides a detailed list of provisions for constructing fire suppression vehicle access.	CA WQC Condition 8, 15, 21 OR WQC Condition 11g; FEIR WQ-2, WSWR-1 FEIR WSWR-2		✓	✓	✓

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## **Chapter 7: References**

## 7 REFERENCES

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