

KLAMATH RIVER RENEWAL PROJECT:

Planning & Implementation for Complex Dam Removal



Agenda

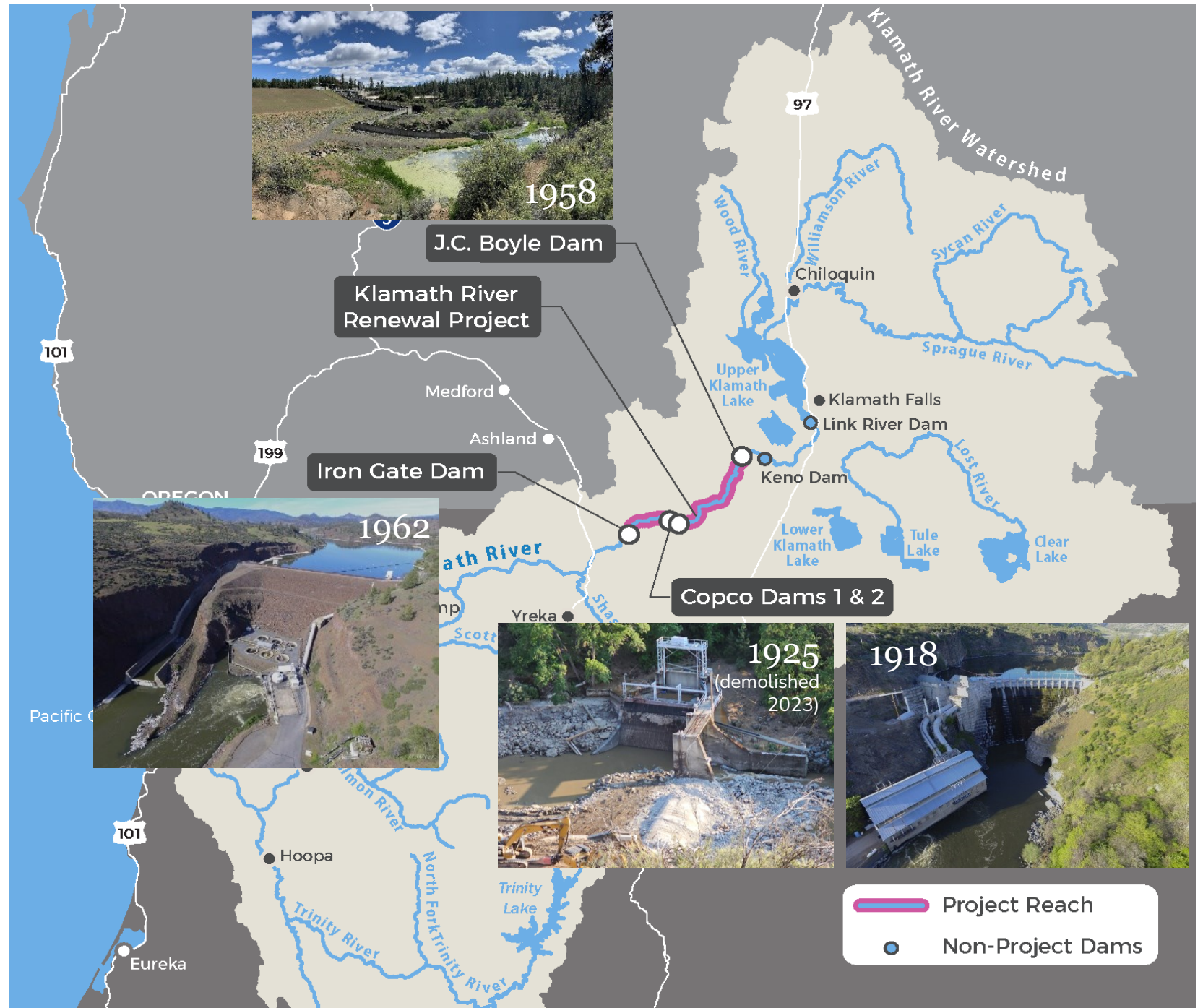
- General Project Overview
- Pre-Drawdown Construction Overview
- Initial Drawdown Phase
- Drawdown Construction Activities Status



The image features a dark teal background with three large, semi-circular shapes arranged horizontally. A horizontal banner of a lighter teal color is positioned across the middle, containing the text "General Project Overview" in a white, serif font.

General Project Overview

Project Vicinity Map



KRRC & Dam Removal



Copco No. 1 | CA



Copco No. 2 | CA



JC Boyle | OR



Iron Gate | CA



Project Partners



Dam Removal Milestones

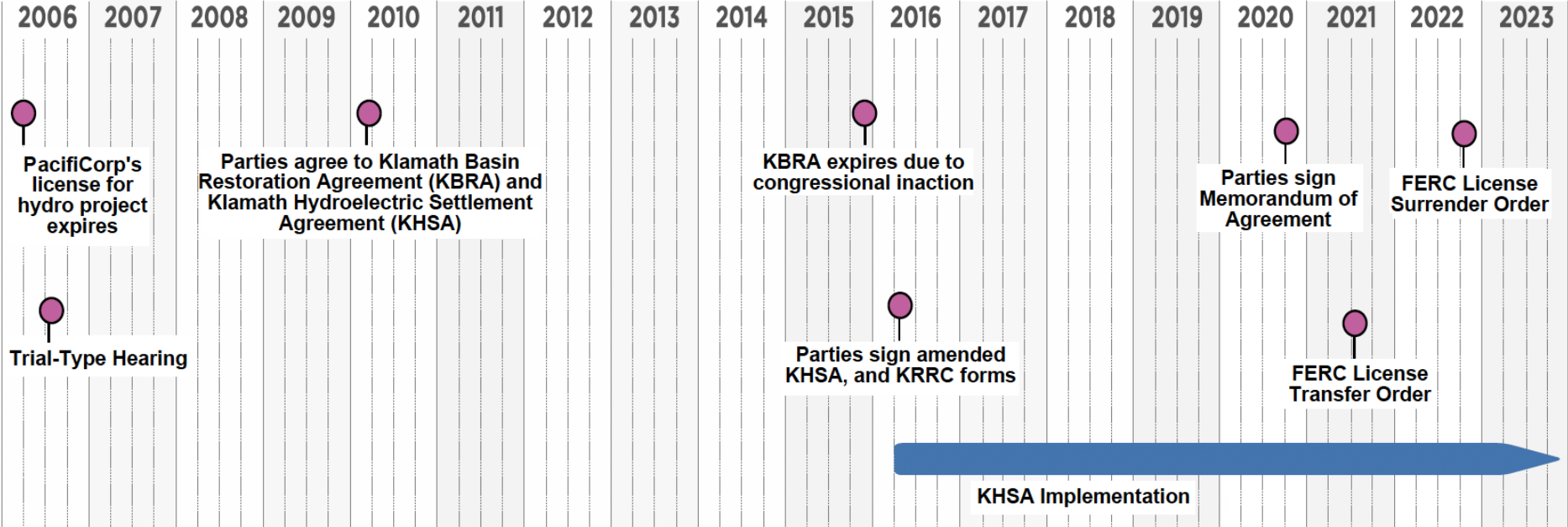


Photo Credit: Karuk Tribe

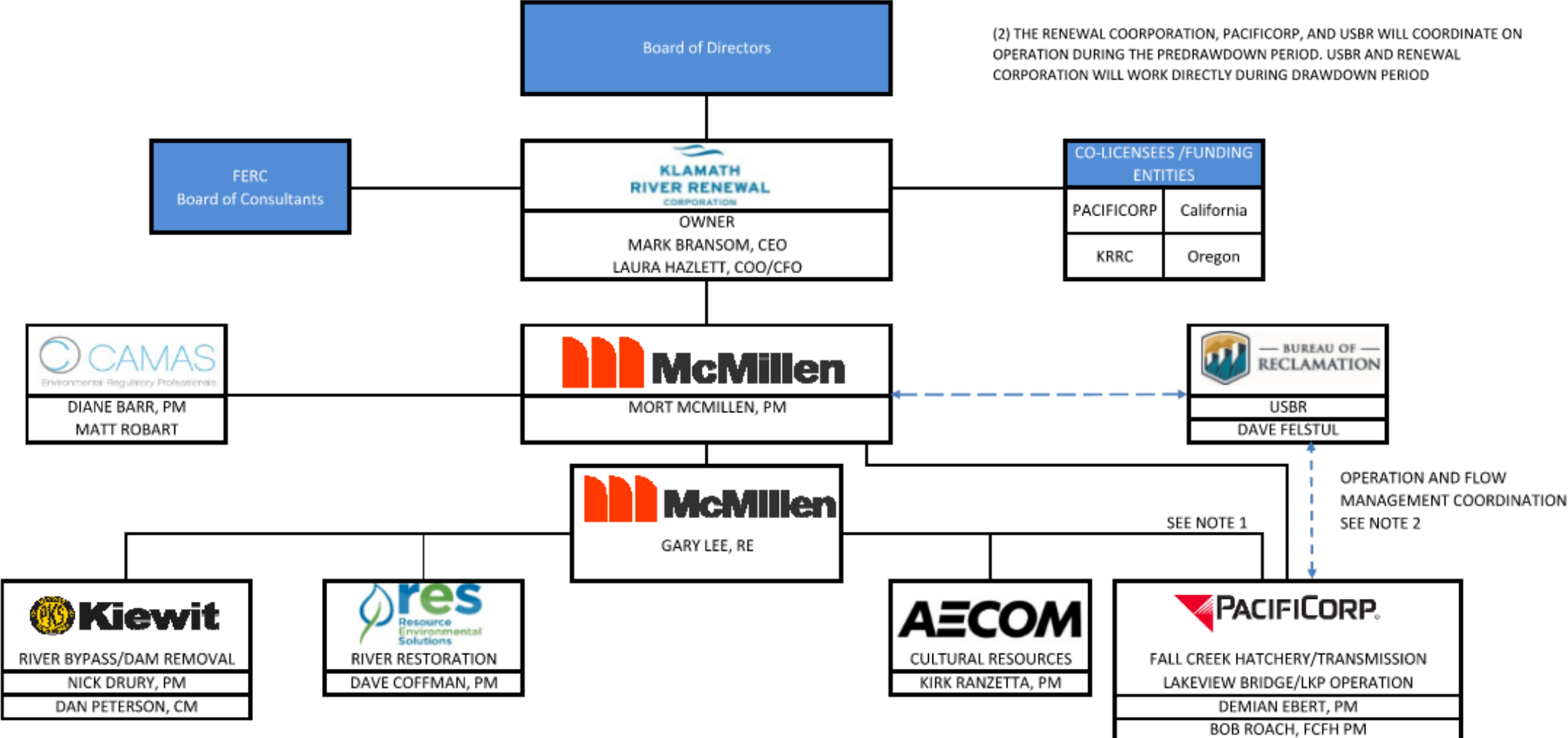


Project Purpose

Achieve dam removal, a free-flowing condition on the Klamath River, and volitional fish passage.



KRRC Organization Chart— Implementation Phase

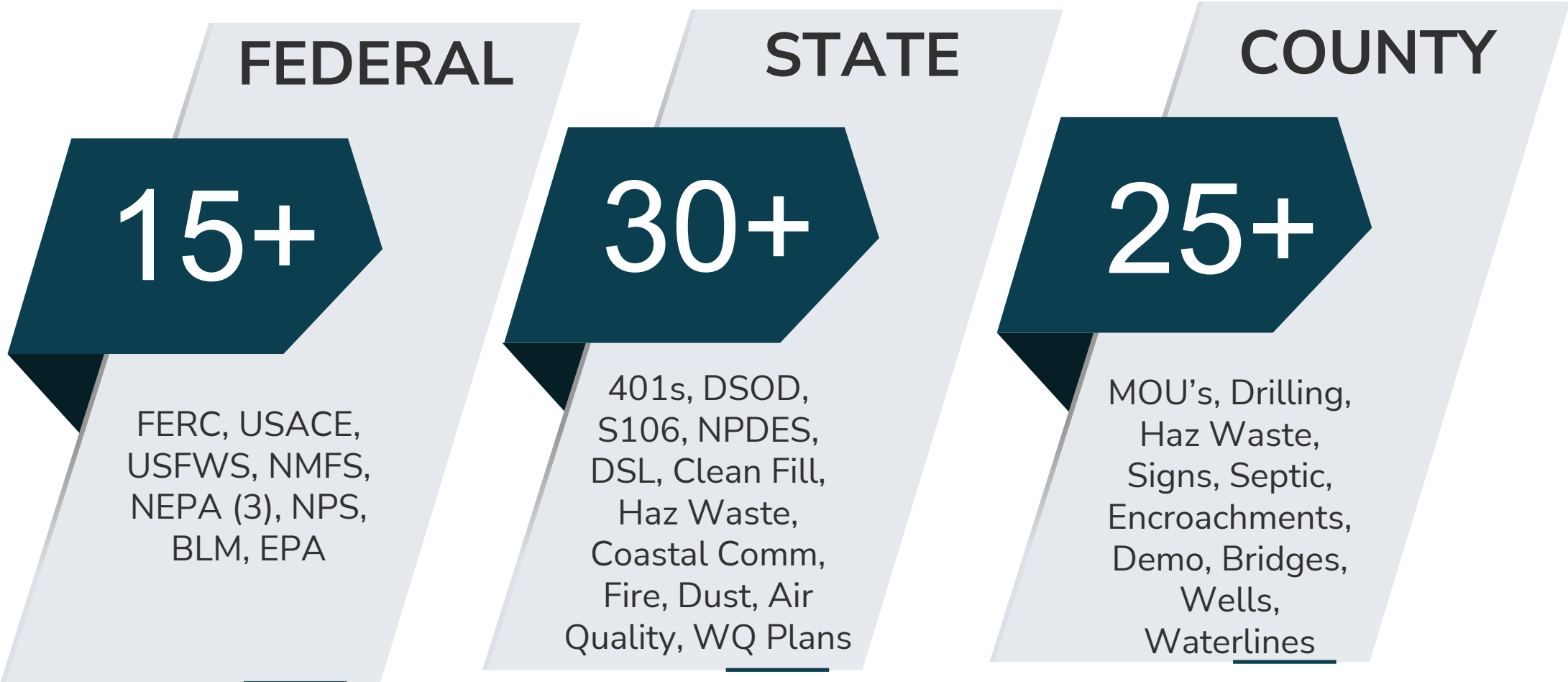


NOTES:
(1) OPERATING LKP UNDER AN O&M AGREEMENT WITH THE RENEWEL COORPORATION DURING PRE-DRAWDOWN PERIOD.

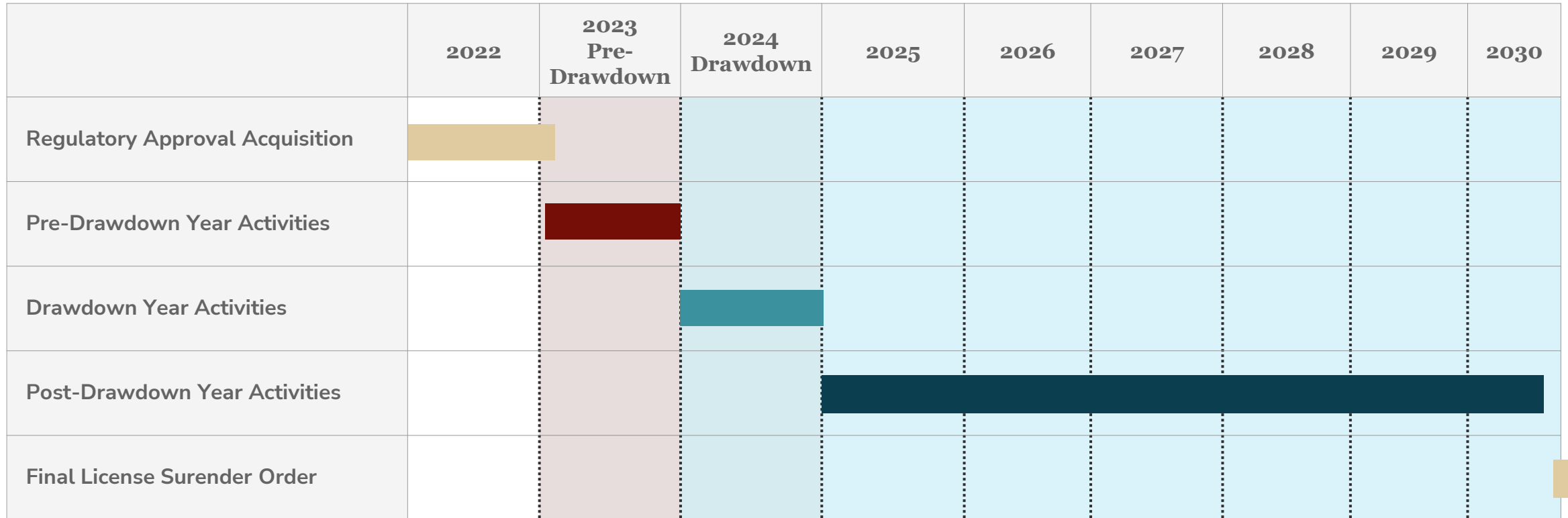
(2) THE RENEWAL COORPORATION, PACIFICORP, AND USBR WILL COORDINATE ON OPERATION DURING THE PREDRAWDOWN PERIOD. USBR AND RENEWAL COORPORATION WILL WORK DIRECTLY DURING DRAWDOWN PERIOD



Regulatory: 70 + Approvals/Agreements



Dam Removal Project Timeline



Pre-Drawdown Year:

- Dam/tunnel modifications
- Road/bridge improvements
- CoY Waterline Replacement
- Fall Creek Hatchery Construction
- Water Quality/Quantity Monitoring
- Copco No. 2 Dam Removal

Drawdown Year:

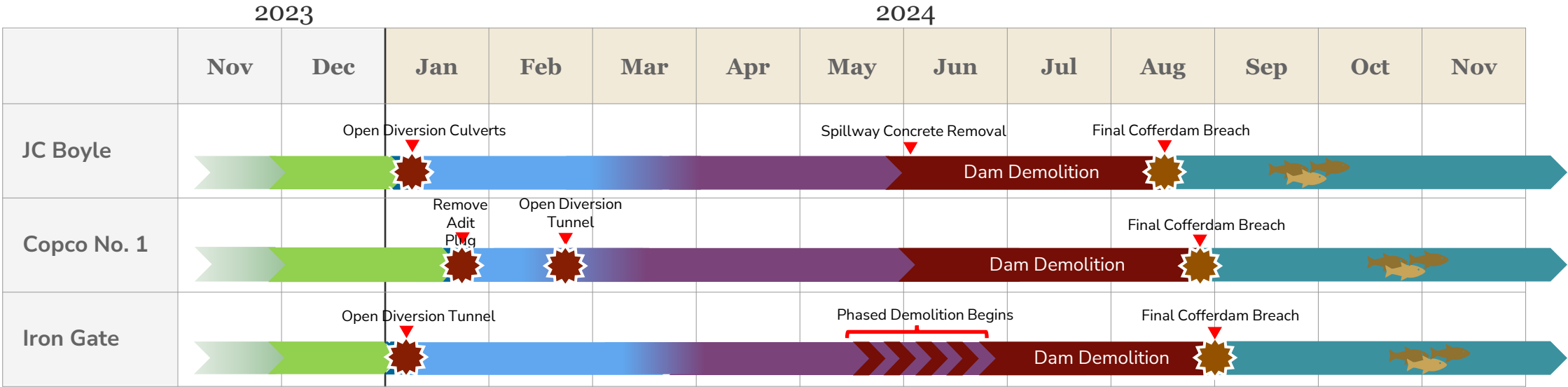
- Dam and infrastructure removal
- Initial reservoir restoration

Post-Drawdown Years:

- Site Restoration
- Monitoring/Adaptive Management



Stages of Reservoir Drawdown



1. Operational Drawdown:
Lowering reservoir to its minimum operating level

2. Initial Drawdown:
Reservoir water evacuation below the Operational Drawdown limits

3. Reservoir Refilling and Releasing Period:
Inflows exceed outflow capacity periodically, causing reservoir levels to rise and fall

4. Dam Demolition:
Reservoir water elevation remains at the top of the historic cofferdam while dam concrete and embankments are removed

5. Klamath River Reconnection:
Breaching of the historic cofferdam, allowing the river to permanently flow in a riverine condition





Pre-Drawdown Construction Overview

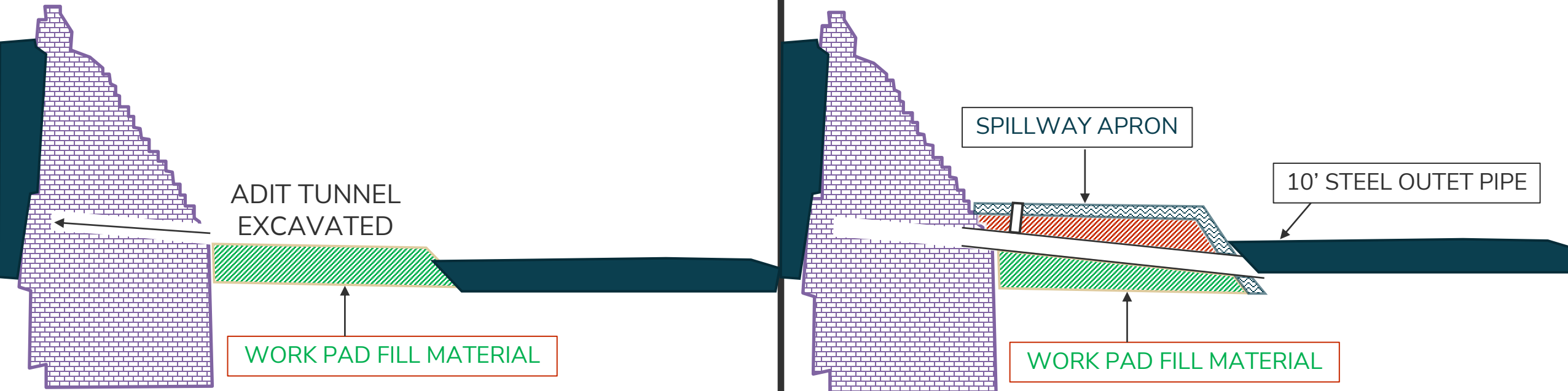
Pre-Drawdown: Copco Complex



2023 Pre-Drawdown: Copco No. 1 Dam Adit Tunnel

- 1) Green work pad constructed on downstream side at base of dam.
- 2) 10' diameter adit tunnel excavated through base of dam. Plug left in place at upstream end.

- 3) 10' diameter extension pipe installed downstream of tunnel.
- 4) Extension pipe covered with spillway apron earthen material and grouted in place.



Copco No. 1 Progress Photos



Dredging and debris barges moored at Copco 1 Dam while dredging in front of the new low-level adit. Debris, including rock and timbers, can be seen in the debris barge.

17 September 2023



Offloading debris barge in dredging disposal area.

30 August 2023



Copco No. 1 Progress Photos



First section of steel extension pipe set in place at the Copco 1 low-level adit.

10 October 2023



Copco No. 1 Progress Photos



General view of Copco 1 dam and powerhouse with progress on grouted riprap placement over the steel extension pipe.
8 November 2023



Copco No. 2 Drawdown Photos



Copco 2 dam site before
demolition.

13 June 2023



Copco No. 2 Drawdown Photos



Completed Copco 2 dam site.
23 January 2024



Copco No. 2 Powerhouse Progress Photos



Copco 2 steel penstock thrust blocks have been removed.
Lower thrust block backfilled.
1 November 2023

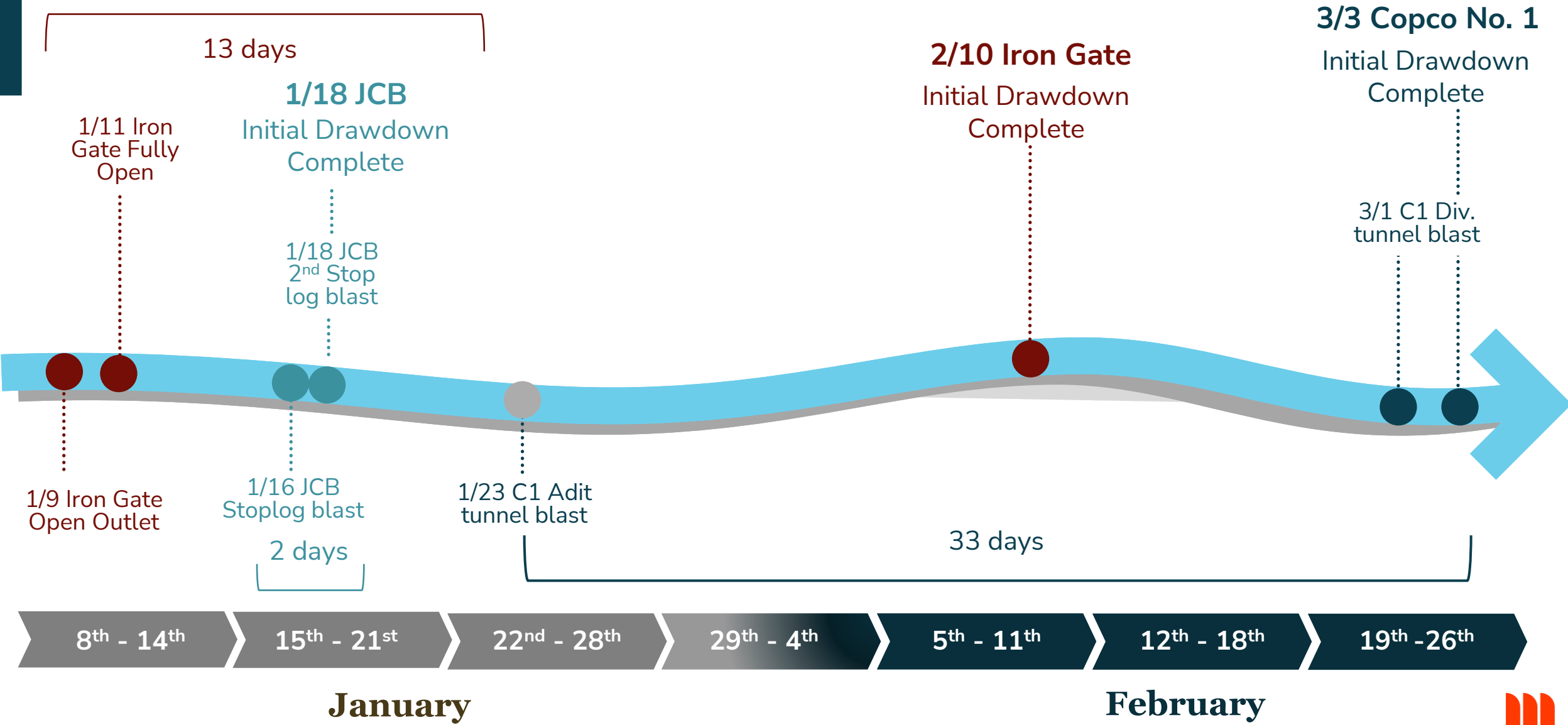


Copco 2 tailrace backfilled with rip rap
11 November 2023



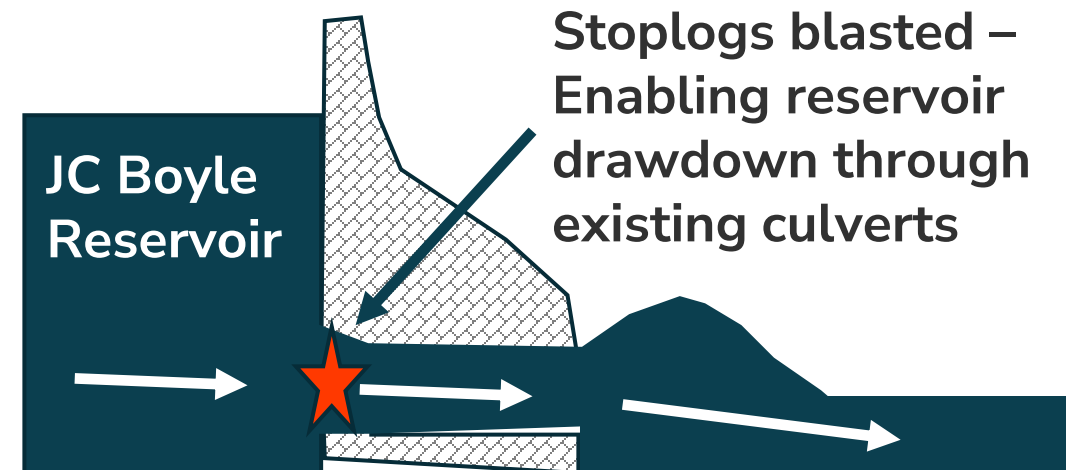
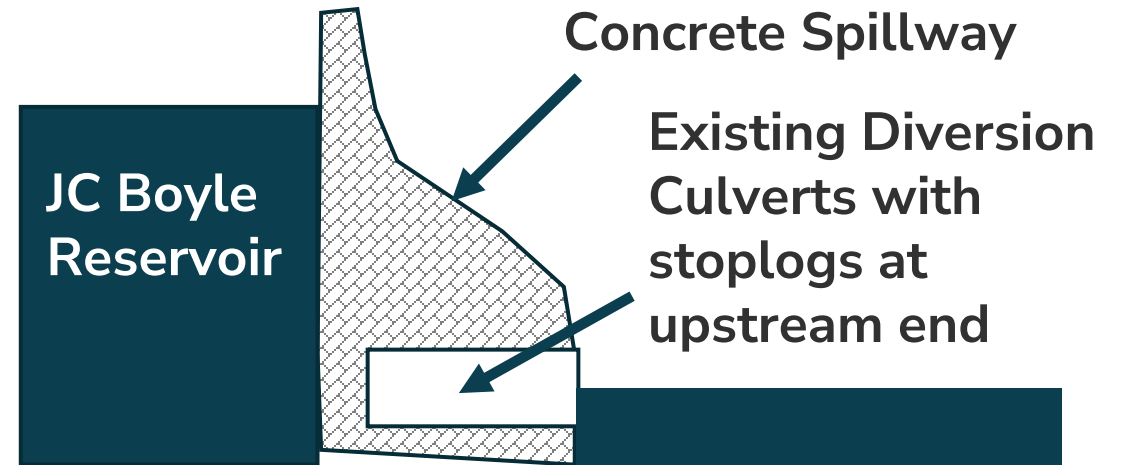
Initial Drawdown Phase

Initial Drawdown Schedule



JC Boyle Reservoir Drawdown & Dam Removal

- 1) JC Boyle reservoir was drawn down in January 2024. Existing culverts underneath the dam (which were used to divert water during original construction) were opened to provide a low-level outlet at the spillway.
- 2) Stoplogs (a thin concrete wall) that were at the upstream end of the diversion culverts were blasted out, allowing the reservoir to drawdown with water passing beneath the existing spillway.



JC Boyle Drawdown Photos



Reservoir drawdown initiated
after blasting the first diversion
culvert.

16 January 2024



JC Boyle Drawdown Photos



JC Boyle reservoir drawdown complete. Historic cofferdam located in the center of the image. 1200 cfs flushing flow in progress.

24 January 2024



JC Boyle Drawdown Photos



JC Boyle reservoir
drawdown complete.
Spillway conduits fully
open.

February 2024



JC Boyle Drawdown Photos

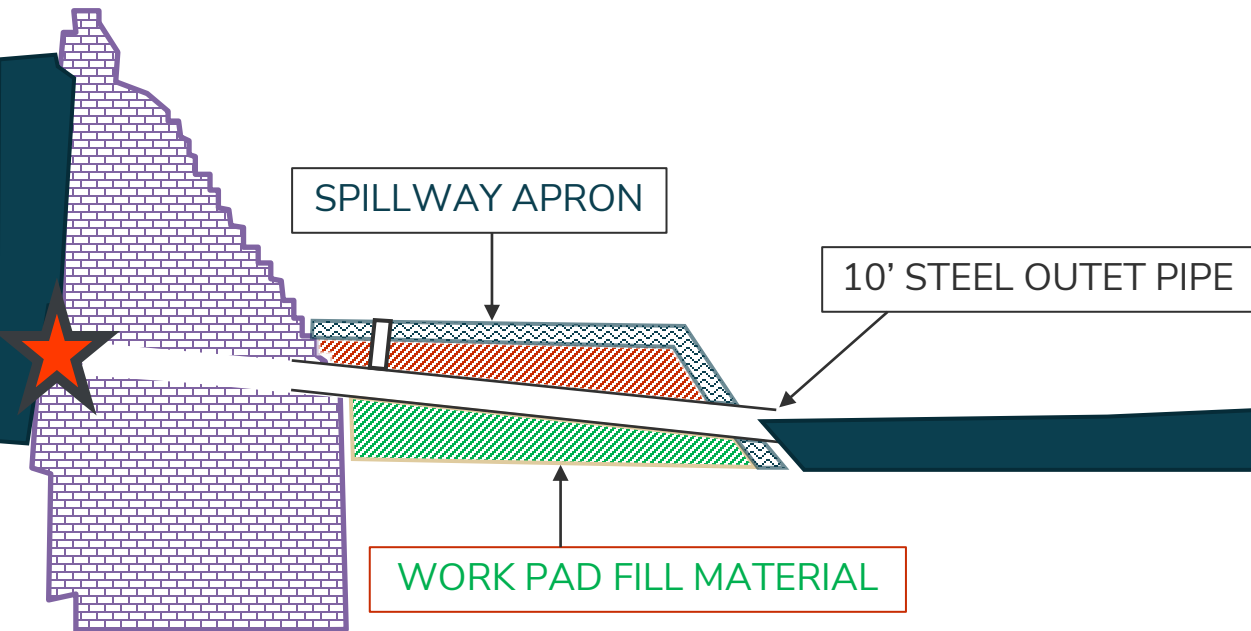


JC Boyle reservoir looking upstream from the dam. *February*
2024

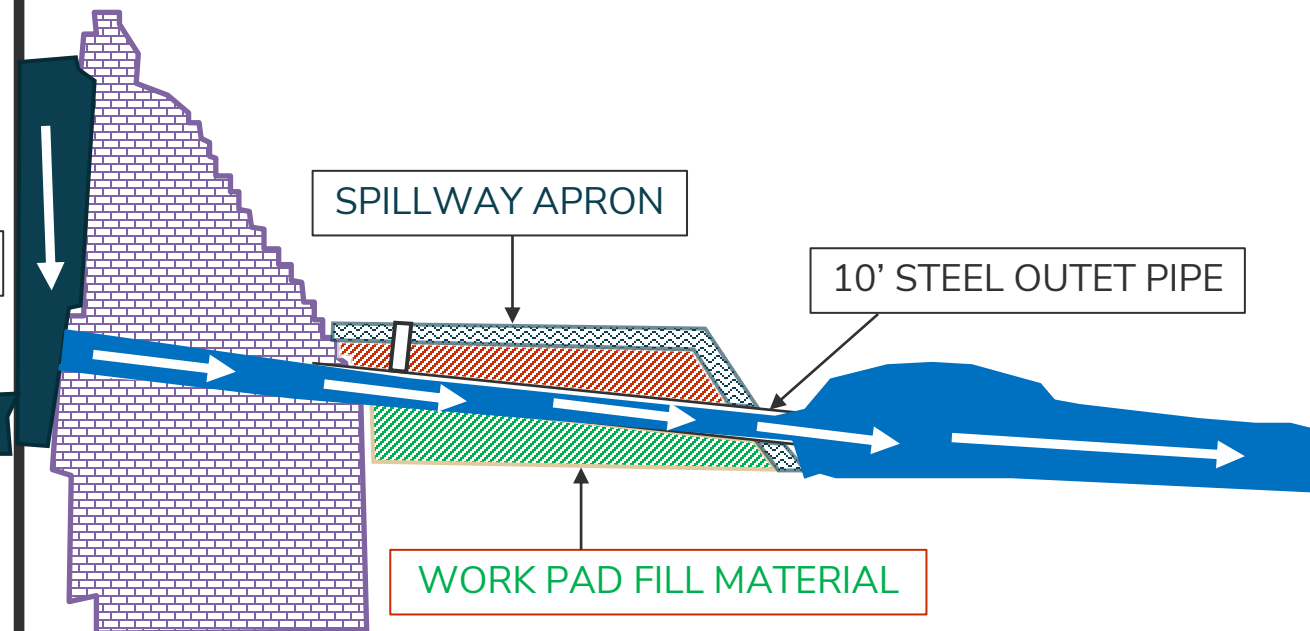



2024 Reservoir Drawdown & Dam Removal: Copco No. 1

1) Plug concrete at upstream end of tunnel blasted and removed



2) Copco 1 reservoir drained through adit tunnel and extension pipe



3) Following reservoir drawdown—Copco 1 Dam will be removed by drilling and blasting, and a new river channel will be built in the existing dam footprint. The new channel is expected to be complete by October 2024. 

Copco No. 1 Drawdown Photos



View of Copco No. 1
Powerhouse and river channel
after adit plug blasted
23 January 2024



Copco No. 1 Drawdown Photos



View of Copco No. 1 Dam and reservoir after drawdown.
31 January 2024



Copco No. 1 Drawdown Photos



View of Copco Reservoir
after drawdown.
31 January 2024



Copco No. 1 Drawdown Photos



Klamath River
looking upstream
from Copco 1 Dam.
15 March 2024



Iron Gate Drawdown Photos



View of Iron Gate dam and reservoir before drawdown.

20 December 2023



Iron Gate Drawdown Photos



Klamath River at Low
Level Outlet tunnel.
5 February 2024



Iron Gate Drawdown Photos



Iron Gate project site including dam (upper right), haul road (center), and waste disposal area (upper left). Note high water level due to ESA geomorphic releases.
15 March 2024



Iron Gate Drawdown Photos



Klamath River at Scotch-Camp Confluence. Klamath River on the right. Note high water level due to ESA geomorphic releases.

15 March 2024



Iron Gate Drawdown Photos



Jenny Creek tributary
looking downstream
towards the
Klamath.

15 March 2024



Iron Gate Drawdown Photos



Klamath River from
Jenny Creek (left
side) looking
upstream towards
Copco Village.
15 March 2024



Iron Gate Drawdown Photos



Klamath River near Copco Village at the Daggett Bridge after drawdown was complete at Iron Gate.

13 February 2024





Drawdown Construction Activities

Drawdown Year Activities

General Infrastructure Removal

- Buildings, residences, misc. features
- Transmission/Distribution line removal
- Temporary Bridge Removal
- New fish passage culvert installation

Dam Removal and Infrastructure

- JC Boyle
- Copco No. 1
- Iron Gate

Reservoir Water Releases

- JC Boyle Reservoir Drawdown
- Copco No. 1 Reservoir Drawdown
- Iron Gate Reservoir Drawdown

Restoration and Resource Management

- Assisted Sediment Evacuation
- Erosion Control BMPs
- Terrestrial Measures
- Aquatic Protection Measures

Management Plan Implementation (44)

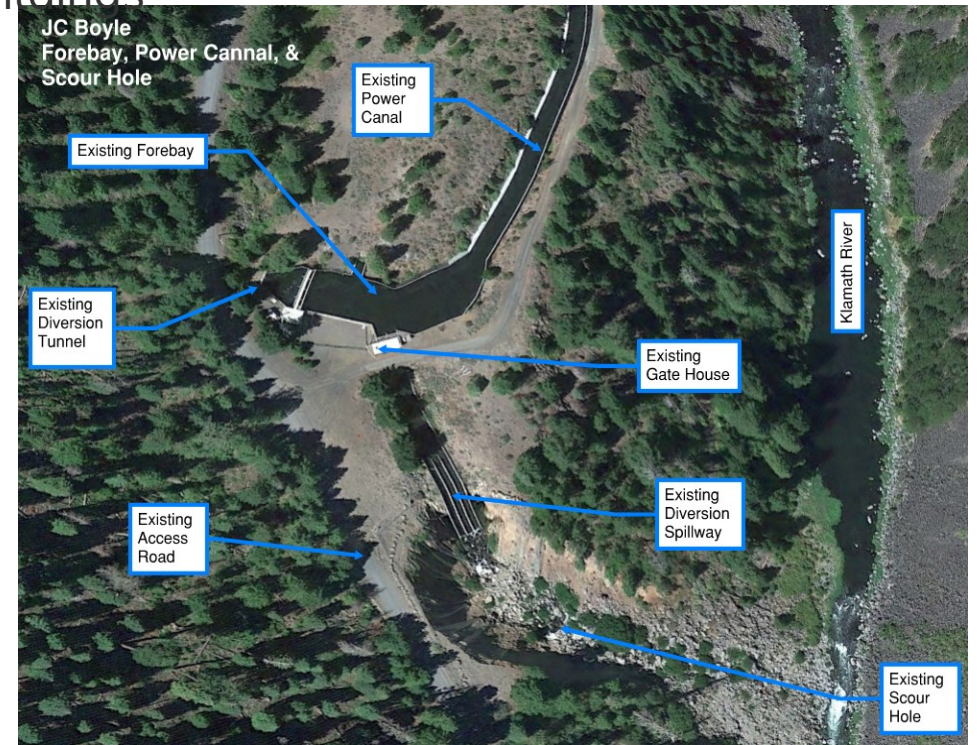
- Water supply Groundwater, irrigation
- Slope stability
- Fire management
- Historic Resources
- Disposal sites, soil testing
- Harbor monitoring



2024 Facilities Removal: JC Boyle

Other aspects of the JC Boyle facility removal include:

- Demolition of a 2-mile-long concrete power canal
- Fill of a large scour hole 2 miles downstream from the dam
- Removal of penstocks, powerhouse and ancillary buildings



2024 Facilities Removal: Copco No. 1

- Concurrent with dam removal, existing structures at the Copco 1 facility will be decommissioned and removed.
- Facilities include the existing hydro-power generation equipment, the powerhouse structure itself, and several other buildings in the vicinity of the dam.



Copco Complex Construction Photos



Overview of Copco 1 and 2 sites and the Klamath River between Copco 1 and 2.
15 March 2024



Copco No. 1 Construction Photos



Tractionline winched excavator removing diversion tunnel gate operator concrete piers at Copco 1.

6 February 2024



Copco No. 1 Construction Photos



Copco 1 penstock
removal in progress in
preparation for U500
road.

21 February 2024



Copco No. 1 Construction Photos



Demolishing the Copco 1
intake gatehouses.

1 March 2024



Copco No. 1 Construction Photos



Mechanical and electrical
demo in progress at
Copco 1 powerhouse.
22 February 2024



Copco No. 1 Construction Photos



Copco 1 diversion tunnel
plug loaded and tied in.

1 March 2024



Copco No. 1 Construction Photos



Copco 1 diversion tunnel
after blasting the plug.

1 March 2024



2024 Reservoir Drawdown & Dam Removal: Iron Gate

- Drawdown of Irongate Reservoir is using the existing low level outlet diversion tunnel.
- Beginning in approximately May/June of 2024, large trucks and excavation equipment will remove the dam embankment from the top down
- Approximately 1 million cubic yards will be excavated in total
- The existing spillway will be filled in with earthen materials
- The powerhouse equipment will be removed and the powerhouse demolished
- Once the dam and facilities are removed, a new river channel will be built in the dam footprint. This channel grading is expected to be completed by October 2024



Iron Gate Construction Photos



Exposed diversion tunnel intake
structure trash racks at Iron Gate.
12 March 2024



Iron Gate Construction Photos



Removal of Iron Gate power generation equipment. 20 March
2024



Fall Creek Hatchery—Complete



Hatchery construction is complete, and the facility has been turned over to CDFW. Contractor has demobilized from site. Only minor punch list items remaining.
5 March 2024



Other Facility Construction

- Relocate City of Yreka Water Supply Pipeline
- New Daggett and Lakeview Bridges
- 5 new recreation sites
- 4 new wildfire access boat ramps, dry hydrants, and wildfire monitoring requirement
- New fish passage arch culvert at Fall Creek
- New fish passage culverts at Camp Creek and Scotch Creek
- Demolition of transmission lines and 3 substations
- Demolition of existing residences and support buildings at each dam
- 2200 acres of reservoir restoration
- 900 trees removed from Ward Canyon
- 45,000 feet of fencing



Questions?