

STATE OF CALIFORNIA
STATE WATER RESOURCES CONTROL BOARD

In the Matter of Water Quality Certification for

**KLAMATH RIVER RENEWAL CORPORATION
LOWER KLAMATH PROJECT LICENSE SURRENDER**

FEDERAL ENERGY REGULATORY COMMISSION PROJECT NO. 14803

Sources: Klamath River and associated tributaries

County: Siskiyou

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**WATER QUALITY CERTIFICATION FOR FEDERAL PERMIT OR LICENSE
 KLAMATH RIVER RENEWAL CORPORATION
 LOWER KLAMATH PROJECT LICENSE SURRENDER
 FEDERAL ENERGY REGULATORY COMMISSION PROJECT NO. 14803**

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SOURCES: Klamath River and associated tributaries

COUNTY: Siskiyou

WATER QUALITY CERTIFICATION FOR FEDERAL PERMIT OR LICENSE

BY THE EXECUTIVE DIRECTOR:

The Lower Klamath Project License Surrender proposes removing four hydroelectric facilities on the mainstem Klamath River, and performing associated facilities modifications and restoration activities. This order certifies that the Lower Klamath Project License Surrender will comply with water quality standards and other appropriate requirements of state law if conducted under the conditions described herein.

1.0 BACKGROUND

On September 23, 2016, PacifiCorp and the Klamath River Renewal Corporation (KRRRC or Licensee) filed a joint application with the Federal Energy Regulatory Commission (FERC) to: separate PacifiCorp's Klamath Hydroelectric Project (FERC Project No. 2082) facilities into two separate projects (outlined below); and transfer ownership of the newly created project – the Lower Klamath Project – to the KRRRC.

- **Lower Klamath Project** consists primarily of four dams and associated facilities, listed from upstream to downstream: (1) J.C. Boyle (Oregon); (2) Copco No. 1 (California); (3) Copco No. 2 (California); and (4) Iron Gate (California).
- **Klamath Hydroelectric Project**¹ consists primarily of the following facilities, listed from upstream to downstream: (1) East Side (Oregon);

¹ The Klamath Hydroelectric Project is not part of this water quality certification action.

(2) West Side (Oregon); (3) Keno (Oregon); and (4) Fall Creek (California).

On the same day, the KRRC applied to FERC for permission to decommission the Lower Klamath Project in accordance with the amended Klamath Hydroelectric Settlement Agreement, and pursue the Lower Klamath Project License Surrender (Project).

On March 15, 2018, FERC approved separation of the Klamath Hydroelectric Project into two licenses, creating a new license for the Lower Klamath Project (FERC Project No. 14083). Subsequently, on June 21, 2018, FERC stayed its March 15, 2018 order, separating the Klamath Hydroelectric Project, until it acts on the PacifiCorp and KRRC license transfer application.

2.0 LOWER KLAMATH PROJECT LICENSE SURRENDER DESCRIPTION

The Project primarily consists of the decommissioning and removal of four dams on the mainstem of the Klamath River (J.C. Boyle, Copco No. 1, Copco No. 2, and Iron Gate) as well as their associated facilities (detailed below). The existing Project facilities are located on the Klamath River in Siskiyou County, California and Klamath County, Oregon (Attachment 1; Figure 1: Lower Klamath Project Location, and Figure 2: Lower Klamath Project Boundary). The nearest city to the California portion of the Project is Yreka, which is located approximately 20 miles southwest of the downstream end of the Project.

The Project implements portions of the **Klamath Hydroelectric Settlement Agreement** (KHSA), as amended on November 30, 2016. The KHSA is an agreement between: PacifiCorp; several state, federal, and local government agencies; Native American tribes; nongovernmental organizations; irrigators; and individual stakeholders. The KHSA seeks to return the Klamath River to free-flowing conditions and provide volitional fish passage in the portion of the Klamath River currently occupied by the Project's dams and associated facilities. The State Water Board is not a signatory to, and is not bound by, the KHSA or any other Klamath-related settlement agreement.

The KRRC proposes to decommission the Project consistent with: 1) the KHSA; 2) the September 30, 2017, California Environmental Quality Act (CEQA) and California and Oregon 401 Water Quality Certifications Technical Support Document; 3) the June 29, 2018, *Definite Plan for the Lower Klamath Project* (2018 Definite Plan); 5) the *July 29, 2019 Definite Plan Update*; and 6) the December 3, 2019, certification application.

The KRRC's proposed Project schedule can be found in Attachment 2: Project Schedule.

The remaining portions of this section provide additional details on the proposed facilities' removal (organized from upstream to downstream), as well as additional information on other major Project elements that have the potential to impact water quality. These include: City of Yreka's water supply line replacement, hatcheries, aquatic resource protection measures, reservoir restoration measures, wetland protection, eagle protection, water quality monitoring, groundwater well management, hazardous materials management, and recreation measures.

J.C. Boyle Complex: J.C. Boyle Dam and associated facilities are located on the Klamath River between River Mile (RM)² 233 and RM 225 in Klamath County, Oregon. Primary components of the J.C. Boyle Complex include:

- 1) J.C. Boyle Reservoir, an approximately 2,267-acre-foot (AF) reservoir and associated facilities (Topsy Campground boat ramps, floating docks, and pier; Pioneer Park; and numerous dispersed shoreline recreation sites);
- 2) J.C. Boyle Dam, a 68-foot combined earthen embankment and concrete dam with associated pool-and-weir fish ladder and concrete spillway;
- 3) An intake structure connecting to a 2.5-mile water conveyance system with an overflow forebay;
- 4) J.C. Boyle Powerhouse, a 98-megawatt (MW) facility;
- 5) A 4.6-mile bypass reach;
- 6) A switchyard with 2.8 miles of transmission lines; and
- 7) Ancillary buildings including an office building (known as the Red Barn), maintenance shop, fire protection building, communications building, two occupied residences, and a warehouse.

The proposed Project includes removal of all physical features associated with the J.C. Boyle Complex (i.e., all items listed above except the bypass reach). Prior to dam removal, the KRRC proposes to make access road improvements and create equipment staging areas. Cofferdams will be constructed, as appropriate, to create dry work areas.

In January of the drawdown period³, J.C. Boyle Reservoir drawdown will begin. Drawdown rates will be limited to five feet per day. Water will be released through the gated spillway, powerhouse intake, and two diversion culverts located beneath the dam. Modification to these facilities is not required prior to

² River Mile (RM) refers to the distance, along the Klamath River, upstream from the mouth of the Klamath River at the Pacific Ocean.

³ Drawdown is the release of Project reservoir water into the Klamath River to lower the elevation of the reservoirs and facilitate dam removal. The KRRC proposes to drawdown the Project reservoirs commencing with Copco No. 1 in November, followed by J.C. Boyle and Iron Gate in January, and concluding with Copco No. 2 in May.

drawdown. Drawdown rates will be controlled by the spillway and capacity of the intake structure. Once the reservoir stabilizes with the spillway and the intake is fully open, the diversion culverts' concrete stop logs will be blasted, and flows will be controlled by the capacity of the culverts, which is approximately 6,000 cubic feet per second (cfs).

J.C. Boyle Dam removal will occur via earth moving equipment, drilling, and blasting. Earthen materials generated from removal of J.C. Boyle Dam will be permanently buried on-site in a six-acre portion of the original borrow pit used to construct J.C. Boyle Dam, located on PacifiCorp property near the right abutment of J.C. Boyle Dam. Additionally, earthen material will be used to bury the powerhouse tailrace in place. Concrete rubble associated with removal of the J.C. Boyle Complex will be placed in an eroded scour hole below the forebay spillway structure created by J.C. Boyle power generation operations. Following concrete rubble placement in the scour hole, the scour hole will be covered with three to five feet of rock and soil debris sourced from material aggrading the river channel at the base of the scour hole. Removal of the J.C. Boyle Complex will generate approximately 130,800 cubic yards of bulk earthen material, 51,900 cubic yards of bulk concrete, 4,100 tons of rebar, 2,500 tons of mechanical and electrical equipment, 2,700 cubic yards of building waste, and 2.8 miles of transmission lines (including poles and transformers). Rebar, mechanical and electrical equipment, building waste, and powerlines will be disposed of offsite in a landfill near Klamath Falls.

Copco No. 1 Complex: The Copco No. 1 Complex is located on the Klamath River between RM 208.3 and RM 201.8 in Siskiyou County, California. Primary components of the Copco No. 1 Complex include:

- 1) Copco No. 1 Reservoir, an approximately 33,724-AF reservoir and associated Mallard Cove and Copco Cove recreation facilities;
- 2) Copco No. 1 Dam, a 133-foot concrete gravity arch dam, including a gated spillway and gatehouse on the right abutment, deck, and piers;
- 3) A diversion tunnel and diversion control structure;
- 4) Three miles of transmission lines (including poles and transformers);
- 5) A switchyard;
- 6) Two 10-foot-diameter and one 14-foot-diameter penstock pipes;
- 7) A 20-MW powerhouse with intake structure and associated equipment; and
- 8) An adjacent warehouse and two residences for powerhouse operators.

The proposed Project includes removal of all Copco No. 1 Complex features (i.e., all features listed above), with Copco No. 1 Dam removed over approximately four months. Blasting, hydraulic excavators, conventional or diamond-wire saw cutting, and drilling will be used to remove the dam in sections, from the top of the dam to approximately 20 feet below the existing streambed level of the dam.

The following activities will be performed prior to Copco No. 1 Dam removal: local seed collection and invasive weed control; access road improvements; and creation of equipment staging areas. Additionally, the diversion tunnel will be equipped with new remote operated spillway gates capable of discharging 13,000 cfs.

The initial drawdown of Copco No. 1 Reservoir is proposed to begin on November 1, commencing the Project drawdown period. Drawdown will initially proceed at the rate of not more than two feet per day, which is within the range of drawdown observed under existing hydroelectric operations. The maximum drawdown rate of five feet per day at Copco No. 1 Reservoir will not be implemented prior to January 15. The maximum additional discharge associated with drawdown of Copco No. 1 Reservoir will not exceed 6,000 cfs. Drawdown of Copco No. 1 Reservoir is anticipated to be complete by March 15. Cofferdams will be constructed upstream of Copco No. 1 Dam, as appropriate, to create dry work areas.

Approximately 104,000 cubic yards of bulk concrete, 1,000 tons of rebar, and 1,100 tons of mechanical and electrical equipment will be removed at the Copco No. 1 Complex. Inert debris such as concrete will be buried at a 3.5-acre disposal area located on the slope north of Copco No. 2 Reservoir (Attachment 1; Figure 3: Copco No. 1 and Copco No. 2 Disposal Site). The disposal area will be graded for drainage and hydroseeded to prevent erosion. Reinforced steel and other recyclable materials will be sent to local recycling facilities.

Copco No. 2 Complex: The Copco No. 2 Complex is located on the Klamath River between RM 201.8 and RM 200 in Siskiyou County, California. Primary components of the Copco No. 2 Complex include:

- 1) A 70-AF unnamed reservoir;
- 2) Copco No. 2 Dam⁴, a 32-foot-tall concrete diversion dam with a gated spillway, basin apron, end sill, and a remnant cofferdam upstream of the concrete dam below the normal water surface elevation of the reservoir;
- 3) An approximately 15,000-square-foot earthen embankment section and a cutoff wall along the river right sidewall;
- 4) A water conveyance system consisting of 3,610 feet of concrete lined tunnels, a 1,333-foot-long wood-stave pipeline, underground surge tank, and two steel penstocks;
- 5) A 27-MW powerhouse;
- 6) Approximately 6.5 miles of transmission lines;
- 7) A control center building, maintenance building, and oil and gas storage building;

⁴ Copco No. 2 Dam is located approximately 0.3 miles downstream of Copco No. 1 Dam.

- 8) A switchyard;
- 9) Copco Village, a nearby village consisting of a cookhouse/bunkhouse, modern bunkhouse, garage/storage building, bungalow, three modular houses, four ranch-style houses, and a schoolhouse/community center; and
- 10) A 1.5-mile-long bypass reach in the Klamath River between Copco No. 2 Dam and Copco No. 2 Powerhouse, created by water diversions at Copco No. 2 Dam for hydropower generation at Copco No. 2 Powerhouse.

The proposed Project includes removal of all Copco No. 2 Complex features (i.e., all features listed above), except for the switchyard, which will be partially removed. PacifiCorp plans to use the remaining portion of the switchyard for power transmission.

The following activities will be performed prior to removal of the Copco No. 2 Complex: local seed collection and invasive weed control; access road improvements; and creation of equipment staging areas.

Under the proposed Project, Copco No. 2 Reservoir drawdown is scheduled to begin in May (Attachment 2: Project Schedule). Drawdown of Copco No. 2 is anticipated to take 24 hours, with a total Copco No. 2 reservoir surface elevation drawdown (drop) of five feet, from 2,486.5 feet to 2,481.5 feet. Due to the proximity of the two Copco reservoirs, drawdown of Copco No. 2 Reservoir will complete Copco No. 1 Reservoir drawdown. Following drawdown of Copco No. 2 Reservoir, temporary cofferdams will be constructed to assist in the removal of Copco No. 2 Dam spillway bays, powerhouse, and powerhouse water intake structures. A cofferdam⁵ will be permanently left in place to facilitate restoration activities following removal of the Copco No. 2 Complex.

Copco No. 2 Dam removal will occur via blasting, hydraulic excavators, diamond-wire saw cutting, and drilling. Inert debris such as concrete will be buried at same disposal site used for the Copco No. 1 Complex, a 3.5-acre disposal area located on the slope north of Copco No. 2 Reservoir (Attachment 1; Figure 3: Copco No. 1 and Copco No. 2 Disposal Site). Inert debris associated with Copco No. 1 powerhouse may be buried in the existing tailrace channel. Approximately 2,100 cubic yards of bulk earthen fill, 16,600 cubic yards of bulk concrete, 400 tons of rebar, 2,900 tons of mechanical and electrical equipment, 9,500 cubic yards of building waste, 700 tons of treated wood, and 6.7 miles of transmission line (including poles and transformers) will be removed. Recyclable materials will be sorted and brought to local recycling centers.

⁵ The cofferdam will be located in the tailrace of the Copco No. 2 Powerhouse, not in the Klamath River channel.

Iron Gate Complex: The Iron Gate Complex is located on the Klamath River between RM 200 and RM 193.1 in Siskiyou County, California. Primary components of the Iron Gate Complex include:

- 1) Iron Gate Reservoir, a 50,941-AF reservoir;
- 2) Iron Gate Dam, a 189-foot-tall earthen dam with a central impervious clay core on basalt bedrock foundation;
- 3) A fish hatchery with a warehouse*, hatchery building*, four fish-rearing ponds*, visitor information center*, and four employee residences*;
- 4) A water supply pipeline and aerator for the hatchery;
- 5) A fish collection facility at Iron Gate Dam, including fish ladder and trapping and hauling facilities;
- 6) An ungated side-channel spillway capable of discharging approximately 26,200 cfs;
- 7) A reinforced concrete diversion tunnel capable of diverting approximately 2,700 cfs, and a footbridge to a gate control building;
- 8) A 45-foot-tall freestanding concrete penstock intake structure and its adjoining footbridge, and a 12-foot-diameter, welded steel penstock with concrete supports;
- 9) An 18-MW powerhouse;
- 10) A switchyard;
- 11) Approximately 0.5-mile of transmission lines; and
- 12) Several recreation facilities, including Fall Creek*, Jenny Creek*, Wanaka Springs, Camp Creek, Juniper Point, Mirror Cove, Overlook Point, Long Gulch, and other small, unnamed, dispersed shoreline recreation sites.

The proposed Project includes removal of all physical features listed above with the exception (in the areas noted above with an *) of the fish hatchery warehouse, hatchery building, four fish-rearing ponds, visitor information center, four employee residences, and two recreation facilities (Jenny Creek and Fall Creek). The KRRC proposes to make a later determination on whether to remove the Jenny Creek and Fall Creek recreation facilities.

The following activities will be performed prior to removal of the Iron Gate Complex: local seed collection and invasive weed control; access road improvements; and creation of equipment staging areas. Additionally, the diversion tunnel will be equipped with new remote operated spillway gates capable of discharging 16,000 cfs.

Iron Gate Reservoir drawdown is proposed to begin on January 1 of the drawdown period. To ensure dam embankment stability, reservoir drawdown will be limited to a maximum of five feet per day and the reservoir's water will be released from the modified diversion tunnel. The maximum additional discharge associated with drawdown of Iron Gate Dam will be approximately 6,000 cfs. During dam removal, operators will maintain adequate water storage capacity to accommodate inflows from probable high flow events. Iron Gate Reservoir

drawdown is anticipated to be complete by March 15. Iron Gate Dam removal will follow the receding reservoir and is expected to be completed by September.

Iron Gate Complex removal will occur via earth-moving equipment, drilling, and blasting. Cofferdams will be used as needed to keep work areas dry and assist with Iron Gate Complex removal. Cofferdam breaches at Iron Gate and J.C. Boyle Complexes will be coordinated to reduce downstream impacts. The spillway structure will be buried in place with approximately 300,000 cubic yards of backfill to mimic the pre-dam appearance of the area.

The majority of earthen material and all the concrete rubble generated from Iron Gate Complex removal will be buried on-site in a 36-acre disposal site located on PacifiCorp property, approximately one mile south of Iron Gate Dam (Attachment 1; Figures 4 and 5: Iron Gate Disposal Site). Estimated quantities of materials associated with Iron Gate Complex removal include approximately 1,257,000 cubic yards of bulk earthen material, 20,700 cubic yards of bulk concrete, 700 tons of rebar, 1,200 tons of mechanical and electrical equipment, 600 cubic yards of bulk building waste, and approximately 0.5 miles of transmission lines (including poles and transformers). The disposal area will be covered with top soil, graded to conform with existing topography, and seeded to prevent erosion. Hazardous waste will be removed from the Project area and disposed per a Hazardous Materials Management Plan.

City of Yreka Water Supply Line: The primary water intake for Yreka's water supply line is located on Fall Creek, downstream of PacifiCorp's Fall Creek hydroelectric facility. The intake diverts raw water to a pump station along Fall Creek. From the pump station, the water supply line crosses the Klamath River near the upstream end of Iron Gate Reservoir to supply the City of Yreka with up to 15 cfs of raw water. To prevent potential water supply interruptions associated with Project implementation, prior to drawdown activities the KRRC will replace the portions of Yreka's Fall Creek Water Supply Line that cross the Klamath River, as described in the 2018 Definite Plan. In addition, the proposed Project includes evaluation of the fish screens at the water supply intakes, and modifications or replacements if needed. Alternatively, the proposed Project includes a permanent fish passage barrier just downstream of the Fall Creek confluence with the Fall Creek Powerhouse tailrace, that may be used in lieu of fish screens.

Hatchery Modifications: Prior to initiating Project drawdown activities, the proposed Project includes modifications to Iron Gate Hatchery and reconstruction of the Fall Creek Hatchery to allow for continued salmonid hatchery production during, and for eight years following, removal of the four dams. Hatchery operations will be managed under a Hatchery Operations Management Plan.

Iron Gate Hatchery will be modified to create a new water supply line from Bogus Creek and the auxiliary trap and ladder system currently in place will be used for

fish collection to produce Chinook smolts and incubate coho eggs⁶. Modifications to Iron Gate Hatchery will occur within the existing footprint, with the exception of the new water supply line from Bogus Creek.

Fall Creek Hatchery, which has not been used since 2003, will be reconstructed to produce Chinook smolts, Chinook yearlings, and coho yearlings. The reconstructed Fall Creek Hatchery will use Fall Creek as a water supply to support salmonid production.

Project Measures: In addition to removal of the four dams and associated facilities, Yreka water supply line replacement, and hatchery modifications, the KRRRC has included Project measures and plans to reduce impacts to local communities and environmental resources. Project measures and plans addressed in this certification include:

- *Aquatic Resource Protection Measures:* Proposed measures to protect aquatic resources include monitoring and implementation of plans to reduce effects to spawning Chinook, coho, steelhead, and lamprey by ensuring mainstem connectivity with Klamath River tributaries from Iron Gate Dam to Cottonwood Creek and spawning habitat restoration actions; surveys and relocation measures to reduce effects on out-migrating juvenile salmonids and lamprey; delayed release of hatchery raised coho at Iron Gate Hatchery to reduce Project-related suspended sediment effects on out-migrating juveniles, surveys and relocation measures to reduce effects on suckers, and surveys and relocation measures to reduce effects on freshwater mussels.
- *Reservoir Restoration Measures:* The KRRRC proposes to revegetate areas exposed during drawdown, and to monitor slopes for instability and undertake stabilization measures as needed. KRRRC will control invasive exotic vegetation species and revegetate the reservoir areas with native grasses, shrubs, and trees. KRRRC will remove any identified fish barriers in the reservoir areas to allow for volitional fish passage. The measures include monitoring and adaptive management to ensure successful restoration of exposed reservoir footprints.
- *Wetland Protection Measures:* KRRRC has conducted an evaluation for the presence of wetlands within the limits of work. KRRRC proposes to comply with regulatory requirements for delineating and protecting wetlands. The restoration plans for the reservoir and non-reservoir areas include designs for wetland and riparian habitat restoration to ensure no net loss of wetland or riparian habitat functions. KRRRC proposed wetland restoration

⁶ Coho eggs will be hatched and reared until they reach a size of approximately 300 fish per pound at Iron Gate Hatchery and then will be transported to Fall Creek Hatchery for rearing until release.

strategies for the reservoir areas include preservation of existing wetlands, hydrologic connection of off-channel wetlands with the river, or creation of new wetlands at lower elevations corresponding to the post-dam removal surfaces and hydrologic regime.

- *Eagle Protection:* KRRC will implement eagle avoidance and minimization measures to reduce Project impacts to eagles. Proposed measures include monitoring, nesting bird surveys, exclusion buffers, and planning construction activities for less sensitive times of the year.
- *Water Quality Monitoring:* KRRC proposes to monitor water quality to assess Project-related impacts and guide aquatic resource management measures. KRRC's water quality monitoring plan includes assessment of Klamath River water quality parameters (e.g., dissolved oxygen, temperature, turbidity, conductivity, suspended sediment, nutrients) collected prior to, during, and following dam removal; sampling and analysis for the presence of blue-green algae related toxins (microcystin) during and following dam removal; and sediment toxicity sampling in and downstream of the reservoirs.
- *Groundwater Well Management:* KRRC proposes to monitor groundwater levels adjacent to Project reservoirs to assess potential water supply impacts to groundwater wells. If the Project adversely impacts groundwater wells, KRRC will take steps (e.g., well deepening) to return the production rate of any affected domestic or irrigation groundwater supply well to conditions prior to dam decommissioning.
- *Hazardous Materials Management:* The Hazardous Materials Management Plan will be implemented to address the management of hazardous materials during Project implementation to comply with applicable regulations, including spill prevention and response, sampling, and proper disposal of hazardous materials and waste.
- *Recreation Measures:* The Project would remove reservoir-related facilities, potentially maintain or improve existing riverine facilities, and potentially develop additional recreation facilities. The Recreation Plan will take a programmatic approach to developing recreational facilities and mitigating any impacts attributed to these developments.

Additional Project measures and plans proposed by the KRRC include:

- Terrestrial resource measures;
- Road improvements;
- Traffic management;
- Fire management;
- Cultural resource management;

- Flood control improvements;
- Emergency response; and
- Noise and vibration control.

3.0 REGULATORY AUTHORITY

The State Water Board is issuing a certification for the water quality impacts of the Project in California. The water quality impacts of the Project in Oregon are addressed by the Oregon Department of Environmental Quality (ODEQ), Oregon's state agency with Clean Water Act section 401 authority. (See ODEQ's September 2018 *Evaluation and Findings Report for Section 401 Water Quality Certification for the Removal of the Lower Klamath Project (FERC Project Number 14803)*⁷ and Final Water Quality Certification⁸).

Water Quality Certification and Related Authorities

The federal Clean Water Act (33 U.S.C. §§ 1251-1387) was enacted "to restore and maintain the chemical, physical, and biological integrity of the Nation's waters." (33 U.S.C. § 1251(a).) Section 101 of the Clean Water Act (33 U.S.C. § 1251 (g)) requires federal agencies to "co-operate with the State and local agencies to develop comprehensive solutions to prevent, reduce and eliminate pollution in concert with programs for managing water resources."

Section 401 of the Clean Water Act (33 U.S.C. §1341) requires every applicant for a federal license or permit, which may result in a discharge into navigable waters, to provide the licensing or permitting federal agency with certification that the project will be in compliance with specified provisions of the Clean Water Act, including water quality standards and implementation plans promulgated pursuant to section 303 of the Clean Water Act (33 U.S.C. § 1313). Clean Water Act section 401 directs the agency responsible for certification to prescribe effluent limitations and other limitations necessary to ensure compliance with the Clean Water Act and with any other appropriate requirement of state law set forth in the certification. Certifications should also comply with the water quality standards of downstream states, including tribes with treatment-in-the-same-manner-as-a-state status under the Clean Water Act. (33 U.S.C. §§ 1341(a)(2), 1377(e).) Section 401 further provides that state certification conditions shall become conditions of any federal license or permit for the project. The State Water Board's Executive Director has been delegated the authority to issue a decision on a certification application. (Cal. Code Regs., tit. 23, § 3838, subd. (a).)

⁷ <https://www.oregon.gov/deq/FilterDocs/ferc14803report.pdf> (last accessed March 31, 2020)

⁸ <https://www.oregon.gov/deq/FilterDocs/ferc14803final.pdf> (last accessed April 3, 2020)

On October 21, 2016, the State Water Board first provided notice of receipt of a complete application for certification to the applicable parties pursuant to California Code of Regulations, title 23, section 3835, subdivision (c). Following the KRRC's initial 2016 water quality certification application filing, the KRRC continued to amend its water quality certification application, conduct environmental resource studies, and revise its Project description. The most recent certification application was submitted on December 3, 2019. Major updates since the first application include:

- 1) June 1, 2017, specification that the KRRC's Project description is the Full Dam Removal alternative listed in the Detailed Plan and associated mitigation measures were subject to change based on stakeholder involvement;
- 2) September 30, 2017 and January 3, 2018 KRRC responses to the State Water Board's August 25, 2017 Information Request, including clarification to the Project description (including hatchery design) and information from KRRC-conducted environmental resource studies;
- 3) June 1, 2018, KRRC clarification on Project description information, including a new Fish Hatchery Plan;
- 4) 2018 Definite Plan, which superseded the Project Description information included in the Detailed Plan;
- 5) October 16, 2018, KRRC submission of revised Aquatic Resource Measure 7 – Freshwater Mussels;
- 6) February 26, 2019, KRRC submission of Draft Environmental Impact Report comments providing updates on Project mitigation measures;
- 7) December 3, 2019, KRRC submission of a Request for Section 401 Water Quality Certification providing an updated Project description that includes:
 - a. A fish barrier below the City of Yreka's two water diversion dams;
 - b. Additional commitments on mitigation measures; and
 - c. A commitment to avoid a net increase of fire risk as compared to baseline conditions in the KRRC's forthcoming fire management plan; and
- 8) February 6, 2020, KRRC comments on the *Recirculated Portions of the Draft Environmental Impact Report*, in which the KRRC confirms it will implement Air Quality Mitigation Measures 1 through 5, and to purchase greenhouse gas credits to offset construction-related impacts associated with Project implementation.

The State Water Board provided public notice of the certification application pursuant to California Code of Regulations, title 23, section 3858 by posting information describing the Project on the State Water Board's website on December 22, 2016. In light of heightened public interest in this Project, on January 7, 2020, the State Water Board provided additional notice, under California Code of Regulations, title 23, section 3858, of the KRRC's most recent (December 3, 2019) certification application.

The State Water Board released a draft water quality certification for a 46-day comment period on June 7, 2018. The State Water Board received 44 comment letters, which the State Water Board considered in development of this final water quality certification.

The State Water Board's records and the FERC docket for the Lower Klamath Project contain more detail about water quality certification-related work associated with the Lower Klamath Project.

Any person aggrieved by this order may petition for reconsideration in accordance with California Code of Regulations, title 23, section 3867. A petition for reconsideration must be submitted in writing and received within 30 days of issuance of this order.

Water Quality Control Plans and Related Authorities

The California Regional Water Quality Control Boards (Regional Water Boards) have primary responsibility for the formulation and adoption of water quality control plans for their respective regions, subject to the State Water Board and United States Environmental Protection Agency (USEPA) approval, as appropriate. (Wat. Code, § 13240 et seq.) The State Water Board may also adopt water quality control plans, which will supersede regional water quality control plans for the same waters to the extent of any conflict. (Wat. Code, § 13170.) For a specified area, the water quality control plans designate the beneficial uses of water to be protected, the water quality objectives established for the reasonable protection of those beneficial uses or the prevention of nuisance, and a program of implementation to achieve the water quality objectives. (Wat. Code, §§ 13241, 13050 subd. (h), and 13050 subd. (j).) The beneficial uses together with the water quality objectives that are contained in the water quality control plans, in addition to state and federal anti-degradation requirements, constitute California's water quality standards. Additionally, USEPA designates specific tribes to be treated in the same manner as states under the Clean Water Act. In the Klamath Basin, the Hoopa Valley Tribe has received such status, and has adopted a water quality control plan, as well. Both the Yurok Tribe and Karuk Tribe have pending petitions for treatment-in-the-same-manner-as-states for the purpose of setting water quality standards and have submitted water quality control plans to USEPA.

North Coast Basin Plan

The North Coast Regional Water Quality Control Board (North Coast Regional Board) has adopted, and the State Water Board and the USEPA have approved, the *Water Quality Control Plan for the North Coast Region* (North Coast Basin Plan). The North Coast Basin Plan designates the beneficial uses of water to be protected along with the water quality objectives necessary to protect those uses.

The North Coast Basin Plan identifies beneficial uses⁹ in the Klamath River Basin as: municipal and domestic supply; agricultural supply; industrial service supply; industrial process supply; groundwater recharge; freshwater replenishment; navigation; hydropower generation; water contact recreation; non-water contact recreation; commercial and sport fishing; warm freshwater habitat; cold freshwater habitat; wildlife habitat; rare, threatened, or endangered species; marine habitat, migration of aquatic organisms; spawning, reproduction, and/or early development; shellfish harvesting; estuarine habitat; aquaculture; and Native American culture. The North Coast Basin Plan sets forth narrative and numeric objectives to protect these beneficial uses.

The North Coast Basin Plan includes a “Policy in Support of Restoration in the North Coast Region” that allows for certification of restoration projects “that result in significant and sometimes unavoidable impacts (including temporary exceedances of water quality objectives) if it is shown that the project will result in long-term protection of beneficial uses and water quality.”

State Water Board staff provided portions of the draft certification that have the potential to cause adverse water quality impacts to the North Coast Regional Board in April and May 2018. (California Code of Regulations title 23, section 3855 subdivision (b)(2)(B)). North Coast Regional Board staff responded with comments, which have been incorporated into this document.

Hoopa Reservation Plan

The Hoopa Valley Tribe has adopted the *Water Quality Control Plan, Hoopa Valley Indian Reservation* (Hoopa Reservation Plan)¹⁰. The northernmost end of the Hoopa Valley Indian Reservation includes part of the Klamath River just upstream of the confluence with the Trinity River. The Hoopa Reservation Plan establishes the following beneficial uses for all waterways on the Hoopa Valley Indian Reservation: water contact and non-contact recreation; cold-water aquatic life; wildlife; fisheries; and fishing rights. Additionally, specific to the Klamath River, the Hoopa Reservation Plan designates potential beneficial uses as: municipal and domestic supply; agricultural supply; industrial service supply; and industrial process supply. The Hoopa Reservation Plan designates existing beneficial uses for the Klamath River as: groundwater recharge; cold freshwater habitat; water-contact recreation; non-contact water recreation; wildlife habitat; preservation of threatened and endangered species; fish migration; fish spawning; and wild and scenic. The Hoopa Reservation Plan also identifies the

⁹ This overview includes all beneficial uses in the Klamath River Basin: a specific use may not apply to all reaches in the Klamath River Basin, and may be either an existing or potential use in any specific reach. For further detail, see Table 2-1 of the North Coast Basin Plan.

¹⁰ The Hoopa Reservation Plan is available online at: <https://www.epa.gov/sites/production/files/2014-12/documents/hoopa-valley-tribe.pdf> (last accessed April 1, 2020)

Klamath River for historic ceremonial and cultural water use. (See Hoopa Reservation Plan, Table 2.1.) The Hoopa Reservation Plan sets forth numeric and narrative objectives to protect these beneficial uses.

List of Impaired Water Bodies

The State Water Board has listed the Klamath River on the Clean Water Act Section 303(d) list. The Klamath River and waterbodies associated with the Project are listed in *California's 2014 and 2016 California Integrated Report (Clean Water Act Section 303(d) List / 505(b) Report) (2014/2016 Integrated Report¹¹)* as follows:

- The Klamath River from the Oregon border to the Pacific Ocean is listed for nutrients, organic enrichment/low dissolved oxygen, and temperature.
- Iron Gate and Copco No. 1 reservoirs are listed for mercury and for a liver toxin produced by blue-green algae, called microcystin.
- The Klamath River from Copco No. 1 Reservoir to the Trinity River is listed for microcystin.
- The Klamath River from the Trinity River to the Pacific Ocean is listed for sediment.
- The Klamath River from Iron Gate Dam to the Scott River is listed for aluminum.

Delegation of Authorities

In this certification, actions that could be taken by the State Water Board may also be taken by the State Water Board's designee. Water Code section 13383 provides the State Water Board with the authority to "establish monitoring, inspection, entry, reporting and recordkeeping requirements... and [require] other information as may reasonably be required" for activities subject to water quality certification under section 401 of the Clean Water Act that involve the diversion of water for beneficial use. The State Water Board delegated this authority to the Deputy Director of the Division of Water Rights (Deputy Director), as provided for in State Water Board Resolution No. 2012-0029. In the *Redelegation of Authorities Pursuant to Resolution No. 2012-0029* memo issued by the Deputy Director on October 19, 2017, this authority is redelegated to the Assistant Deputy Directors of the Division of Water Rights.

¹¹ The 2014/2016 Integrated Report is available online at: https://www.waterboards.ca.gov/water_issues/programs/tmdl/integrated2014_2016.shtml (last accessed April 1, 2020)

Construction General Permit

The *General Permit for Stormwater Discharges Associated with Construction and Land Disturbance Activities* (Construction General Permit; Water Quality Order No. 2009-0009-DWQ and NPDES No. CAS000002, as amended by Order No. 2010-0014-DWQ and Order No. 2012-0006-DWQ), applies to dischargers whose projects disturb one or more acres of soil or are part of a larger common plan of development that totals more than one acre. The Construction General Permit sets forth detailed best management practices to protect water quality from stormwater discharges associated with land disturbance.

Aquatic Weed Control Permit

The *Statewide National Pollutant Discharge Elimination System Permit for Residual Aquatic Pesticide Discharges to Waters of the United States from Algae and Aquatic Weed Control Applications* (Aquatic Weed Control Permit; State Water Board Order No. 2013-0002-DWQ and NPDES No. CAG990005, as amended by Order No. 2014-0078-DWQ, Order No. 2015-0029-DWQ, and Order No. 2016-0073-EXEC), applies to projects that require aquatic weed management activities. The Aquatic Weed Control Permit sets forth detailed management practices to protect water quality from pesticide and herbicide use associated with aquatic weed control.

Onsite Wastewater Treatment Systems Policy

The *Water Quality Control Policy for Siting, Design, Operation and Maintenance of Onsite Wastewater Treatment Systems* (OWTS Policy; State Water Board Resolution No. 2012-0032, as amended by State Water Board Resolution No. 2018-0019) establishes a statewide, risk-based, tiered approach for the regulation and management of onsite wastewater treatment system installation and replacement, and sets the level of performance and protection expected from onsite wastewater treatment systems.

Thermal Plan

The *Water Quality Control Plan for the Control of Temperature in the Coastal and Interstate Waters and the Enclosed Bays and Estuaries of California* (Thermal Plan) establishes water quality objectives for temperature in certain waters in California, including the Klamath River.

Ocean Plan

The *Water Quality Control Plan for Ocean Waters of California* (Ocean Plan; first established by the State Water Board in 1972 via Resolution No. 72-045, and most recently revised in 2019 via Resolution No. 2019-0015) establishes water quality standards to protect the beneficial uses of California's ocean waters through establishment of water quality objectives and implementation plans.

Water Quality Control Policy for the Enclosed Bays and Estuaries of California

The *Water Quality Control Policy for the Enclosed Bays and Estuaries of California* establishes statewide policies for discharges to enclosed bays and estuaries, including the Klamath Estuary. (See State Water Board Resolutions Nos. 74-43, 95-84, 2018-0028, and 2019-0015.) It establishes management policies, water quality requirements, and discharge prohibitions for discharges affecting enclosed bays and estuarine waters, including silt discharges.

State Wetland Definition and Procedures for Discharges of Dredged or Fill Material to Waters of the State

On April 2, 2019, the State Water Board adopted the *State Wetland Definition and Procedures for Discharges of Dredged or Fill Material to Waters of the State* (Procedures) (State Water Board 2019)¹². The Procedures provide California's definition of wetland, wetland delineation procedures, and procedures for submitting applications for activities that could result in discharges of dredged or fill material to waters of the state. The Procedures ensure that State Water Board regulatory activities will result in no net loss of wetland quantity, quality, or permanence, compliant with Executive Order W-59-93. The KRRC will need to comply with the Procedures when conducting Project activities that include dredge or fill activities that may impact waters of the state, including wetlands (see Condition 10 and Condition 14).

California Environmental Quality Act

The State Water Board is the lead agency for purposes of California Environmental Quality Act (CEQA) compliance. The State Water Board issued a **Notice of Preparation** (NOP) for the Project on December 22, 2016. The NOP comment period began on December 22, 2016, and ended on February 1, 2017. During the NOP comment period, the State Water Board hosted three public scoping meetings to facilitate public input. Public scoping meetings were held in the cities of Arcata (January 12, 2017), Sacramento (January 20, 2017), and Yreka (January 26, 2017). More than 300 organizations and individuals provided approximately 1,300 comments.

On December 27, 2018, the State Water Board released a draft environmental impact report (EIR), Volumes I and II analyzing environmental impacts associated with Project implementation as well as alternatives to the Project. Project alternatives evaluated in the draft EIR, Volumes I and II include: 1) Partial Removal; 2) Continued Operations with Fish Passage Facilities; 3) Two Dam Removal (J.C. Boyle and Copco No. 2 remain); 4) Three Dam Removal (J.C. Boyle remains); and 5) No Hatchery. The draft EIR, Volumes I and II was available for public review and comment from December 27, 2018, to

¹² The Office of Administrative Law approved the Procedures on August 28, 2019. The Procedures become effective on May 28, 2020.

February 26, 2019. During the public comment period, State Water Board staff hosted four public information and comment meetings to facilitate public input. Public meetings were held in the cities of Yreka (February 5, 2019), Arcata (February 6, 2019), Orleans (February 7, 2019), and Sacramento (February 15, 2019).

On December 21, 2019, the State Water Board issued *Recirculated Portions of the Draft Environmental Impact Report*. Portions of the draft EIR were recirculated in order to appropriately respond to comments received and to fully analyze the proposed project and project alternatives effects to air quality, greenhouse gas, and energy consumption. Air quality, greenhouse gas emissions, and energy analysis portions of the EIR were updated to address public comments on the draft EIR, Volumes I and II by providing additional details regarding elements of the proposed project and project alternatives by incorporating new modeling information to support the assessment of potential impacts to those resources. The *Recirculated Portions of the Draft Environmental Impact Report* were available for public review and comment from December 21, 2019, through February 6, 2020. During the public review period a total of 441 comment letters were received and approximately 108 oral commenters provided comments on the draft EIR, Volumes I and II and recirculated portions of the draft EIR.

The State Water Board considered comments received on the draft certification, draft EIR, Volumes I and II, and recirculated portions of the draft EIR in development of the final EIR. Pursuant to sections 15088, subdivision (b) and 15088.5, subdivision (f) of the CEQA Guidelines, on March 27, 2020, the State Water Board sent public agencies proposed responses to their comments on the draft EIR, Volumes I and II and the recirculated draft EIR. Pursuant to sections 15088 and 15132 of the CEQA Guidelines, the State Water Board included a summary of comments and recommendations received on the draft EIR and its responses to comments in Volume III, along with text changes to Volumes I and II and the recirculated portions of the draft EIR. Volumes I, II, recirculated portions of the EIR, and Volume III, including attachments to all volumes, constitute the final EIR.

The State Water Board, through the Executive Director, certifies that the final EIR is adequate to support approval of the Project, with incorporation of the Mitigation, Monitoring, or Reporting Program (Attachment 3), and CEQA Findings and Statements of Overriding Considerations (Attachment 4) of this water quality certification. In accordance with CEQA Guidelines section 15090, the State Water Board, through the Executive Director, further certifies that: the final EIR has been completed in compliance with CEQA; the final EIR was presented to, reviewed by, and considered by the State Water Board prior to approving the Project; and the final EIR represents the State Water Board's independent judgment and analysis.

3.0 ANALYSIS AND DISCUSSION

As described above, a water quality certification under Clean Water Act Section 401 certifies that a federally licensed or permitted project can comply with water quality standards and other appropriate requirements of state law. To the extent that a project threatens to violate such standards, the certification imposes conditions designed to protect water quality. These certification conditions become mandatory conditions of any federal license or permit issued for a project.

The Klamath Basin historically supported one of the largest salmon populations on the West Coast of the United States, providing hundreds of miles of migration, rearing, and spawning habitat as far inland as Upper Klamath Lake tributaries such as the Wood, Sprague, and Williamson Rivers (Snyder 1931; Hamilton et al. 2005). Prior to the 1900's, expected coho salmon population estimates for the entire Klamath Basin ranged from 15,400 – 20,000 (Moyle et al. 1995), while fall-run and spring-run Chinook salmon population estimates were 500,000 and 100,000, respectively (Moyle 2002). Historic steelhead populations were estimated to exceed several million (Hardy and Addley 2001). These historic salmonid populations provided, in part, for Native American sustenance, traditional, and ceremonial practices along the Klamath River and its tributaries, with the salmon fishery being “not much less necessary [to the Yurok Tribe and Hoopa Valley Tribe] as the atmosphere they breathed.” *Paravanno v. Babbitt* (9th Cir. 1995) 70 F.3d 539, 542 (internal citations omitted). Salmon, lamprey, steelhead, mussels, and other aquatic species were and continue to be an essential resource and of cultural significance for Native American Tribes. Additionally, the salmon and steelhead populations supported commercial ocean fisheries, and provided for a local recreational fishing industry.

Since the early 1900s, the Klamath River has been altered by construction of large dams for the United States Bureau of Reclamation's (USBR) Klamath Project, and PacifiCorp's Klamath Hydroelectric Project,¹³ as well as by extensive land use changes including associated water diversions and wetland loss. Loss of salmonid access to habitat upstream of dams and other impediments, flow reductions, land use changes, and associated water quality impairment have negatively impacted salmonid populations and Native American Tribes near the Klamath River (e.g. Snyder 1931, Williams et al. 2011, NMFS 1997a). Recent coho salmon population estimates for the entire Klamath Basin range from 973 – 14,650 (Ackerman et al. 2006), with fall-run and spring-run Chinook salmon population estimates of 27,369 – 316,754 (CDFW 2017) and 11,930 – 35,082 (CDFW 2015b), respectively. Steelhead population (1977-1991) estimates

¹³ Klamath Hydroelectric Project includes Lower Klamath Project facilities associated with the J.C. Boyle, Copco No. 1, Copco No. 2, and Iron Gate complexes.

include 110,000 for summer-run and 20,000 for winter-run (Busby et al. 1994). These numbers include both hatchery fish and natural spawners.

In light of salmonid population declines, in 1997 the National Marine Fisheries Service (NMFS) listed the Southern Oregon/Northern California Coast (SONCC) coho salmon evolutionary significant unit as threatened under the federal Endangered Species Act (ESA). Low levels of Chinook salmon returns on the Klamath River have resulted in commercial ocean fisheries closures and/or fishing curtailments. Additionally, in recent years, Native American tribes on the Klamath River have had severe restrictions and closures of subsistence, commercial, and ceremonial fisheries. These restrictions and closures have resulted in disruption to traditional diets and cultural impacts to tribal members. Both the NMFS and the California Department of Fish and Wildlife (CDFW) have determined that petitions to protect spring-run Chinook salmon merit further review and have undertaken listing determinations.

The Lower Klamath Project facilities are a major factor contributing to the decline of Klamath Basin water quality and salmonid populations. Lower Klamath Project facilities: 1) contribute to poor water quality conditions both at and downstream of Project facilities and associated reservoirs (e.g., temperature, pH, dissolved oxygen, and nutrient alterations) (Huntington 2006; DOI 2007; NMFS 2007b); 2) contribute to fish disease; and 3) block access to over 360 river miles of the Klamath River and associated tributaries leading to a reduction of salmonid populations.

The Upper Klamath River Basin has historically been a high-nutrient, eutrophic system, based in part on its naturally high-nutrient soils. However, over time, water diversions and land use changes, have helped shift the Upper Klamath River Basin to a hyper-eutrophic system. These changes have degraded the biological, chemical, and physical integrity of the Klamath River, including in and below the reach of the Lower Klamath Project. The State Water Board has designated reaches of the Klamath River as impaired for nutrients, organic enrichment/low dissolved oxygen, temperature, microcystin, sediment, and aluminum¹⁴. In 2005, toxic blue-green algae¹⁵ blooms began annually occurring at levels requiring warnings for water contact in Iron Gate and Copco Reservoirs.

The primary effects of Lower Klamath Project facilities on water quality result from changes in the physical structure of the aquatic ecosystem from a free-flowing river to reservoirs. Copco No. 1 Dam and Iron Gate slow water and form reservoirs, which shift water temperature patterns in downstream river reaches, making the water cooler in spring and warmer in fall as described in final EIR,

¹⁴ Additional information on 303(d) listing is located in Section 3, *List of Impaired Water Bodies* of this certification.

¹⁵ Blue-green algae is not an algae, but rather a type of cyanobacteria. However, it is commonly referred to as an algae. For readability, this certification refers to cyanobacteria as blue-green algae, except in the conditions.

Volume III, Section 3.2 (Water Quality). Seasonal temperature alterations associated with Copco and Iron Gate reservoirs contribute to water temperatures being too warm to support several designated beneficial uses annually during late summer/early fall including cold freshwater habitat (COLD), rare, threatened, or endangered species (RARE), and migration of aquatic organisms (MIGR) (North Coast Regional Board 2010). Due to surface heating of Iron Gate and Copco reservoirs in late spring and summer, a warmer, less dense layer of water forms on the reservoirs' surfaces, which overlies colder, denser water in a process called thermal stratification. This thermal stratification negatively influences water quality and cold-water species habitat suitability. Additionally, Lower Klamath Project reservoirs impact water chemistry in part due to large blue-green algae blooms that alter dissolved oxygen, pH, and the amount and timing of nutrient releases from the reservoirs.

Since 2005, the Klamath River and Lower Klamath Project reservoirs have experienced large blue-green algae (cyanobacteria) blooms of *Microcystis aeruginosa* (*M. aeruginosa*), which produces a hepatotoxin (microcystin) that can affect both humans and animals (State Water Board et al. 2010, updated 2016; OEHHA 2012). Specifically, in humans, exposure to microcystin has been documented to cause abdominal pain, headaches, sore throat, vomiting, nausea, dry cough, diarrhea, blistering around the mouth, pneumonia, muscle weakness, and acute liver failure (OEHHA 2012). Additionally, studies suggest *M. aeruginosa* blooms can result in increased fish mortality, reduced fish fertility and feeding, and fish habitat avoidance (Interagency Ecological Program 2007; Fetcho 2008, 2009; CH2M Hill 2009; Teh et al. 2010; Kann et al. 2013).

Although *M. aeruginosa* occurs in Upper Klamath Lake and throughout the Klamath River, the stable reservoir environment provided by Copco Reservoir and Iron Gate Reservoir coupled with high nutrient availability and warm reservoir surface water temperatures in summer and fall months, provides ideal conditions for *M. aeruginosa* growth. This leads to large blooms in Copco Reservoir and Iron Gate Reservoir, which pose a health risk to humans and the environment. Genetic testing and measurements of algae population densities have shown that the *M. aeruginosa* detected in Copco Reservoir and Iron Gate Reservoir originated inside the individual reservoirs rather than being transported from an upstream source. Additionally, Iron Gate Reservoir is the principal source of algae populations that cause nuisance blooms in the Middle and Lower Klamath River (Otten et al. 2015).

In the Klamath River downstream of Lower Klamath Project reservoirs, turbulent mixing, increased velocity, and tributary dilution result in a gradual decrease in suspended algal materials in the Klamath River water column (Armstrong and Ward 2008; Ward and Armstrong 2010). *M. aeruginosa* transported downstream from Lower Klamath Project reservoirs can become trapped and accumulate in calm pools and eddies along the edges of the Middle and Lower Klamath River (Kann and Corum 2006), resulting in pockets of highly concentrated blue-green

algae along the shoreline. The presence of blue-green algae along the shoreline is of particular concern because the shoreline is where wild animals, pets, and humans are most likely to interact with the Klamath River. Additionally, calm pools and eddy areas are also areas where anadromous fish seek refuge during their upstream migration.

On a seasonal basis, total phosphorus and nitrogen, can increase in the mainstem Hydroelectric Reach¹⁶ of the Klamath River due to releases of nutrients from reservoir sediments during the summer and fall when reservoir bottom waters are anoxic (Kier Associates 2006; Kann and Asarian 2007; Stillwater Sciences 2009; Asarian et al. 2010; Oliver et al. 2014). These seasonal releases, together with the existing high nutrients in the Klamath River can stimulate the growth of periphyton (aquatic freshwater organisms such as plants and algae attached to river substrate). Periphyton benefit from stable substrate, which is in part caused by the Lower Klamath Project's retention of sediment (in reservoirs) that would otherwise move downstream. Stable river substrates and periphyton downstream of Lower Klamath Project reservoirs, provide habitat for polychaete worms. These polychaete worms are the host species for myxozoan parasites that cause substantial infections of Klamath River salmon.

Fish infections of myxozoan parasites *Ceratomyxa shasta* (*C. shasta*) and *Parvicapsula minibicornis* (*P. minibicornis*) regularly result in substantial mortality of Klamath River salmon (Fujiwara et al. 2011, True et al. 2013). These parasites require two hosts to complete their life cycle – the salmon and a polychaetae worm. Additionally, there have been significant outbreaks of fish diseases, including Ich (from *Ichthyophthirius multifiliis*) and columnaris disease (from *Flavobacterium columnare*), among Klamath River salmon and steelhead. While these parasites and diseases can occur throughout the Klamath River watershed, they appear to cause the most severe mortality in the mainstem Klamath River downstream of Iron Gate Dam.

FERC (2007) concluded that the hydroelectric facilities associated with the Lower Klamath Project¹⁷ has likely contributed to conditions that support fish disease and lead to salmon losses in the Middle and Lower Klamath River in several ways. First, the hydroelectric facilities increase the density of spawning adult fall-run Chinook salmon downstream of Iron Gate Dam. Second, the hydroelectric facilities promote the development of attached algae beds that provide favorable

¹⁶ The Hydroelectric Reach refers to the stretch of the Klamath River that begins at the confluence of J.C. Boyle Reservoir with the Klamath River and continues to the base of Iron Gate Dam, and includes both J.C. Boyle and Copco No. 2 bypass reaches, and tributaries in this reach such as Jenny Creek, Fall Creek, Spencer Creek, and Shovel Creek.

¹⁷ Note the FERC document refers to the Klamath Hydroelectric Project rather than the Lower Klamath Project. Both projects include the same major hydroelectric facilities: J.C. Boyle, Copco No. 1, Copco No. 2, and Iron Gate.

habitat for the polychaete host for *C. shasta* and *P. minibicornis*. Finally, the hydroelectric facilities contribute to water quality conditions (increased late summer and fall temperature, elevated ammonia, and swings in dissolved oxygen and pH associated with algae blooms in reservoirs, and from effects of exposure to elevated levels of microcystin) that increase the stress level of juvenile and adult salmonids and increase their susceptibility to diseases.

Data collected between 2003 to 2012 show that juvenile Chinook and coho salmon outmigrants had *C. shasta* and *P. minibicornis* infection rates as high as 90 percent and 50 percent, respectively, which likely resulted in high mortality of out-migrating salmon smolts. Studies of out-migrating coho salmon smolts estimated that mortality rates were between 35 and 70 percent in the Klamath River near Iron Gate Dam (Beeman et al. 2008). High transmission rates of myxozoon parasites require a confluence of factors that allow the parasites to complete their life cycle. The current infectious zone and high parasite loads below Iron Gate Dam result from the synergistic effect of numerous factors including: 1) close proximity/crowding of parasite infected fish carcasses; 2) abundant polychaete populations; 3) suitable water temperatures (greater than 5°F) during periods when juvenile salmonids are present; and 4) low flow variability (Bartholomew and Foott 2010).

Ich and columnaris fish diseases occasionally result in substantial mortality, such as in 2002 when several factors, including low flows, poor water quality, an unusually large fish return, and intense crowding resulted in the death of more than 33,000 adult salmon and steelhead in the lower 36 miles of the Klamath River. Based on a review of available literature and historical records, this was the largest known pre-spawning adult salmonid die-off recorded on the Klamath River and possibly the Pacific Coast (USFWS 2003).

Prior to the construction of the hydroelectric dams, anadromous fish were able to reach cold-water tributaries below Upper Klamath Lake such as Fall Creek, Jenny Creek, Spencer Creek, and Shovel Creek. Steelhead and Chinook would also migrate to spawning habitat above Upper Klamath Lake in the Williamson, Sprague, and Wood rivers. Construction of Lower Klamath Project dams eliminated access to historic anadromous fish spawning and rearing habitat, with corresponding impacts on the fish species' populations and resilience. The impact has been particularly severe for spring-run Chinook salmon, which used habitat in the upper reaches of the Klamath River system and were the primary salmon run above Upper Klamath Lake. Both CDFW and NMFS are considering petitions to list spring-run Chinook on the Klamath River as a threatened or endangered species.

The Project, which involves the removal of Lower Klamath Project facilities, is a restoration project, that will result in temporary adverse impacts to aquatic resources, and water quality and associated beneficial uses. However, the Project will result in long-term benefits to water quality and aquatic resource conditions in the Klamath River.

The predominant water quality impacts of Project implementation are associated with the release of sediments stored in Lower Klamath Project reservoirs. Within one year of completing drawdown of Project reservoirs, approximately 5.6 to 8.8 million cubic yards (36 to 57 percent) of the approximate 15.5 million cubic yards of sediment stored behind J.C. Boyle, Copco, and Iron Gate reservoirs is expected to erode into the Klamath River. (Final EIR, 2020) (USBR 2012). The release of this sediment will affect approximately 233 river miles of the Klamath River, 214 river miles of which are located in California. Model results indicate sediment released from behind Lower Klamath Project dams will primarily continue downstream of the Klamath River into the Pacific Nearshore Ocean Environment, except for coarse sediments. Depending on the water-year type, the coarse sediments may deposit below Iron Gate Dam in the Klamath River, reducing the Klamath River depth by an average of 0.9 feet (between Bogus Creek and Willow Creek) and 0.4 feet (between Willow Creek and Cottonwood Creek) (USBR 2012). Additionally, sediment associated with the Project dams removal may deposit in backwater and vegetated areas of the Klamath Estuary. As described in Section 2 of the EIR, the main sediment release associated with Project implementation has been timed to reduce impacts across a broad range of salmonids. However, during drawdown, and potentially periodically in the first two years after removal of the Project dams, elevated amounts of sediment are anticipated to negatively impact aquatic species and a range of water quality parameters.

Although Project implementation and the associated export of reservoir sediments will have negative impacts on aquatic resources (EIR Section 3.3) and water quality (EIR Section 3.2), sediment-associated impacts will be temporary and are necessary to achieve the long-term permanent benefits associated with removal of the Project dams and associated facilities. Removal of the Lower Klamath Project eliminates water quality and aquatic resource impacts associated with continued operations of the Lower Klamath Project facilities (described above) and opens over 360 river miles of habitat to anadromous species. These long-term improvements outweigh the temporary impacts that would result from dam removal.

When preparing the conditions in this certification, State Water Board staff reviewed and considered the following documents and amendments thereto: 1) State Water Board's 2020 EIR; 2) FERC's 2007 *Environmental Impact Statement for Relicensing of the Klamath Hydroelectric Project No. 2082-027* (EIS) developed for the Klamath Hydroelectric Project; 3) 2012 *Klamath Facilities Removal Final Environmental Impact Statement/ Environmental Impact Report* (EIS/R); 4) KRRC's FERC license surrender application; 5) KRRC and PacifiCorp's license transfer application; 6) Amended KHSR and associated Detailed Plan; 7) KRRC's September 30, 2017, Technical Support Document; 8) KRRC's January 3, 2018, Updated Project Information Submittal; 9) submittals made to the FERC record for Project No. 14803 and Project No. 2082; 10) relevant communications with consultants, agencies, Native American tribes,

stakeholders, and the KRRC; and 11) KRRC's original 2016 water quality certification application and subsequent December 3, 2019, water quality certification application and attachments. State Water Board staff also considered the North Coast Basin Plan, existing water quality conditions, Project-related controllable factors, and other information in the record.

Overall, Project implementation, as a restoration project, is anticipated to improve the health of the Klamath River ecosystem by removing Lower Klamath Project dams and the associated water quality and environmental impacts that have resulted from the continued operation of the hydroelectric facilities over the past 100 years. The conditions in this water quality certification are required to ensure that water quality impacts are temporary and reduced to acceptable levels. The following sections provide additional discussion regarding the water quality certification conditions in support of these overarching goals.

Discussion of Condition 1 - Water Quality Monitoring and Adaptive Management

The Project is a restoration project that will result in short-term exceedances of sediment-related water quality objectives, but will result in long-term water quality improvements. The Project's primary anticipated exceedances are related to the release of sediments deposited in the reservoirs.

Monitoring of water quality is required to assess water quality impacts associated with Project implementation, and to inform adaptive management actions to correct Project-related water quality impacts.

Condition 1 primarily addresses monitoring and adaptive management regarding water quality changes anticipated with the removal of the dams, the associated sediment release, and related restoration. Other conditions of this certification require additional monitoring for other Project-related activities. Project implementation is expected to affect:

- 1) Sediment Dynamics. The release of sediment from behind the dams is anticipated to result in short-term increases in suspended sediments (inorganic and organic). Additionally, sediment deposition is expected in the reach directly below Iron Gate Dam down to Cottonwood Creek, which may potentially impact tributary connectivity.
- 2) Temperature. The elimination of reservoirs and resulting shift to a riverine system will affect water temperatures. The reservoir temperature regimes will be eliminated, including increased surface solar heating and seasonal temperature stratification of the reservoirs. Downstream of the dams, modeling indicates the Project will eliminate the temperature lag created by the reservoirs and increase daily temperature changes, with diminishing influence as colder water tributaries enter the system in the Middle Klamath River. Additionally, sediment has the potential to deposit in slack backwater areas decreasing water depth and potentially

increasing water temperatures in certain areas, such as in the Klamath Estuary.

- 3) Nutrients. Short-term increases in sediment-associated nutrients are expected due to the release of sediments stored in the reservoirs. Additionally, conversion to a riverine system is expected to result in the permanent loss of seasonal nutrient loading from the reservoirs and a permanent small increase in total nutrients.
- 4) Dissolved Oxygen. Release of sediments stored in the reservoirs during drawdown is expected to drive biological decomposition and result in a short-term increase in oxygen demand and reduction in dissolved oxygen in the Klamath River below the reservoirs and in the Klamath Estuary.
- 5) Chemicals of Potential Concern. Removal of the dams is expected to result in the short-term release of sediments stored in the reservoirs, which contain chemicals of potential concern. As described in Section 3.2.2.8 [*Water Quality*] *Inorganic and Organic Contaminants* of the EIR, several reservoir sediment sampling events have been conducted in the reservoirs to analyze sediments for chemicals of potential concern. Cyanide, arsenic, mercury, copper, lead, dioxin, ethyl benzene, xylene, and other chemicals of potential concern were identified in reservoir sediment samples. Nickel, iron, and 2,3,4,7,8-pentachlordibenzofuran (PECDF) were detected in sediment in all three reservoirs (J.C. Boyle, Copco, and Iron Gate), while 4,4'-dichlorodiphenyltrichloroethane (DDT), 4,4'-dichlorodiphenyldichloroethane (DDD), 4,4'-dichlorodiphenyldichloroethylene (DDE), dieldrin, and 2,3,7,8-tetrachlorodibenzodioxin (TCDD) were detected only in J.C. Boyle sediments.

Water quality monitoring required in Condition 1 is divided into three categories based on the type of monitoring required: Category 1 refers to continuous monitoring; Category 2 refers to water grab samples; and Category 3 refers to sediment grab samples. Each category is discussed further below.

Category 1. Continuous water quality monitoring of basic water quality constituents (e.g., dissolved oxygen, water temperature, turbidity, conductivity, and pH) with monthly reporting will allow for evaluation of water quality in relation to Project implementation and the compliance schedule (Condition 2). Such monitoring is cost-effective compared to grab samples and is a standard practice in monitoring impacts of hydroelectric facilities. Due to the geographic extent of the Project, and the potential extent of Project related impacts to water quality, continuous water quality monitoring stations are needed above the most upstream Project site (Klamath River above J.C. Boyle Reservoir), throughout the Project sites (above and below J.C. Boyle, Copco, and Iron Gate reservoirs), and stationed throughout the lower 190 river miles of the Klamath River, including the Klamath River Estuary. A 30-minute monitoring frequency

provides sufficient data to inform trends in water quality and to capture diel fluctuations or patterns (e.g., related to temperature or dissolved oxygen) that are expected to be affected by removal of the dams and the associated sediment release.

Category 2. Water quality grab samples serve to assess Project-related impacts to water chemistry and to provide information on a more robust set of constituents.

Suspended sediment concentration monitoring is required because it was used in the models to evaluate salmonid impacts and is related to the North Coast Basin Plan's suspended material water quality objective.¹⁸ Settleable solids data will allow assessment of the degree to which sediment released from the Project will remain suspended, as opposed to depositing in the Klamath River.

As discussed above and in EIR Section 3.4 *Phytoplankton and Periphyton*, the reservoirs provide habitat for large annual blooms of *Microcystis aeruginosa* that alter water quality and produce a liver toxin (microcystin). Dam removal will release reservoir-stored sediments that include dead and dormant blue-green algae, which are anticipated to flush through the river system. However, there is the potential for Project activities to continue to contribute nutrient inputs into the Klamath River that could support algal blooms either from: 1) additional inputs of dormant blue-green algae and sediment associated nutrients from sediments remaining in former Project reservoir areas that may continue to erode; and/or 2) reservoir sediments that deposited in backwater areas of the Klamath River following reservoir drawdown. While overall microcystin concentrations are anticipated to fall significantly with the removal of the reservoirs, monitoring will allow for identification of and adaptive management to eliminate a Project-related contribution to microcystin.

303(d) listed constituents and chemicals of potential concern may be present in remaining sediments and will be monitored to assess potential Project-related water quality impacts. Additionally, because the Klamath River is 303(d) listed for

¹⁸ While measurements of suspended sediment and turbidity are related such that a relationship can be determined to estimate suspended sediment from turbidity, the relationship between suspended sediments and turbidity can vary by monitoring location on the same river. Both suspended sediment and turbidity data must be collected at one or more locations in a river over a sufficiently long time period (preferably with varying flow events) to characterize the range of suspended sediment and turbidity conditions and determine the relationship between the two parameters at sampling locations. As the Klamath River's suspended sediment and turbidity relationship has yet to be established and will likely change during and following dam removal until the Klamath River establishes a new equilibrium, Condition 1 does not require the KRRC to establish a suspended sediment and turbidity relationship.

aluminum and mercury, this certification requires testing for the unlikely event that the release of sediments exacerbates the existing conditions.

Category 3. This condition requires the KRRC to perform sediment grab sampling prior to and following dam removal. As discussed in EIR Section 3.2.2.8: *Inorganic and Organic Contaminants*, metals typically bind to fine sediments and exhibit limited bioavailability or aquatic toxicity. Contaminants such as pesticides and dioxins are adsorbed (i.e., attach to the surface of) organic particulate matter, such as dead vegetation and phytoplankton. Sediment sampling results that could exceed naturally occurring background levels or exceed a human or environmental health standard are discussed in detail in EIR Section 3.2.2.8 [*Water Quality*] *Inorganic and Organic Contaminants* and in Appendix C *Water Quality Supporting Technical Information*. Model results indicate most fine reservoir sediments released into the Lower Klamath River will flush into the Pacific Nearshore Ocean Environment, limiting the potential for toxic human or riverine wildlife exposure. However, this condition requires sediment grab samples at 11 locations downstream of the facilities prior to and following removal of the dams because: results associated with core sampling show the presence of chemicals of potential concern; there is inherent uncertainty associated with modeling and sediment deposition; and some limited sediment deposition is expected. The condition requires sediment grab samples to be analyzed for chemicals of potential concern, for those constituents identified above detection levels during previous core sampling of the Lower Klamath Project reservoirs sediments, which include: nickel; iron; 2,3,4,7,8-pentachlorodibenzofuran (PCDF); 4,4'-dichlorodiphenyltrichloroethane (DDT); 4,4'-dichlorodiphenyldichloroethane (DDD); 4,4'-dichlorodiphenyldichloroethylene (DDE); dieldrin; and 2,3,7,8-tetrachlorodibenzodioxin (TCDD).

Analysis of the results of the 2009–2010 USBR sediment core samples from J.C. Boyle, Copco No. 1, and Iron Gate reservoirs and the Klamath Estuary indicate that total chromium and total nickel concentrations are higher in the Klamath Estuary sediments than in Lower Klamath Project reservoir sediments; but, total arsenic, total copper, and total lead concentrations are higher in reservoir sediments than Klamath Estuary sediments. Dioxin was measured in J.C. Boyle, Copco No. 1, and Iron Gate reservoir sediment samples. The range of dioxin concentrations reported was slightly above the minimum USEPA fish and wildlife guidelines screening levels for human health and ecological receptors. One sediment sample showed an exceedance of screening levels for ethyl benzene and total xylene. Cyanide was detected in multiple sediment core samples, but not in the free cyanide form (hydrogen cyanide or cyanide ion), which is bioavailable and toxic. Condition 1, Category 3 requires sediments to be analyzed for cyanide, arsenic, copper, lead, dioxin, ethyl benzene, and xylene concentrations to confirm reservoir sediments are not contributing to an increased concentration of these chemicals of potential concern downstream of the Hydroelectric Reach.

Copco No. 1 and Iron Gate reservoirs are included on the 303(d) list of impaired waterbodies for mercury based on elevated methylmercury concentrations in fish tissue for trophic level 4 fish. This condition requires testing for the unlikely event that the release of sediments exacerbates these existing conditions downstream of Iron Gate Dam.

The Middle Klamath River, from Iron Gate Dam to the Scott River, is included on the 303(d) list of impaired waterbodies for aluminum. Data collected under the California Surface Water Ambient Monitoring Program for the period 2001–2005 indicates that at eight monitoring sites from the Oregon-California state line to Turwar, aluminum concentrations were less than California primary drinking water standards. However, some sample concentrations were slightly above the aluminum USEPA freshwater aquatic life standard and the USEPA and California secondary drinking water standards. Condition 1, Category 3 requires sediments to be analyzed for aluminum to confirm reservoir sediments are not contributing to an increased concentration of aluminum downstream of the Hydroelectric Reach.

The EIR anticipates that the main sediment-related water quality impacts from reservoir drawdown will end within 10 months of completing drawdown. However, Condition 1, does not prescribe an end point to water quality monitoring. This is in light of the scope and scale of the Project, uncertainties inherent in modeling predictions, the stability of remaining sediments, and the time required for successful restoration. As such, Condition 1 requires ongoing monitoring and frequent reporting and evaluation, such that monitoring can be modified, discontinued, or resumed as necessary. Water quality monitoring and adaptive management will continue for the duration of any Project-related water quality impacts and their remediation.

The mobilization of sediments is a primary driver of water quality impacts for the Project. Assessing the amount of sediment mobilized during Project implementation and remaining after dam removal, will assist in assessing, identifying, and understanding several water quality implications of the Project. These include whether the Project is likely to comply within the compliance schedule identified in Condition 2, whether sediment-related water quality measurements are attributable to the Project, and whether additional measures are required to prevent sediment discharges over the long term.

Discussion of Condition 2 – Compliance Schedule

In evaluating the Project, the State Water Board considered the short-term water quality impacts in the context of the long-term benefits gained from implementing the Project. The State Water Board determined that short-term exceedance of sediment-related water quality objectives is permissible as the main impacts will: be limited in duration; occur at the time period least damaging to the various life-stages of salmonid species on the whole; and result in substantial long-term water quality improvements in the Klamath River, including improvements to the chemical, physical, and biological quality of the system. Additionally, Condition 1

requires the development of a Water Quality Monitoring Plan with measurable compliance criteria and monitoring requirements to inform additional actions for the protection of water quality.

Sediment transport models predict suspended sediment concentrations will be reduced to levels observed under existing conditions within 10 months of completing drawdown. However, there is the potential for unvegetated sediments (sediments in the reservoir footprint, not successfully vegetated during initial restoration activities) to cause elevated suspended sediment concentrations during fall rain events in the year following the completion of drawdown (EIR Section 3.2.5.2, Potential Impact 3.2-3). A compliance schedule of 36 months was established to account for the: 10-month period following the completion of drawdown; full calendar year following completion of drawdown when periodic rain events may increase suspended sediment concentrations; and evaluation of any potential adaptive management actions implemented per this certification (e.g., if initial restoration actions are insufficient to prevent sediment erosion into the Klamath River).

Discussion of Condition 3 – Reservoir Drawdown

Dewatering of the primary reservoirs (i.e., J.C. Boyle, Copco No. 1, and Iron Gate) is proposed from November through March 15, with the main drawdown period from January to mid-March. The proposed drawdown period was selected by the KRRC for several reasons, including: 1) it provides for power generation revenues for the period specified in the KHSAs; 2) the proposed timing is designed to reduce impacts to salmonids, balancing the impacts among the various life stages of the different species; 3) most salmonids are in tributaries or farther downstream during the period of maximum sediment discharge; 4) it is the period for natural winter flows and associated high levels of suspended sediment; and 5) the native aquatic species have adapted to naturally high levels of suspended sediment in winter, through tolerance and avoidance. (EIR, Section 2.7 *Project Description*.)

The rate, method, duration, and capacity of reservoir water releases during drawdown is discussed in EIR *Section 2: Proposed Project* and Section 4 of the 2018 Definite Plan. The EIR indicates that reservoir drawdown will affect Klamath River water quality through the release of stored reservoir sediments during drawdown. The removal of the dams and associated reservoirs are proposed to occur in the same water year in order to limit the frequency and duration of sediment impacts to aquatic resources.

Condition 3 requires the KRRC to submit a reservoir drawdown plan consistent with its proposed Project and with additional elements included in Condition 3. The condition requires completion of drawdown of Iron Gate, Copco No. 1, and J.C. Boyle by March 15 and completion of Copco No. 2 by May 1 in the year following the initiation of drawdown (i.e., within approximately six months of drawdown initiation). Requiring Deputy Director review and approval of the drawdown plan will provide the State Water Board with the opportunity to

evaluate the its feasibility and to ensure that any changes from what is outlined in the 2018 Definite Plan are evaluated for potential impacts to water quality. Condition 3 also requires the KRRC to implement key elements of the Project that may influence water quality as described in the application. Such key elements include the timing of drawdown in the winter when high sediment concentrations occur naturally and potential impacts on various life stages of salmonids will be reduced.

Discussion of Condition 4 – Sediment Deposits

Analysis of the 2009–2010 USBR sediment core sample results from J.C. Boyle Reservoir, Copco No. 1 Reservoir, Iron Gate Reservoir, and the Klamath Estuary indicate that total arsenic concentrations are higher in reservoir sediments than estuary sediments. As discussed in EIR, Section 2.7.3 *Reservoir Sediment Deposits and Erosion During Drawdown*, the majority of reservoir sediments mobilized during dam removal are fine particles that are not expected to deposit along the Klamath River. However, it is possible that there will be some reservoir sediment deposition along riverbanks and/or floodplains below Iron Gate Dam to the mouth of the Klamath Estuary. It is anticipated that these reservoir sediments would be most likely to deposit in areas where water velocities are slow. These could include riverbank areas used for residential or agricultural purposes (as discussed in Potential Impact 3.2-13 of the EIR). In order to eliminate potential human health exposure risk from arsenic associated with potential reservoir sediment deposition following drawdown, Condition 4 requires the KRRC to investigate and remediate sediment deposits with exceedances of local background levels, USEPA human health residential screening levels, or California Environmental Protection Agency human health residential screening levels.

Discussion of Condition 5 – Anadromous Fish Presence

The Lower Klamath Project dam developments currently block anadromous fish passage in the Klamath River. Removing the dams and restoring the reservoir sites to return the Klamath River to free-flowing riverine conditions will provide anadromous fish passage to tributaries and the mainstem Klamath River upstream of the dams. Expanding anadromous fish habitat above the Lower Klamath Project dams is a key restoration purpose of the Project. Fish presence monitoring will provide information to assess whether this restoration purpose is being met, and, if not, whether additional actions are needed to the enable access. Additionally, testing for fish presence is an efficient method to determine whether more time- and resource-intensive methods of identifying Project-related fish passage barriers are needed. Condition 5 requires the Licensee KRRC to develop, in consultation with the State Water Board, North Coast Regional Board, CDFW, and NMFS, a Fish Presence Plan to monitor anadromous fish access to locations previously blocked by Lower Klamath Project dams.

Discussion of Condition 6 – Aquatic Resources

The KRRC has developed several measures to help reduce short-term Project-related impacts to aquatic resources. These include tributary-mainstem connectivity monitoring, spawning habitat evaluation, salvage of overwintering juvenile salmonids, and rescue and relocation of juvenile salmonids and lamprey from tributary confluence areas. These measures are important to strike a balance between short-term and long-term Project impacts by reducing the potential for and severity of short-term impacts on aquatic species (see EIR Section 3.3.5.9). Condition 6 ensures that the Project aquatic resource measures are conducted using appropriate methods and protocols, and that adaptive management measures are implemented to reduce the severity of Project impacts to aquatic species.

Discussion of Condition 7 – Remaining Facilities

Implementation of the Project includes leaving some Lower Klamath Project facilities in place. Remaining facilities could impair water quality through any ongoing operations, as well as erosion, degradation, or releases of hazardous materials associated with the remaining Project facilities. Factors that may influence impacts to water quality include the type of structure (e.g., asbestos tiles), location (e.g., proximity to water), and state of building (e.g., well-maintained or in disrepair). Condition 7 requires the development and implementation of a plan to ensure that any remaining facilities do not impair water quality.

Discussion of Condition 8 – Public Drinking Water Supplies

The transport and potential deposition of sediments associated with removal of Project dams has the potential to result in public water supplies that fail to meet drinking water quality standards. EIR Section 3.2.5.7 [Water Quality] *Inorganic and Organic Contaminants*, identified two potable water supplies that draw from the mainstem Klamath River. Condition 8 requires the KRRC to conduct an evaluation of potentially affected potable water supplies and implement measures to sufficiently protect potable drinking water supplies.

Additionally, the 2018 Definite Plan proposes, and Condition 8 requires, the KRRC to construct a new, fully operational replacement pipeline for the portion of the City of Yreka's current water supply pipeline that crosses Iron Gate Reservoir. Drawdown of Iron Gate Reservoir could potentially damage that pipeline section, so it must be removed and replaced prior to initiating drawdown of the reservoirs. The new replacement pipeline section will be installed in a location that prevents river flows during and after drawdown from affecting the City of Yreka's water supply. The 2018 Definite Plan describes three potential locations. In addition to identifying how and where the pipeline will be relocated, Condition 8 defines the time frame for the pipeline replacement and requires coordination with the City of Yreka to ensure an adequate water supply is available during the temporary period associated with the disconnection from the

existing water supply pipeline section and re-connection of the new pipeline section.

Discussion of Condition 9 – Aquatic Vegetation Management

It is anticipated that herbicides may be used to control invasive exotic vegetation. Without proper selection, handling, and application, herbicides could impact Klamath River water quality through runoff or drift. The KRRC has indicated in the Reservoir Areas Management Plan that herbicide use would be a last resort and only implemented upon approval. However, the current plan lacks specificity regarding what herbicide may be used and application practices, should they be needed (EIR, Potential Impact 3.2-16). If herbicides are employed without specific guidelines for their use, the Project has the potential to impact short-term aquatic toxicity in the Klamath River. In order to minimize potential impacts to water quality, Condition 9 requires the KRRC to obtain coverage under the Aquatic Weed Control Permit if herbicides will be used as part of Project implementation. If vegetation must be treated with herbicides, the KRRC will follow the Aquatic Weed Control Permit requirements and measures applicable to vegetation/material removal.

Discussion of Condition 10 – Construction: General Permit Compliance and Water Quality Monitoring and Protection Plans

Protection of the instream beneficial uses identified in the North Coast Basin Plan requires effluent limitations and other limitations on discharges of pollutants from point and nonpoint sources to the Klamath River and its tributaries. The Project includes deconstruction and removal of existing facilities and other activities that require construction or maintenance. Erosion from Project-related construction and maintenance activities has the potential to result in discharges that violate water quality standards. Condition 10 requires the KRRC to comply with terms of the Construction General Permit, as applicable, or to develop and implement Water Quality Monitoring and Protection Plans (WQMP Plans) to protect water quality and beneficial uses. WQMP Plans will be developed for construction and maintenance activities with the potential to cause erosion, stream sedimentation, release of hazardous materials, or otherwise impair water quality that are not covered by another condition of the certification.

Discussion of Condition 11 – Waste Disposal

Section 5 of the 2018 Definite Plan includes a description of measures the KRRC will implement for waste disposal. Condition 11 requires the Licensee to properly manage waste materials to ensure that non-hazardous waste material associated with Project activities do not enter waterways or impact water quality.

Condition 11 requires development and implementation of a plan to dispose of non-hazardous waste materials and implementation of erosion control measures to preclude runoff from acquiring waste materials and conveying those materials to surface waters. In addition, Condition 11 requires the restoration and regrading of on-site disposal areas for drainage, to prevent future run-off from conveying waste materials to surface waters. Condition 11 also requires

implementation of best management practices for disposal sites to help prevent any waste effluent from impacting water quality and protect beneficial uses.

Discussion of Condition 12 – Hazardous Materials Management

As noted in EIR Section 3.21.2.3: *Contaminants/Contaminated Sites*, several locations in the vicinity of the Project have been identified as potentially contaminated with hazardous materials. On December 30, 2019, the State Water Board received a submittal from PacifiCorp (PacifiCorp 2019a), which included redacted versions of Phase I and Phase II reports. These redacted reports disclosed the potential for certain types of hazardous materials (e.g., asbestos, heavy metals, polychlorinated biphenyls, creosote-treated wood) at the various Lower Klamath Project facilities. Hazardous materials could include, but are not limited to, hazardous materials associated with structures to be removed, hazardous materials in remaining facilities that should be removed during Project implementation, or existing septic tanks associated with the Project. The Project also involves the use of heavy machinery and large trucks that contain metals and oils that could be harmful to the environment.

It is crucial to prevent the release of hazardous materials into the environment and waterways for the protection of water quality and associated beneficial uses, including protection of state- and federally-listed species, and other aquatic species. Condition 12 requires the KRRC to store and properly dispose of hazardous materials related to the Project in a manner that avoids direct or indirect release into waterways. Condition 12 also requires the KRRC to ensure appropriate equipment and supplies are available to respond to spills and take appropriate corrective actions, including contacting appropriate agencies in the event of a spill. The condition also includes measures to help ensure proper disposal of hazardous materials associated with the Project (i.e., oil storage tanks, mechanical fluids, batteries, etc.).

Discussion of Condition 13 – Hatcheries

Hatchery operation is proposed for eight years with a combined production that is less than the number of fish currently being produced, with no proposal for operations thereafter. As discussed in EIR Section 3.3.5.6, *Fish Hatcheries*, it is not anticipated that the proposed reduction in operation of the hatcheries and the eventual cessation of hatchery production, and the other impacts of implementing the Project will have a significant impact on fish populations when balanced with the anticipated long-term fish population benefits of dam removal. The proposed hatchery operations are anticipated to accelerate re-population of new habitat by coho and fall-run Chinook salmon, and to support tribal, commercial, and recreational fishing in the near term, including supporting tribal fishing as a contributing element of the Klamath Riverscape. (See EIR Vol. III, Master Response AQF-2).

As described in EIR Section 3.3.5.6, *Fish Hatcheries*, and Potential Impact 3.2-17, the Project-related activities associated with the Fall Creek and Iron Gate hatcheries have the potential to impact water quality. The continued operation of

Iron Gate Hatchery and the reopening of Fall Creek Hatchery will include a new water source for Iron Gate Hatchery, changes to the Fall Creek diversion, and wastewater discharge at both facilities. Operation of a newly-reopened Fall Creek Hatchery has the potential to cause intermittent exceedances of water temperature and dissolved oxygen requirements in Fall Creek downstream of the hatchery for the duration of its operations. In order to protect water quality in Fall Creek and Bogus Creek the KRRC must provide a plan that describes: operations of each hatchery; target production numbers for each species; water supply details including the quantity, timing, and location of water diversions; water treatment methods; and specific practices that will be implemented to minimize impacts to water quality. The hatcheries must also comply with NPDES permitting requirements issued by the North Coast Regional Board. Although some of the information for this plan has already been developed, additional details must still be developed and finalized, and the proposal is subject to change through consultation and permitting requirements under the Endangered Species Act. The Hatcheries Plan will allow for consolidation of the hatcheries' proposal following consultation with appropriate agencies and inclusion of associated provisions to ensure the protection of water quality and beneficial uses.

Discussion of Condition 14 –Restoration

Erosion from exposed reservoir beds and disturbed areas and potential runoff of herbicides associated with treatment of noxious weeds, could result in Project-related water quality problems, as described in EIR Sections 3.2 *Water Quality* and 3.5 *Terrestrial Resources*. Additionally, the Project has the potential to disturb wetlands and riparian areas, as described in EIR Section 3.5 *Terrestrial Resources*.

To address potential impacts to water quality and beneficial uses associated with the dewatering and decommissioning of the dams, as well as to improve habitat complexity, the KRRC developed a Reservoir Area Management Plan that details, among other things, the collection of native plant seeds, propagation of native plants, seeding of exposed soils, salvaging and re-planting of existing wetland and riparian vegetation, noxious weed control, installation of habitat features (i.e., large woody material), several years of monitoring, and, as necessary, adaptive management such as plant maintenance and additional seeding or planting. These measures are expected to stabilize soils and re-establish wetlands and riparian areas at a ratio of greater than 1:1, and protect culturally-sensitive plant species, as described in the EIR Section 3.5 *Terrestrial Resources*. Condition 14 ensures effective development, implementation, and monitoring of these measures, and includes specific additional provisions for large woody debris installation, and wetland and riparian area protection and replacement, as further described below.

Currently, Lower Klamath Project facilities prevent the downstream movement of large woody material, which can lead to a reduction in habitat diversity and loss

of cover for aquatic species. Habitat quality in the vicinity of and downstream of the Project will likely improve with a requirement that ensures large woody material is available and able to move downstream. Large woody material will increase recruitment of live vegetative material and help restore ecosystem functions.

Several existing wetlands have been identified in the Project area. Several culturally significant plant species are associated with wetlands and riparian areas. Without adequate protective measures, these wetlands and associated species may be subject to heavy machinery and associated damage, as well as polluted runoff resulting from construction activities. It is important that Project activities avoid impacts to wetlands and culturally significant species wherever possible. To avoid impacts to existing wetlands and associated species, Condition 14 requires the KRRC to implement minimum buffers around all delineated wetlands that may be affected by Project-related construction activities, consistent with EIR Mitigation Measure TER-1.

Discussion of Condition 15 –Water Supply Monitoring and Management

The potential for water supply impacts is an important concern for residents in the area of the reservoirs and downstream in the mid and lower Klamath Basin. Project activities may affect surface and groundwater resources. For example, if drawdown were to occur in a dry year, deposition of sands and coarser sediment would be expected in the reach from Iron Gate Dam to as far as eight miles downstream, near the confluence with Cottonwood Creek. Such deposition could affect water intake pumps for water rights being exercised in this reach. Additionally, high suspended sediment concentrations resulting from Project implementation can adversely impact surface water diversions on the Klamath River by impairing water quality or quantity due to sedimentation. As such, the KRRC will be required to prepare a Water Supply Management Report and work with willing water right holders to evaluate and mitigate potential Project impacts. Additionally, the KRRC will monitor groundwater levels in the vicinity of the Project for at least two years to determine Project effects on surrounding groundwater wells. The 2018 Definite Plan includes actions to ensure continued water access for groundwater users.

The Project will also remove reservoirs that are currently used in firefighting efforts. KRRC will create a list of locations where fire trucks and/or helicopters could access water for residential fire protection after re-establishment of the riverine system.

Discussion of Condition 16 – Amphibian and Reptile Management

Project implementation has the potential to impact special status amphibians and reptiles, including the potential for stranding western pond turtles during reservoir drawdown, as well as potential impacts from construction and alterations to habitat. Condition 16 requires development and implementation of an Amphibian and Reptile Management Plan to protect listed and special status species previously found in the areas of the Project affected by drawdown and land-

disturbing activities. The condition requires surveys and relocation protocols be developed and implemented for the relocation of species, if needed.

Discussion of Condition 17 – Bald and Golden Eagle Management

Bald and golden eagles are protected by the Bald and Golden Eagle Protection Act that prohibits anyone without a permit from taking alive or dead, or any part, of a bald or golden eagle or its nest or egg. As described in EIR Section 3.5.5.3, *Special-Status Species and Rare Natural Communities*, bald eagles are a riparian species that feed on fish and waterfowl and may be sensitive to human disturbances. The EIR further identifies the potential for construction activities to disturb bald or golden eagles or to remove or alter potential bald or golden eagle habitat. Project activities that could result in noise disturbance or habitat impacts on bald and golden eagles include, but are not limited to, structure demolition, hatchery modifications, road and bridge upgrades, and culvert improvements. To help ensure protection of bald and golden eagles, Condition 17 requires surveys to be conducted to identify active bald or golden eagle nests, buffers around eagle nesting sites to address potential noise-related impacts, and timing construction activities to minimize the potential for direct disturbance of nesting bald and golden eagles.

Discussion of Condition 18 – Slope Stability

Project implementation has the potential to cause slope instability that can lead to water quality impacts, particularly along the banks and rims of the reservoirs during and following drawdown, as discussed in the EIR, Section 3.11.5, Potential Impact 3.11-3. Factors such as local topography and drainage characteristics can influence water quality impacts associated with slope instability. Potential measures to mitigate impacts associated with slope instability are discussed in EIR, Section 3.11.5, Potential Impact 3.11-3 and Mitigation Measure GEO-1 – *Slope Stabilization*.

To avoid and minimize potential water quality impacts related to slope stability, Condition 18 requires the KRRC to develop and implement a Slope Stability Management Plan that requires the identification of areas prone to instability, monitoring for instability, and measures to prevent or address instability throughout the term of the Project to ensure soil instability does not result in discharges that violate water quality standards. Implementation of Condition 18 should have additional benefit in protecting private property, structures, and cultural sites that could similarly be impacted by slope instability.

Discussion of Condition 19 – Recreation Facilities

As part of the Project, the KRRC will remove several existing recreation facilities and may make modifications to existing recreation facilities or construct new recreation facilities. Facility removal and any modifications to existing recreation facilities or construction of new facilities have the potential to affect surface water quality, as described in EIR (see e.g., Potential Impact 3.2-4) and will be required to meet Construction General Permit standards under Condition 10. Operation of sanitary facilities associated with recreation facilities has the ongoing potential to

affect surface water and groundwater quality, and boat facilities have the ongoing potential to allow for the transfer of invasive species between waterbodies and associated water quality impacts. Further, water contact recreation has the ongoing potential to expose recreationalists to potentially unhealthy water. To ensure appropriate measures are implemented to protect water quality and beneficial uses associated with recreation facilities, the KRRC will be required to prepare and implement a plan for operation and removal of recreation facilities, as well as construction associated with modifications to any existing facilities or new facilities.

Discussion of Condition 20 – Limitations on Hydropower Operations

The proposed Project is a dam removal and restoration project, not a plan for continued hydropower production. As such, the terms in this certification are to protect water quality in the event of dam removal, not for ongoing hydropower production. As described above in this section, the current hydropower facilities contribute to violations of water quality standards. Condition 20, therefore, limits continued operation of Project facilities to an incidental, short-term timeframe prior to removal, and requires implementation of additional conditions should such interim operation exceed 24 months after issuance of the license surrender order.

Discussion of Condition 21 – Water Rights Modification

As the Project proposes to alter various water rights associated with Lower Klamath Project facilities, it is necessary for the KRRC to demonstrate compliance with applicable water rights laws. The State Water Board is tasked with preventing any unauthorized or threatened unauthorized diversions of water, and changes to water rights can have water quality impacts. Therefore, the KRRC must provide the State Water Board with a description of the disposition of all water rights associated with the Project, and must follow the required procedures for amending any state-issued water rights. This includes, but is not limited to, water rights for existing or remaining facilities, each of the hatcheries that will be operated, or any restoration activities that require irrigation on non-riparian lands.

Discussion of Condition 22 – Tribal Water Quality Standards

Section 518 of the Clean Water Act allows federally-recognized tribes to apply for and receive approval from the USEPA to be treated in the same manner as a state under the Clean Water Act. This authority can include, among other authorities, the ability to adopt and implement water quality standards for the reservation. Water quality certifications under Section 401 that fail to protect the water quality standards of a downstream jurisdiction may be revised through the procedures described in Clean Water Act, Section 401(a)(2).

Section 3.2 of the EIR analyzed the water quality impacts of dam removal against the adopted water quality control plan of the Hoopa Valley Indian Tribe, which has received treatment-in-the-same-manner-as-a-state under the Clean Water Act, and whose reservation intersects the Klamath River at the confluence of the

Trinity River. Additionally, the EIR analyzed the impacts against the proposed water quality standards of the Yurok Tribe, whose reservation extends from the mouth of the Klamath River to the confluence with the Trinity River. The Yurok Tribe's application for treatment-in-the-same-manner-as-a-state is pending. The EIR indicates that the proposed Project will be carried out in a manner consistent with these plans in the long term, similarly to the analysis using North Coast Basin Plan standards.

The Karuk Tribe submitted its standards as comments on the draft EIR, as well as comments on the draft EIR's water quality analysis. The Karuk Tribe's draft EIR comments indicate that dam removal is necessary to meet state and federal water quality standards despite the short-term water quality impacts associated with Project implementation. The Karuk Tribe also has a pending application for treatment-in-the-same-manner-as-a-state.

In order to ensure that monitoring and adaptive management continues to the extent necessary to comply with USEPA-approved tribal water quality standards, Condition 22 requires the KRRC to submit to tribe(s) with treatment-in-the-same-manner-as-a-state the 32-month report demonstrating Project compliance with the conditions of this certification. The KRRC must also submit any relevant water quality monitoring modification proposals to appropriate tribes. Comments made by Native American Tribes shall be provided to the Deputy Director.

Discussion of Condition 23 – Consultation Requirements

The State Water Board recognizes that many parties have an interest and/or stake in a range of implementation decisions within the parameters of the Project, and that many of these parties have expertise that will contribute to improved planning. This condition clarifies that the designation of particular consultation parties does not prohibit the broader consultation the KRRC and other interested parties have proposed. The KRRC has indicated that it intends to enter into "good neighbor" agreements with various state and local agencies, has undertaken tribal consultation, and has begun various stakeholder processes to inform development of plans. The State Water Board encourages broad consultation and anticipates it is likely to result in better conceived plans that are less likely to require additional modification during the State Water Board review and approval process.

Discussion of Conditions 24 – 41: Additional Conditions

In order to ensure that Project implementation meets water quality standards as anticipated, to ensure compliance with other relevant state and federal laws, and to ensure that the decommissioned Project will continue to meet state water quality standards and other appropriate requirements of state law following implementation of all decommissioning activities, this certification imposes conditions regarding monitoring, enforcement, and potential future revisions. Additionally, California Code of Regulations, title 23, section 3860 requires imposition of certain mandatory conditions for all water quality certifications, which are included in this certification.

ACCORDINGLY, BASED ON ITS INDEPENDENT REVIEW OF THE RECORD, THE STATE WATER RESOURCES CONTROL BOARD CERTIFIES THAT THE LOWER KLAMATH PROJECT LICENSE SURRENDER will comply with sections 301, 302, 303, 306, and 307 of the Clean Water Act, and with applicable requirements of State law under the following terms and conditions.

CONDITION 1. WATER QUALITY MONITORING AND ADAPTIVE MANAGEMENT

The Klamath River Renewal Corporation (Licensee) shall submit the Water Quality Monitoring Plan (WQMP) for review and approval by the Deputy Director for the Division of Water Rights (Deputy Director) no later than six months following issuance of a Federal Energy Regulatory Commission (FERC) license surrender order and prior to Lower Klamath Project License Surrender (Project) implementation. The WQMP shall be developed in consultation with staff from the State Water Resources Control Board (State Water Board), North Coast Regional Water Quality Control Board (North Coast Regional Board), Oregon Department of Environmental Quality (ODEQ), and California Department of Fish and Wildlife (CDFW). The WQMP shall include comments received during the consultation process and identify how the Licensee addressed the comments. The Deputy Director may require modifications as part of any approval. The Licensee shall file the Deputy Director-approved WQMP, together with any required plan modifications, with FERC. Any changes to WQMP shall be approved by the Deputy Director prior to implementation. Upon receiving all necessary approvals, the Licensee shall implement the WQMP for the duration of the license surrender order or until otherwise approved by the Deputy Director in writing. The Deputy Director may require modifications to the WQMP, including implementation of additional adaptive management measures informed by monitoring results, as part of review and approval of reports as specified below.

At a minimum, the WQMP shall 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 to inform the Licensee's implementation of a water quality compliance schedule (Condition 2). Additionally, the WQMP shall 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.

Field Sampling and Analytical Methods

The Licensee shall implement field sampling and monitoring methods consistent with the State of California's Surface Water Ambient Monitoring Program or equivalent methods approved by the Deputy Director. The Licensee shall use analytical methods that comply with Code of Federal Regulations, title 40, part 136, or methods approved by California's Environmental Laboratory

Accreditation Program (ELAP), where such methods are available. Samples that require laboratory analysis shall be analyzed by ELAP-certified laboratories.

Types of Sampling and Frequency by Category

At a minimum, the WQMP shall identify the parameters and sampling frequency¹⁹ for the three categories of sampling outlined below. Water quality monitoring shall be implemented at the noted frequency or more often.

Category 1: Continuous Water Quality Monitoring

The Licensee shall continuously monitor the following water quality parameters:

- (1) dissolved oxygen (DO) in milligrams per liter (mg/L) and percent saturation;
- (2) water temperature;
- (3) turbidity;
- (4) conductivity; and
- (5) pH.

Category 1 Frequency: At a minimum, 30-minute interval recordings.

Category 2: Water Quality Grab Samples

The Licensee shall collect and analyze water quality grab samples for the following parameters:

- (1) total nitrogen;
- (2) nitrate;
- (3) nitrite;
- (4) ammonia
- (5) total phosphorus;
- (6) particulate organic phosphorus;
- (7) orthophosphate;
- (8) particulate organic carbon;
- (9) dissolved organic carbon;
- (10) chlorophyll-a (beginning May 1 following drawdown activities and continuing annually from May 1 through October 31);
- (11) turbidity;
- (12) microcystin (beginning May 1 following drawdown activities and continuing annually from May 1 through October 31);
- (13) suspended sediment concentrations;
- (14) methylmercury (only at Klamath River monitoring locations below Copco No. 1);
- (15) settleable solids; and

¹⁹ See pre-drawdown monitoring below for minimum monitoring frequency prior to drawdown.

- (16) particulate and dissolved aluminum (only at Klamath River monitoring locations below Iron Gate).

Category 2 Frequency: At a minimum, monthly (with the exception of suspended sediment concentrations), at approximately the same time of day, during and following drawdown. For suspended sediment concentrations, monitoring shall occur every two weeks.

Category 3: Klamath Riverbed Sediment Grab Samples

The Licensee shall collect and analyze sediment samples from the Klamath Riverbed prior to and following dam decommissioning. At a minimum, sediment samples shall be analyzed for the following parameters:

- (1) arsenic;
- (2) lead;
- (3) copper;
- (4) nickel;
- (5) iron;
- (6) aluminum;
- (7) dioxin;
- (8) cyanide;
- (9) mercury;
- (10) ethyl benzenes;
- (11) total xylenes;
- (12) dieldrin;
- (13) 4,4'-dichlorodiphenyltrichloroethane (DDT);
- (14) 4,4'-dichlorodiphenyldichloroethane (DDD);
- (15) 2,3,7,8-tetrachlorodibenzodioxin (TCDD);
- (16) 4,4'-dichlorodiphenyldichloroethylene (DDE); and
- (17) 2,3,4,7,8-pentachlorodibenzofuran (PECDF).

Category 3 Frequency: One monitoring event prior to drawdown activities²⁰ and one event within 12 to 24 months of completing drawdown activities.

Monitoring Locations (Categories 1 through 3)

The Licensee shall consider the following when selecting monitoring locations: existing water quality monitoring stations in the Klamath River Basin, site access, land use, and input received during consultation. Whenever feasible, the Licensee shall select monitoring locations at or near existing water quality monitoring locations. At a minimum, the Licensee shall monitor at the following locations:

²⁰ In lieu of collecting additional pre-drawdown [in-reservoir] samples, the Licensee may rely on the results of previously-analyzed sediment samples, to the extent they provide the necessary information.

Category 1 (Continuous Water Quality Monitoring) and Category 2 (Water Quality Grab Samples²¹) shall be conducted at the following locations:

- Klamath River at or near United State Geological Survey (USGS) gage no. 11509500 (below Keno)
- Klamath River at or near USGS gage no. 11510700 (below J.C. Boyle)
- Klamath River upstream of Copco No. 1 Reservoir, and downstream of Shovel Creek;
- Klamath River downstream of Copco No. 2 Powerhouse, no further downstream than the Daggett Road bridge crossing of the Klamath River;
- Klamath River at or near USGS gage no. 11516530 (below Iron Gate);
- Klamath River at or near Walker Bridge (Category 1 monitoring only);
- Klamath River at or near USGS gage no. 11520500 (below Seiad Valley);
- Klamath River at or near USGS gage no. 11523000 (Orleans);
- Klamath River at or near USGS gage no. 11530500 (Klamath); and
- Klamath Estuary near the mouth of the Klamath River.

Category 3 (Klamath Riverbed Sediment Grab Samples) shall be collected at the following locations²²:

- Klamath River upstream of Copco No. 1 Reservoir and downstream of Shovel Creek;
- Three locations in the Copco No. 1 Reservoir footprint, in areas where sediments will likely be terraced. If terracing does not occur at the previously sampled location, the sample location shall be moved to a location with terraced sediments;
- Klamath River downstream of Copco No. 2 Powerhouse, no farther downstream than the Daggett Road bridge crossing of the Klamath River;
- Three locations in the Iron Gate Reservoir footprint, in areas where sediments will likely be terraced. If terracing does not occur at the previously sampled location, the sample location shall be moved to a location with terraced sediments;
- Klamath River at or near USGS gage no. 11516530 (below Iron Gate);
- Klamath River at or near USGS gage no. 11523000 (Orleans); and
- Klamath Estuary.

²¹ Samples shall be collected at the same location, or as close as possible, each time.

²² Samples shall be collected at the same location, or as close as possible, each time. Locations should target slow-velocity depositional areas (eddies and backwaters) where fine sediment accumulation is most likely to occur.

Pre-Drawdown Monitoring (Categories 1 through 3)

At a minimum, prior to drawdown activities the Licensee shall monitor as follows:

- Category 1 (Continuous Water Quality Monitoring): One year of continuous monitoring at all Category 1 monitoring locations.
- Category 2 (Water Quality Grab Samples): One year with samples collected monthly, at all Category 2 monitoring locations.
- Category 3 (Klamath Riverbed Sediment Grab Samples): One collection event at all Category 3 monitoring locations, except as specified in Footnote 20.

Quality Assurance Project Plan

The Licensee shall develop a Quality Assurance Project Plan (QAPP) using the State Water Board's and United States Environmental Protection Agency's (USEPA's) guidance resources to describe the Project's monitoring goals, data needs and assessment, responsible individuals, quality assurance plan, equipment maintenance, quality control measures, and reporting deadlines. The QAPP shall be submitted as part of the WQMP.

Sediment Load Quantification

The Licensee shall submit reports to the Deputy Director describing the status of sediment movement at 12 and 24 months, respectively, following completion of drawdown activities. The reports shall: (a) quantify the amount of sediment present in each Project reservoir footprint; (b) quantify the total amount of sediment exported from the Project reservoirs; (c) quantify the amount of sediment that has settled in the Klamath River between Iron Gate Dam and Cottonwood Creek (River Mile²³ [RM] 185); and (d) describe remediation activities planned or undertaken, if any. For (a) and (b) estimates shall be provided in million cubic yards, tons (dry weight), and percentage of sediment present compared to total amount of sediment present prior to drawdown. For (c) estimated sediment deposition shall be presented as total estimated quantities in million cubic yards, tons (dry weight), average depth change from pre-drawdown conditions, and percent particle size composition. The reports shall be submitted to the Deputy Director at 15- and 27-months following completion of drawdown activities, respectively.

Reporting and Adaptive Management: Prior to, during, and for a minimum of one year following completion of drawdown, the Licensee shall provide monthly monitoring reports to the State Water Board, ODEQ, and North Coast Regional Board. Monitoring and monthly reporting shall continue until otherwise approved by the Deputy Director in writing. The monthly report shall, at a minimum: 1) summarize the results of the month's monitoring; 2) be provided in a Microsoft Excel spreadsheet format and include all data collected during the reporting

²³ River Mile (RM) refers to the distance, along the Klamath River, upstream from the mouth of the Klamath River at the Pacific Ocean.

period; 3) highlight any exceedances of water quality objectives; 4) highlight observed trends; 5) request any changes to the WQMP; and 6) report on any adaptive management measures taken and propose any additional or substitute adaptive management measures to address exceedances. Any proposal to modify, reduce, or discontinue monitoring and reporting shall be included in the reports with a request for Deputy Director approval and must include information to support the request. Such requests must also comply with Tribal Water Quality Standards (Condition 22). Modifications to the WQMP or additional or substitute adaptive management measures requested by the Licensee require Deputy Director approval prior to implementation.

As noted in the Sediment Load Quantification section above, at 15 months and 27 months following completion of drawdown activities, the Licensee shall submit the reports describing the status of sediment movement.

Based on monitoring results, the Deputy Director may require the Licensee to modify monitoring parameters, frequency, methods, duration, constituents, reporting, or other elements of the WQMP, or to implement additional adaptive management measures. The Licensee shall implement changes upon receiving Deputy Director and any other required approvals. The Licensee shall file the Deputy-Director-approved updates to the WQMP with FERC. The Licensee may integrate the reporting in this condition with other reporting requirements outlined in this water quality certification (certification).

Other Project-Related Monitoring

The WQMP shall identify other monitoring efforts the Licensee plans to conduct under other plans or aspects of the Project, which include, but are not limited to monitoring under the following conditions: Sediment Deposits (Condition 4); Public Water Supplies (Condition 8); Construction: General Permit Compliance, and Water Quality Monitoring and Protection Plans (Condition 10); Hatcheries (Condition 13); and Recreation Facilities (Condition 19).

CONDITION 2. COMPLIANCE SCHEDULE

Project activities related to drawdown and the export of reservoir sediments into the Klamath River are anticipated to result in temporary exceedances of water quality objectives related to sediment. Temporary exceedance of a water quality objective is permissible for restoration projects with long-term benefits to water quality and beneficial uses. Pursuant to this certification, discharges to the Klamath River that exceed sediment-related water quality objectives can temporarily occur during and following reservoir drawdown, dam removal, and associated sediment flushing activities. The Licensee shall demonstrate that, in the long term, these Project activities attain all sediment-related water quality objectives listed in *the Water Quality Control Plan for the North Coast Region* (North Coast Basin Plan) as outlined in this condition. Implementation of this condition shall also serve to demonstrate compliance with North Coast Basin Plan prohibitions.

The Licensee shall monitor water quality consistent with Water Quality Monitoring and Adaptive Management (Condition 1) to assess attainment of water quality objectives listed in the North Coast Basin Plan. Within 36 months of beginning drawdown, unless otherwise approved by the Deputy Director in writing, the Licensee shall submit a report that documents: 1) Project attainment of sediment-related water quality objectives over a range of flows, including high winter flows and low summer flows; and 2) post-dam removal Klamath River water quality conditions following attenuation of impacts associated with drawdown and establishment of new riverine conditions.

The Licensee shall document changes in water quality following drawdown and assess trends in water quality parameters. The Licensee’s report shall evaluate the Project’s effects on all California portions of the Klamath River (i.e., from California/Oregon Stateline to Klamath Estuary) and Klamath River tributaries, including attainment of: (i) numeric water quality objectives outlined in Table 1; and (ii) narrative water quality objectives in the North Coast Basin Plan. Outlier exceedances that are localized or isolated may be accepted if the Project is consistently in attainment with water quality standards. Localized or isolated exceedances may be addressed through adaptive management associated with Restoration (Condition 14) or other measures proposed by the Licensee. If data indicate that a water quality objective is exceeded and the Licensee believes the exceedance is not a result of Project activities, the Licensee shall provide information and support demonstrating that the exceedance is not related to Project activities. The Deputy Director will consider the information provided by the Licensee in evaluating the Licensee’s attainment of water quality objectives.

Table 1: Minimum Parameters to Demonstrate Attainment of Numeric Water Quality Objectives

Parameter	Water Quality Objective*
Turbidity	Turbidity shall not be increased more than 20% above naturally occurring background levels.
pH	pH shall be between 7.0 (minimum) and 8.5 (maximum). Changes in normal ambient pH levels shall not exceed 0.2 units in waters designated marine or saline beneficial uses nor 0.5 units within the range specified above in fresh waters with designated COLD** or WARM***.
Dissolved Oxygen (percent saturation)	Stateline to the Scott River: <ul style="list-style-type: none"> • October 1 to March 31: 90% • April 1 to September 30: 85% Scott River to Hoopa: <ul style="list-style-type: none"> • All year: 90% saturation Downstream of Hoopa to Turwar: <ul style="list-style-type: none"> • June 1 to August 31: 85%

Parameter	Water Quality Objective*
	<ul style="list-style-type: none"> • September 1 to May 31: 90% Upper and Middle Estuary: <ul style="list-style-type: none"> • September 1 to October 31: 85% • November 1 to May 31: 90% • June 1 to July 31: 85% • August 1 through August 31: 80%
Temperature	Elevated temperature waste discharges into COLD** interstate waters are prohibited. Thermal waste discharges having a maximum temperature greater than 5°Fahrenheit above natural receiving water temperature are prohibited. At no time or place shall the temperature of WARM*** intrastate water be increased more than 5°Fahrenheit above natural receiving water temperature.
Specific Conductance	Klamath River above Iron Gate Dam and including Iron Gate and Copco Reservoirs: <ul style="list-style-type: none"> • 275 micromhos (50% upper limit)****; and • 425 micromhos (90% upper limit)***** Middle Klamath River below Iron Gate Dam: <ul style="list-style-type: none"> • 275 micromhos (50% upper limit); and • 350 micromhos (90% upper limit) Lower Klamath River: <ul style="list-style-type: none"> • 200 micromhos (50% upper limit); and • 300 micromhos (90% upper limit)

* Naturally occurring background levels, for the purpose of numeric water quality objectives in Table 1, are defined as the post-dam-removal condition of the Klamath River with successful implementation of revegetation and bank stabilization. It does not include discharges from construction or restoration activities, including failures of vegetation and/or bank stabilization.

** COLD is defined as Cold Freshwater Habitat uses of water that support cold water ecosystems including, but not limited to, preservation or enhancement of aquatic habitats, vegetation, fish, or wildlife, including invertebrates.

*** WARM is defined as Warm Freshwater Habitat uses of water that support warm water ecosystems including, but not limited to, preservation or enhancement of aquatic habitats, vegetation, fish, or wildlife, including invertebrates.

**** 50% upper and lower limits represent the 50 percentile values of the monthly means for the calendar year. 50% or more of the monthly means must be less than or equal to an upper limit and greater than or equal to a lower limit.

***** 90% upper and lower limits represent the 90 percentile values of the monthly means for the calendar year. 90% or more of the monthly means must be less than or equal to an upper limit and greater than or equal to a lower limit.

At 32 months following the beginning of drawdown, the Licensee shall submit an assessment of whether Project activities are anticipated to result in exceedance of a water quality objective(s) beyond 36 months following the beginning of Project drawdown. The assessment shall be submitted to the Deputy Director and the Executive Officer of the North Coast Regional Board (Executive Officer), and consistent with Tribal Water Quality Standards (Condition 22). If the assessment indicates a high risk of continued exceedance beyond this timeline, the Licensee shall immediately commence consultation with staff from the State Water Board and North Coast Regional Board regarding the development of a report and compliance proposal for actions to address the anticipated exceedance(s). The report and proposal shall be submitted to the Deputy Director for review and approval no later than 35 months following the beginning of Project drawdown activities and shall at a minimum include:

- A summary of which water quality objective(s) and compliance location(s) continue to exceed a water quality objective(s);
- An explanation of why the water quality objective(s) continues to be exceeded in relation to Project activities;
- A description of Licensee actions taken to date to address the exceedance(s); and
- A proposal to address the water quality objective(s) exceedance and associated timeline for attainment of compliance with the water quality objective(s).

The Deputy Director may require modifications as part of any approval. The Licensee shall file the Deputy Director's approval, together with any required modifications, with FERC. The Licensee shall implement the compliance plan upon receiving Deputy Director and any other required approvals. Any changes to the compliance plan shall be approved by the Deputy Director prior to implementation.

If the Licensee is unable to demonstrate attainment of water quality objectives within 36 months of beginning Project drawdown activities, the Licensee shall notify the Deputy Director and immediately begin implementation of the approved compliance proposal, or the approved portions of the proposal if the entire proposal has not yet been approved.

CONDITION 3. RESERVOIR DRAWDOWN

No later than six months following issuance of the FERC license surrender order, the Licensee shall prepare and submit a Reservoir Drawdown and Diversion Plan (Drawdown Plan) to the Deputy Director for review and approval. The Deputy Director may require modifications as part of any approval. The Licensee shall file the Deputy Director's approval, together with any required modifications, with FERC. The Licensee shall implement the Drawdown Plan upon receipt of Deputy Director and any other required approvals. Any changes to the

Drawdown Plan shall be approved by the Deputy Director prior to implementation.

At a minimum, the Drawdown Plan shall include:

- (1) The material elements of the drawdown plan presented in Section 4 of the Licensee's 2018 Definite Plan. If the Licensee proposes to change any elements material to water quality, the Drawdown Plan shall highlight such changes and provide a rationale, including any new information relied on;
- (2) A description of the facilities that will be used to draw down the reservoirs;
- (3) An updated flood frequency analysis and associated average flows;
- (4) Anticipated drawdown rates for each reservoir. The drawdown rate for each reservoir shall be determined using best available science and consider any potential slope instability issues;
- (5) Drawdown scenarios for different water years (e.g., wet, dry, etc.);
- (6) Construction schedule, including anticipated schedule for drawdown, and each reservoir's anticipated drawdown start and end dates;
- (7) Anticipated total (drawdown and inflow) and drawdown only discharge rates (cubic feet per second [cfs]) associated with each structure (e.g., spillways, diversion tunnels, outlets, etc.);
- (8) Public notice of Project schedule and potential impacts, including but not limited to closure of reservoirs, recreation facilities, and impacts to water quality;
- (9) Surface water elevation at which each reservoir is considered drawn down;
- (10) A detailed description of all structures related to reservoir operations that are proposed to be removed during drawdown;
- (11) Compliance with cofferdam requirements in this condition, and a detailed description of cofferdams that will be installed as part of drawdown that includes locations, timing and duration of installations, and other information related to how the installation and removal of cofferdams will be coordinated to limit impacts;
- (12) A detailed description of operations required to maintain reservoir water at the gated spillway crest elevation on Copco No. 1 Dam between the conclusion of the first phase and initiation of the second phase of drawdown. (The two phases of Copco No. 1 Reservoir drawdown are described below.);
- (13) Detail on how long Project powerhouses are anticipated to be operational during drawdown of the reservoirs; and
- (14) An overview of the sequence of drawdown activities for all four reservoirs, including a detailed sequence of how drawdown activities will be implemented at each reservoir.

Cofferdams: Construction areas in active streams shall use cofferdams or equivalent barriers to isolate construction areas from instream flows. Instream water shall be routed around the isolated construction area either by pipe or by isolating the stream in phases so that construction does not impede stream flow around the construction area. In addition, all dewatering pump intakes shall be screened to avoid potential impacts to fish and all bypass routes (e.g., pipelines, outlets, etc.) shall be properly removed or sealed upon completion of Project activities unless otherwise approved by the Deputy Director as part of review and approval of the Drawdown Plan. Any fish entrained by a Project cofferdam shall be safely relocated.

The Licensee shall notify the Deputy Director, in writing, within 24 hours of initiation and conclusion of drawdown activities at each reservoir. The Licensee shall notify the Deputy Director within 72 hours of knowledge that reservoir drawdown has the potential to be delayed or extended while still meeting the requirements outlined in this certification. The notification shall include the reason for the delay or extension and a proposed revised drawdown schedule that complies with this condition. The Deputy Director may require modifications to the proposed revised drawdown schedule. Development of a proposed revised drawdown schedule shall include consultation with State Water Board staff.

Drawdown of the reservoirs shall occur over no more than a single six-month period between November 1 (earliest date to start drawdown) and May 1 of the following year (latest date to conclude drawdown), and shall occur as more specifically outlined below:

- Copco No. 1 Reservoir drawdown is divided into two timeframes based on the rate of drawdown²⁴ allowed at specific reservoir elevations.
 - The first phase of Copco No. 1 Reservoir drawdown, from its normal operating reservoir elevation (2,609.5 feet) to gated spillway (crest elevation 2,597.0 feet), shall start no sooner than November 1 and no later than December 15. The maximum drawdown rate during the initial drawdown of Copco No. 1 Reservoir is two feet per day, unless otherwise approved by the Deputy Director based on new information provided in the Drawdown Plan. The initial phase of Copco No. 1 Reservoir drawdown shall be concluded no later than January 1.
 - The second phase of Copco No. 1 Reservoir drawdown, from the gated spillway until empty, shall not start until at least two weeks

²⁴ For purposes of this certification, the actual drawdown rates may be less than what is described in the Drawdown Plan and may even be negative during storm events due to increased inflow to the reservoirs. The drawdown rates shall be sufficient to end drawdown of Copco No. 1 Reservoir by March 15 of the year directly following the initiation of Copco No. 1 Reservoir drawdown.

after Iron Gate Reservoir drawdown begins and shall start no later than February 15 of the year directly following the initial drawdown of Copco No. 1 Reservoir. Copco No. 1 Reservoir drawdown shall conclude no later than March 15 of the year in which the second phase of Copco No. 1 Reservoir drawdown is initiated. The maximum drawdown rate for the second phase of Copco No. 1 Reservoir drawdown shall be five feet per day, unless otherwise approved by the Deputy Director based on new information provided in the Drawdown Plan.

The maximum additional discharge below Copco No. 1 Dam associated with Copco No. 1 Reservoir drawdown shall be limited to 6,000 cfs, unless otherwise approved by the Deputy Director based on new information provided in the Drawdown Plan. If initial drawdown of Copco No. 1 Reservoir has not started by December 15, drawdown activities shall be delayed until at least November 1 of the following calendar year.

- Iron Gate Reservoir drawdown shall start no sooner than January 1 of the year directly following the initiation of Copco No. 1 Reservoir drawdown and no later than January 15 of the same year. Iron Gate drawdown shall conclude no later than March 15 of the same year Iron Gate drawdown is initiated. The maximum drawdown rate for Iron Gate shall be five feet per day. The maximum additional discharge below Iron Gate Dam associated with Iron Gate Reservoir drawdown activities shall be limited to 6,000 cfs, unless otherwise approved by the Deputy Director based on new information provided in the Drawdown Plan.
- J.C. Boyle Reservoir drawdown shall start no sooner than January 1 and no later than February 1 of the year directly following the initiation of Copco No. 1 drawdown. J.C. Boyle Reservoir drawdown shall conclude no later than March 15 of the same year in which J.C. Boyle drawdown is initiated.
- Copco No. 2 Reservoir drawdown shall conclude no later than May 1 of the year following initiation of Copco No. 1 Reservoir drawdown.

Removal of the Project facilities shall begin and be completed, to the extent feasible, during drawdown to minimize the duration of sediment releases, and to comply with the schedule set forth in the Compliance Schedule (Condition 2) of this certification. Additionally, drawdown and dam deconstruction shall be conducted to ensure instream flow requirements²⁵ below Iron Gate Dam are maintained.

²⁵ The United States Bureau of Reclamation's (USBR) Klamath River Project must meet flows below Iron Gate Dam that are specified in the *Endangered*

CONDITION 4. SEDIMENT DEPOSITS

Unless otherwise approved in writing by the Deputy Director, by no later than December of the first full calendar year following completion of drawdown activities, the Licensee shall assess 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. Assessment is limited to sediment deposits on parcels with a current or potential residential or agricultural (e.g., row crop) land use, for which the property owner has notified the KRRC of a potential sediment deposit that may be associated with reservoir drawdown activities.

Within 60 days of property owner notification, visibly obvious sediment deposits shall be assessed by the Licensee to determine if the deposits are consistent with physical sediment properties associated with Project reservoir sediments. Sediment deposits consistent with the physical sediment properties of Project reservoirs shall be tested for arsenic or remediated without testing per the requirements of this condition. If testing is performed, soil samples in the vicinity of the deposited sediments (e.g., from the adjacent riverbank and/or floodplain), shall also be tested for arsenic to determine the local background arsenic concentrations. No additional actions or remediation shall be required if the measured arsenic concentrations in the deposited sediments are less than or equal to measured local background soil concentrations for arsenic. If the concentration of arsenic in the deposited sediments on the river banks and floodplain of the Klamath River exceed local background levels and USEPA or California Environmental Protection Agency human health residential screening levels, the deposited sediments shall be remediated to local background levels through removal of the deposited sediments or soil capping, if sediment removal is infeasible or poses a greater risk than soil capping.

For Sediment Deposits that Require No Further Action. Within 30 days of a determination that a reported deposit does not require remediation, either because it is not consistent with reservoir sediment deposits or because sediment testing does not indicate a need for further action, the Licensee shall notify the property owner and submit a report to the Deputy Director. At a

Species Act Section 7(a)(2) Biological Opinion, and Magnuson-Stevens Fishery Conservation and Management Act essential fish habitat response for Klamath Project operations from April 1, 2019 through March 31, 2024 (NMFS 2019) and the Biological Opinion on the Effects of the Proposed Klamath Project Operations from April 1, 2019, through March 31, 2024, on the Lost River Sucker and the Shortnose Sucker (USFWS, 2019)(jointly 2019 BiOp). USBR has released two Biological Assessments (in February and April 2020) for amended operations, including amended flow requirements: one of these proposals - or other amendments - could occur prior to drawdown. Drawdown shall not interfere with implementation of the required instream flow requirements that are current at that time.

minimum, the report shall include the location of the reported deposit, a summary of actions taken, and support for the determination that no further action is needed. If sampling was performed, the report shall also include, at a minimum:

- Estimated quantity of the reported sediment deposit;
- Arsenic testing method(s) used and the number, location, and depth of samples collected from the reported sediment deposit and surrounding soils (background); and
- Arsenic concentrations associated with each sample.

The Deputy Director may require additional testing, remediation, or other actions based on the report. The Licensee shall provide additional information upon request by the Deputy Director.

For Sediment Deposits that Require Further Action. Within 14 days following completion of the inspection of a reported sediment deposit that requires further action (including any associated sediment sampling results), the Licensee shall submit a Sediment Deposit Remediation Plan to the Deputy Director for review and approval. At a minimum, the Sediment Deposit Remediation Plan shall include:

- Estimated location and quantity of the reported sediment deposit;
- If testing was performed, the arsenic sediment testing methods used and the number, location, depth, and concentration associated with each sediment samples collected from the reported sediment deposit and surrounding soils (background); and
- Proposed remediation actions, including a schedule for remediation and any proposed post-remediation soil sampling. If soil capping is proposed, the Licensee shall provide documentation supporting why soil removal is infeasible or poses a greater risk than soil capping.

The Deputy Director may require modifications to the Sediment Deposit Remediation Plan as part of any approval. The Licensee shall file the Deputy Director's approval, together with any required modifications, with FERC. The Licensee shall implement the Sediment Deposit Remediation Plan upon receipt of Deputy Director and any other required approvals. Any changes to the Sediment Deposit Remediation Plan shall be approved by the Deputy Director prior to implementation.

Within 30 days of completing remediation activities, the Licensee shall provide the property owner and Deputy Director with a report documenting completion of the remediation. At a minimum, the report shall include the location of the remediation, a summary of action(s) taken including the quantity of soil removed

or area capped, and support for the determination that no further remediation is needed. Additionally, if post-remediation soil sampling was performed, the report shall include, at a minimum: arsenic soil testing method(s) used; the number, location, and depth of soil samples collected and their relation to the area remediated; and the associated arsenic soil concentrations.

The Deputy Director may require additional testing, remediation, or other actions based on the report. The Licensee shall provide additional information upon request by the Deputy Director.

CONDITION 5. ANADROMOUS FISH PRESENCE

The purpose of fish presence surveys is to ensure that following Project implementation anadromous fish can volitionally access the Klamath River and its tributaries within and upstream of the California portion of the Hydroelectric Reach²⁶). Accordingly, the Licensee shall conduct surveys to document anadromous fish presence and access to the tributaries and mainstem Klamath River.

No later than 24 months following issuance of a FERC license surrender order, the Licensee shall submit a Fish Presence Monitoring Plan (Fish Presence Plan) to the Deputy Director for review and approval. The Fish Presence Plan shall be developed in consultation with staff from the State Water Board, North Coast Regional Board, CDFW, and National Marine Fisheries Service (NMFS). The Licensee shall solicit comments from the agencies listed above. Additionally, the Fish Presence Plan shall include comments received during the consultation process and identify how the Licensee has addressed the comments. The Deputy Director may require modifications as part of any approval. The Licensee shall file the Deputy-Director-approved Fish Presence Plan, together with any required plan modifications, with FERC. The Licensee shall implement the Fish Presence Plan upon Deputy Director and any other required approvals. Any changes to the Fish Presence Plan shall be approved by the Deputy Director prior to implementation.

At a minimum, the Fish Presence Plan shall include: (1) a list of anadromous fish species covered by the plan; (2) California survey reaches; (3) timing, frequency, and duration of surveys; (4) survey methods; and (5) reporting. Additional information on the minimum requirements for each of these plan elements is provided below. Additionally, the Fish Presence Plan may include a discussion of how the information collected under Action 1 (Tributary-Mainstem

²⁶ The Hydroelectric Reach refers to the stretch of the Klamath River that begins at the confluence of J.C. Boyle Reservoir with the Klamath River and continues to the base of Iron Gate Dam, and includes both J.C. Boyle and Copco No. 2 bypass reaches, and tributaries in this reach such as Jenny Creek, Fall Creek, Spencer Creek, and Shovel Creek.

Connectivity) of the Mainstem Spawning Aquatic Resources Measure (Condition 6) will be used to inform implementation of the Fish Presence Plan.

Fish Species: The Fish Presence Plan shall, at a minimum, include surveys for the following anadromous fish species: spring-run and fall-run Chinook salmon (*Oncorhynchus tshawytscha*), coho salmon (*Oncorhynchus kisutch*), Pacific lamprey (*Entosphenus tridentatus*), and steelhead (*Oncorhynchus mykiss*).

California Survey Reaches: Unless otherwise approved by the Deputy Director in writing, the Licensee shall survey, in California, all tributaries with potentially viable anadromous fish habitat that have a confluence in the Hydroelectric Reach, as well as the mainstem Klamath River to the stateline to determine if anadromous fish are present. Specific survey reaches of the mainstem Klamath River shall include areas upstream of the California Project reservoir footprints.

Timing, Frequency, and Duration: Fish presence surveys shall begin in the third year following the completion of drawdown. Fish presence surveys shall be conducted for at least four consecutive years and until otherwise approved or modified by the Deputy Director. The Licensee, through annual reporting (discussed below), may request to reduce the duration or scope of surveys based on new information (e.g. survey results that substantiate either anadromous fish presence or lack of fish passage barriers related to Project implementation).

Survey Methods: The Licensee shall propose appropriate survey methods (e.g., carcass surveys, snorkel surveys, etc.) to evaluate anadromous fish presence. Information provided shall include: number of days required for surveys with approximate field crew size; equipment that will be used to assess fish presence; global positioning system (GPS) and map of survey areas; field documentation methods (e.g., data sheets, photo documentation); and survey timing. The results of tributary fish presence surveys may be used to determine the need for surveys of the mainstem Klamath River (e.g., anadromous fish present in tributaries above Copco No. 1 Reservoir footprint would indicate anadromous fish can access portions of the mainstem Klamath River below that point, eliminating the need for additional evaluation). A minimum of four weeks prior to conducting fish presence surveys, the Licensee shall notify staff from the State Water Board, North Coast Regional Board, CDFW, and NMFS so that agency staff may participate in the surveys, if desired.

Reporting: The Licensee shall report fish presence survey results annually to the Deputy Director.

Annual reports shall, at a minimum, include:

- (1) A summary of the fish presence results; and
- (2) An overall assessment of fish presence in the newly accessible Klamath River and tributaries. The Licensee shall consider fish return projections and observations (e.g., barrier) as part of the fish surveys in the reports.

Additionally, the fourth annual report shall, at a minimum, include:

- (1) An analysis of whether any encountered fish passage impediment is Project-related; and
- (2) Proposed actions to remedy any Project-related impediments to anadromous fish.

The Deputy Director may require the Licensee to submit proposed actions to address a fish passage impediment that the Deputy Director finds is Project-related. Prior to implementing any proposed actions, the Licensee shall receive approval from the Deputy Director. The Deputy Director may require modifications as part of any approval. The Licensee shall file the Deputy Director's approval, together with any required modifications, with FERC. The Licensee shall implement the action upon receipt of Deputy Director and any other required approvals.

CONDITION 6. AQUATIC RESOURCES

The Licensee shall implement the Aquatic Resource (AR) Measures: as proposed in Appendix I of the 2018 Definite Plan (Appendix I); updated by the Licensee's October 10, 2018 letter to the State Water Board; and based on the requirements presented in this condition. Except to the extent changes are required by this condition, the Licensee shall submit to the Deputy Director any proposed changes in the material terms of the measures described in the June 2018 Appendix I and October 2018 updates, along with an explanation of the reason for the proposed change and any additional information relied on. The Deputy Director may approve, deny, or conditionally approve any changes to the AR Measures proposed by the Licensee.

Mainstem Spawning Aquatic Resource Measure

The Mainstem Spawning AR Measure includes two actions: 1) Tributary-Mainstem Connectivity; and 2) Spawning Habitat Evaluation.

Action 1: Tributary-Mainstem Connectivity. No later than six months following issuance of a FERC license surrender order and prior to Project implementation, the Licensee shall submit the Tributary-Mainstem Connectivity Plan for Deputy Director review and approval. The Tributary-Mainstem Connectivity Plan shall be developed in consultation with staff from the State Water Board, North Coast Regional Board, ODEQ, NMFS, and CDFW. The Licensee shall solicit comments from the agencies listed above. Additionally, the Tributary-Mainstem Connectivity Plan shall include comments received during the consultation process and identify how the Licensee has addressed the comments. The Deputy Director may require modifications as part of any approval. The Licensee shall file the Deputy-Director-approved Tributary-Mainstem Connectivity Plan, together with any required plan modifications, with FERC. The Licensee shall implement the Tributary-Mainstem Connectivity Plan upon receipt of Deputy Director and any other required approvals. Any changes to the Tributary-

Mainstem Connectivity Plan shall be approved by the Deputy Director prior to implementation.

The Tributary-Mainstem Connectivity Plan shall assess tributary confluences with the Klamath River for connectivity that provides coho salmon, Chinook salmon, steelhead, and Pacific lamprey passage. At a minimum, the Tributary-Mainstem Connectivity Plan shall include: proposed monitoring elements such as methods, timing, duration, frequency, and locations; and proposed reporting. The Tributary-Mainstem Connectivity Plan shall also include potential actions the Licensee may implement to remove Project-related obstructions to tributary connectivity and fish passage. The Tributary-Mainstem Connectivity Plan shall monitor and address tributary connectivity and fish passage in at least the tributaries identified in Action 1 of the Mainstem Spawning AR Measure (i.e., at least four tributaries in the Hydroelectric Reach and five tributaries from below Iron Gate to Cottonwood Creek), as well as all newly created stream channels that were previously inundated by Project reservoirs prior to drawdown.

The Tributary-Mainstem Connectivity Plan shall include monitoring for at least two years directly following the completion of drawdown activities, and within one month following a five-year flow event²⁷²⁸ unless it is unsafe for field crews, in which case monitoring shall be conducted as soon thereafter as safe conditions occur.

Reporting: The Licensee shall submit annual reports to the Deputy Director. Annual reports shall, at a minimum, include:

- (1) A summary of monitoring results;
- (2) An overall assessment of fish passage in the newly accessible Klamath River and tributaries; and
- (3) A summary of tributary obstructions that limit fish passage and proposed remedial actions.

Action 2: Spawning Habitat Evaluation. The Licensee shall implement spawning gravel surveys as proposed in Action 2 of the Mainstem Spawning AR Measure. The Licensee shall develop a Spawning Habitat Availability Report and Plan (SHARP) that: (i) summarizes the survey of newly-accessible anadromous fish spawning habitat; and (ii) proposes actions to augment spawning habitat in the mainstem Klamath River and its tributaries. The SHARP shall be developed in consultation with staff from the State Water Board, North Coast Regional Board, CDFW, NMFS, United States Fish and Wildlife Service (USFWS), ODEQ, and Oregon Department of Fish and Wildlife. The SHARP shall be submitted to the Deputy Director for review and approval no later than December 31 of the year in

²⁷ A 5-year flow event is 10,908 cfs as recorded at USGS gage no. 11516530 (below Iron Gate).

²⁸ A 5-year flow event may occur outside of the two years following completion of drawdown, in which case the monitoring described here would be required.

which drawdown is completed. The Deputy Director may require modifications as part of any approval. The Licensee shall file the Deputy-Director-approved SHARP, together with any required plan modifications, with FERC. The Licensee shall implement the actions identified in the Deputy-Director-approved SHARP upon receipt of Deputy Director and any other required approvals. Any changes to the SHARP shall be approved by the Deputy Director prior to implementation.

The SHARP shall include the following elements for proposed actions to improve spawning habitat: 1) a detailed description of each proposed action; 2) locations of the proposed actions; 3) duration and timing (e.g., season) for implementation of the proposed actions; 4) assessment of estimated spawning habitat benefits resulting from the proposed action compared to the targets identified in Action 2 of the Mainstem Spawning AR Measure; and 5) reporting on SHARP implementation. In the SHARP, the Licensee shall evaluate a range of actions to meet the spawning targets identified in Action 2 (Table 3-2) of the Mainstem Spawning AR Measure. When spawning gravel augmentation is not appropriate²⁹, the Licensee shall evaluate and propose other actions to improve spawning and rearing habitat that meet the targets identified in Table 3-2 (Action 2 of the Mainstem Spawning AR Measure). Other actions may include: installation of large woody material, riparian planting for shade coverage, wetland construction or enhancement, and cattle exclusion fencing.

Juvenile Outmigration Aquatic Resource Measure

The Juvenile Outmigration AR Measure includes three actions: 1) Mainstem Salvage of Overwintering Juvenile Salmonids; 2) Tributary-Mainstem Connectivity Monitoring; and 3) Rescue and Relocation of Juvenile Salmonids and Pacific Lamprey from Tributary Confluence Areas.

Action 1: Mainstem Salvage of Overwintering Juvenile Salmonids. Except as modified by this condition, the Licensee shall implement overwintering juvenile salmonid salvage and relocation efforts as proposed in Action 1 of the Juvenile Outmigration AR Measure. The Licensee shall survey sites in the Klamath River between Iron Gate Dam (RM 192.9) and the Trinity River (RM 43.4) during the pre- and early-drawdown surveys described in Action 1 of the Juvenile Outmigration AR Measure to evaluate the presence and relative abundance of yearling coho salmon. Site selection and survey methods shall be developed in consultation with staff from CDFW, NMFS, State Water Board, and North Coast Regional Board, and implemented as approved by the Deputy Director.

²⁹ Gravel augmentation shall only be performed in the mainstem Klamath River, unless the Deputy Director-approved SHARP allows otherwise.

Action 2: Tributary-Mainstem Connectivity Monitoring. The Licensee shall implement Action 2 of the Juvenile Outmigration AR Measure as proposed, with the same modifications identified in Action 1 of the Mainstem Spawning AR Measure, above.

Action 3: Rescue and Relocation of Juvenile Salmonids and Pacific Lamprey from Tributary Confluence Areas. No later than six months following issuance of the FERC license surrender order, the Licensee shall submit a Juvenile Salmonid and Pacific Lamprey Rescue and Relocation Plan (Juvenile Salmonid Plan) to the Deputy Director for review and approval. The Juvenile Salmonid Plan shall be developed in consultation with staff from the State Water Board, North Coast Regional Board, NMFS, and CDFW. The Licensee shall solicit comments from the agencies listed above. Additionally, the Juvenile Salmonid Plan shall include comments received during the consultation process and identify how the Licensee has addressed the comments. The Deputy Director may require modifications as part of any approval. The Licensee shall file the Deputy-Director-approved Juvenile Salmonid Plan, together with any required plan modifications, with FERC prior to initiating drawdown. The Licensee shall implement the Juvenile Salmonid Plan upon receipt of Deputy Director and any other required approvals. Any changes to the Juvenile Salmonid Plan shall be approved by the Deputy Director prior to implementation.

At a minimum, the Juvenile Salmonid Plan shall include:

- (1) Methods that will be used to find and relocate juvenile salmonids and lamprey;
- (2) Potential relocation areas and/or criteria that will be used to identify potential relocation areas;
- (3) Detailed description of water quality monitoring to be performed at each confluence of the Klamath River and the 13 tributaries³⁰ listed in Action 3 of the Juvenile Outmigration AR Measure. In addition, the plan shall include water quality triggers for implementation of lamprey and juvenile salmonid relocation efforts. The Licensee shall perform the water quality monitoring required here consistent with the sampling methods and quality control procedures identified in the Deputy-Director-approved WQMP and its QAPP (Condition 1). The Licensee shall provide the proposed frequency, duration, and location of water quality monitoring that will be conducted under Action 3 of the Juvenile Outmigration AR Measure. The Licensee may use water quality monitoring results from implementation of the WQMP (Condition 1), as applicable. The plan shall identify what monitoring results from Condition 1 may be used under this action;

³⁰ The 13 tributaries are: Bogus Creek, Dry Creek, Cottonwood Creek, Shasta River, Humbug Creek, Beaver Creek, Horse Creek, Scott River, Tom Martin Creek, O'Neil Creek, Walker Creek, Grider Creek, and Seiad Creek.

- (4) Detailed description of proposed rescue efforts that includes: duration, method of rescue, target number of fish, locations for capture and relocation;
- (5) Provisions for incidental rescue and relocation of Pacific lamprey encountered in tandem with any juvenile salmonid rescue and relocation efforts: and
- (6) Reporting to the Deputy Director on implementation of Action 3 of the Juvenile Outmigration AR Measure within six months following implementation of rescue and relocation efforts. At a minimum, reporting shall include: a summary of the water quality data collected; any actions taken by the Licensee to rescue and relocate lamprey and juvenile salmonids, including number of lamprey and juvenile salmonids rescued (including age class), release location, and the success of such efforts.

Iron Gate Hatchery Management Aquatic Resource Measure

The Licensee shall implement the Iron Gate Hatchery Management AR Measure— as listed in the Licensee’s June 2018, Appendix I.

Suckers Aquatic Resource Measure

The Licensee shall implement the Suckers AR Measure as listed in the Licensee’s June 2018, Appendix I. The Licensee shall submit the summary reports to the Deputy Director no later than six months after each sampling event or no later than three months following issuance of the FERC license surrender order for sampling events implemented before license surrender order issuance. The Licensee shall submit summary reports to the Deputy Director detailing relocation efforts implemented under this measure no later than three months following completion of the relocation efforts.

Freshwater Mussels Aquatic Resource Measure

The Licensee shall implement the Freshwater Mussels AR Measure, as listed in the Licensee’s October 2018 letter to the State Water Board. The Licensee shall submit summary reports to the Deputy Director detailing relocation efforts implemented under this measure no later than three months following completion of the relocation efforts.

CONDITION 7. REMAINING FACILITIES

No later than six months following issuance of the FERC license surrender order, and prior to Project implementation, the Licensee shall submit a Remaining Facilities Plan to the Deputy Director for review and approval. The Deputy Director may require modifications as part of any approval. The Licensee shall file the Deputy Director-approved Remaining Facilities Plan, together with any required plan modifications, with FERC. The Licensee shall implement the Remaining Facilities Plan upon receiving Deputy Director and any other required approvals. Any changes to the Remaining Facilities Plan shall be approved by the Deputy Director prior to implementation.

At a minimum, the Remaining Facilities Plan shall include:

- (1) A list and description of all Project facilities and structures that will be retained during Project implementation³¹, including but not limited to facilities buried in place;
- (2) An analysis of potential water quality impacts associated with remaining facilities and operations, including hazardous materials or wastes present at the facilities and the potential for erosion or runoff to surface waters;
- (3) Measures the Licensee will implement to ensure remaining facilities do not contribute to water quality impairments; and
- (4) 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.

CONDITION 8. PUBLIC DRINKING WATER SUPPLIES

This condition outlines provisions to ensure protection of public drinking water supplies that may be impacted by Project implementation, including drinking water supplies sourced from the Klamath River and the City of Yreka's water supply. The provisions for each of these types of water supplies are provided below.

Drinking Water Supplies Sourced from the Klamath River. No later than three months following issuance of the FERC license surrender order, and prior to Project implementation, the Licensee shall consult with community water systems, transient non-community water systems, or other drinking water providers that use Klamath River surface water for drinking water to identify appropriate measures to reduce water supply impacts associated with Project implementation. The Licensee shall ensure that Project implementation does not result in service of water that fails to meet drinking water quality standards. Potential measures shall include, as appropriate: (1) providing an alternative potable water supply; (2) providing technical assistance to assess whether existing treatment is adequate to treat the potential increase in sediments and sediment-associated contaminants to meet drinking water standards; (3) providing water treatment assistance to adequately treat Klamath River water to minimize suspended sediments and associated constituents that may impact human health; (4) ensuring that transient, non-community supplies are temporarily shut off for drinking; and/or (5) ensuring that water not intended for drinking is clearly marked as non-potable.

At least six months prior to initiating drawdown, the Licensee shall submit a report to the Deputy Director that: (i) identifies all drinking water supplies

³¹ While all remaining facilities shall be listed in the Remaining Facilities Plan, it is not necessary to include a description and other information for recreational facilities addressed under Recreation Facilities (Condition 19) and hatcheries addressed under Hatcheries (Condition 13).

sourced from the Klamath River that may be impacted by the Project; (ii) details measures the Licensee will implement to protect each potentially affected water supply and why such measures are sufficient to protect the drinking water supplies; and (iii) documents consultation with the applicable water supplier and how any comments made on the proposed measures were addressed in the report. The Licensee shall implement the measures sufficiently prior to, during, and following the reservoir sediment releases to ensure protection of water supplies. The Deputy Director may require modifications or additional measures. The Licensee shall provide the Deputy Director with a summary of its implementation of this provision within three months of concluding implementation of the measures.

City of Yreka's Water Supply. Prior to initiating drawdown of Project reservoirs, the Licensee shall construct a new, fully operational replacement pipe for the City of Yreka's current water supply pipeline for the section of pipe that crosses Iron Gate Reservoir. The new replacement pipeline section shall be connected to the existing City of Yreka water supply pipeline and installed in a location that prevents Klamath River flows during and after drawdown from affecting the City of Yreka's water supply.

Any work the Licensee undertakes to ensure that the City of Yreka water supply intake structures comply with fish screen criteria shall be completed within the water delivery outage period specified in this condition. Installation of a fish barrier that does not impact the City of Yreka's water supply and associated intake structures may be performed at an alternate time outside of the water delivery outage period.

Except as provided in this condition, the Licensee shall ensure uninterrupted water supply during replacement of the water pipeline section, any required intake structure modifications, and throughout Project implementation. A short water delivery outage is necessary to make the final connections following construction of the new pipeline. The Licensee shall limit the water delivery outage to a maximum of 12 hours or another water delivery outage timeframe agreed upon between the City of Yreka and the Licensee. The Licensee shall coordinate the water delivery outage period with the City of Yreka to ensure the City of Yreka has an adequate supply of water stored to cover the maximum water delivery outage period.

Water pipeline and intake work shall not cause impacts to water quality that exceed North Coast Basin Plan standards. If the Licensee proposes any in-water work, the Licensee shall prepare a water quality monitoring and protection plan in compliance with Condition 10 of this certification for Deputy Director review and approval.

CONDITION 9. AQUATIC VEGETATION MANAGEMENT

In the event chemical vegetation control is proposed to control algae or aquatic weeds, the Licensee shall consult with staff from the United States Army Corps

of Engineers (USACE), CDFW, North Coast Regional Board, and State Water Board and submit a proposal to the Deputy Director for review and approval. The proposal shall include: (1) the Licensee's plans to implement chemical vegetation management, including any public noticing or additional measures proposed beyond those required in this certification; (2) the timeline for the application of chemicals and any potential impacts to beneficial uses of water, including Native American culture uses; (3) comments and recommendations made in connection with the consultation and how they were incorporated into the proposal; and (4) a description of how the proposal incorporates or addresses use of glyphosate in an aquatic formulation, avoidance of glyphosate formulations containing the surfactants POEA or R-11, and prohibition of application if precipitation is predicted within 24 hours of intended use. If another herbicide is selected for use, it shall meet the characteristics of low soil mobility and low toxicity to fish and aquatic organisms and shall be applied using low use rates (i.e., spot treatments), avoidance of application in the rain, avoidance of treatments during periods when fish are in life stages most sensitive to the herbicide(s) used, and adherence to appropriate buffer zones around stream channels as specified in Bureau of Land Management 2010³².

The Deputy Director may approve, deny, or require modifications of the proposal. The Licensee shall file any Deputy-Director-approved proposal, together with any required proposal modifications, with FERC. The Licensee shall implement the proposal upon Deputy Director and any other required approvals. Any changes to the proposal shall be approved by the Deputy Director prior to implementation.

At a minimum, the Licensee shall comply with the terms in State Water Board Order No. 2013-0002-DWQ (as amended by Order 2014-0078-DWQ), National Pollutant Discharge Elimination System (NPDES) No. CAG990005, *Statewide National Pollutant Discharge Elimination System Permit for Residual Aquatic Pesticide Discharges to Water of the United States from Algae and Aquatic Weed Control Applications* and any amendments thereto.

CONDITION 10. CONSTRUCTION GENERAL PERMIT COMPLIANCE AND WATER QUALITY MONITORING AND PROTECTION PLANS

The Licensee shall comply with the terms and conditions in the State Water Board's *National Pollutant Discharge Elimination System (NPDES) General Permit for Storm Water Discharges Associated with Construction and Land Disturbance Activities* (Construction General Permit; State Water Board Order 2009-0009-DWQ, as amended by State Water Board Orders 2010-0014-DWQ and 2012-0006-DWQ), and ongoing amendments during the life of the Project.

³² Bureau of Land Management (BLM). 2010. Final environmental impact statement. Vegetation treatments using herbicides on BLM lands in Oregon. Volume 2- Appendices. FES 10-23 BLM/OR/WA/AE-10/077+1792. Prepared by BLM, Pacific Northwest Region, Portland, Oregon.

For any ground-disturbing activities that could impact water quality (including beneficial uses) that are neither addressed by the Construction General Permit nor addressed in other conditions of this certification (e.g., Reservoir Drawdown [Condition 3], Hatcheries [Condition 13], and Restoration [Condition 14]) site-specific water quality monitoring and protection plans shall be prepared and implemented following Deputy Director approval. Prior to construction or other activity that could impact water quality or beneficial uses, the Licensee shall submit the water quality monitoring and protection plan to the Deputy Director for review and approval. The Deputy Director may require modifications as part of any approval. The Licensee shall file the Deputy Director's approval, together with any required modifications, with FERC. The Licensee shall implement site-specific water quality monitoring and protection plans upon receipt of Deputy Director and any other required approvals.

Any water quality monitoring and protection plans shall include measures to control erosion, stream sedimentation, dust, and soil mass movement. The plans shall be based on actual-site geologic, soil, and groundwater conditions and at a minimum include:

- (1) Description of site conditions and the proposed activity;
- (2) Detailed descriptions, design drawings, and specific topographic locations of all control measures in relation to the proposed activity, which may include:
 - a. Measures to divert runoff away from disturbed land surfaces;
 - b. Measures to collect and filter runoff from disturbed land surfaces, including sediment ponds at the sites; and
 - c. Measures to dissipate energy and prevent erosion;
- (3) Revegetation of disturbed areas using native plants and locally-sourced plants and seeds; and
- (4) A monitoring, maintenance, and reporting schedule.

Potential best management practices (BMPs) include those identified in the Licensee's 2018 Definite Plan, the Licensee's September 30, 2017, Technical Support Document, *Water Quality Management for Forest System Lands in California –Best Management Practices* (USFS 2012), California Department of Transportation's May 2017 *Construction Site Best Management Practices (BMP) Manual* (Caltrans BMP Manual) (Caltrans 2017), or other appropriate documents.

CONDITION 11. WASTE DISPOSAL

No later than six months following issuance of the FERC license surrender order, the Licensee shall submit a Waste Disposal Plan to the Deputy Director for review and approval. The Waste Disposal Plan shall describe how the Licensee will manage and dispose of all non-hazardous wastes³³ generated as part of the

³³ Management of hazardous materials is covered in Hazardous Materials Management (Condition 12).

Project in a manner protective of water quality. The Waste Disposal Plan shall be developed in consultation with staff from the North Coast Regional Board and State Water Board. The Licensee shall solicit comments from the agencies listed. Additionally, the Waste Disposal Plan shall include comments received during the consultation process and identify how the Licensee has addressed the comments. The Deputy Director may require modifications as part of any approval. The Licensee shall file the Deputy Director's approval, together with any required modifications, with FERC. The Licensee shall implement the Waste Disposal Plan upon receipt of Deputy Director and any other required approvals. Any changes to the Waste Disposal Plan shall be approved by the Deputy Director prior to implementation.

At a minimum, the Waste Disposal Plan shall include:

- (1) The elements of the waste disposal description presented in Section 5 of the Licensee's 2018 Definite Plan, that influence water quality, and as updated based on the requirements presented in this condition. If the Licensee proposes to change any elements material to water quality, the Waste Disposal Plan submittal shall highlight such changes and provide a rationale, including any new information relied on;
- (2) An estimate of the quantity and nature of anticipated waste generated by dam removal and other Project decommissioning activities and a description of where all materials and debris will be disposed;
- (3) A detailed description of on-site disposal, including the proposed locations and associated size of sites;
- (4) Erosion control measures for on-site disposal activities; and
- (5) A proposal to restore on-site disposal sites with topsoil and native vegetation, including monitoring, reporting, and follow up actions (if needed) to ensure the long-term stability of the restored disposal site and protection of water quality.

On-site disposal of inert, non-hazardous debris resulting from dam removal and other Project decommissioning activities may be buried in accordance with requirements in division 2, title 27 of the California Code of Regulations. With exception of the J.C. Boyle scour hole and powerhouse tailrace disposal sites identified in the 2018 Definite Plan, the Licensee shall ensure that the disposal sites are above the ordinary high-water mark (OHWM) and in a location that does not drain directly to surface waters. The Licensee shall select disposal site locations where drainage patterns can be preserved. If a waste disposal site has the potential to drain into surface waters, catch basins shall be constructed whenever feasible³⁴ and other appropriate BMPs from the Caltrans BMP Manual shall be implemented, to intercept runoff before it reaches surface waters.

³⁴ The Licensee shall provide justification for any determination that a catch basin is infeasible at a disposal site with the potential to drain into surface water.

On-site disposal areas that will remain uncovered through the rainy season (between October 16 and May 14) shall be protected with appropriate BMPs from the Caltrans BMP Manual to prevent erosion. Reinforced steel and other recyclable materials should be recycled at local recycling facilities. Excavated embankment material may be used as topsoil to cover on-site disposal areas prior to grading and being sloped for drainage. Concrete rubble resulting from demolition of the powerhouses may be buried in the existing tailrace channel. All mechanical and electrical equipment shall be hauled to a suitable commercial landfill or salvage collection point. Prior to Project completion, all on-site disposal locations shall be graded and vegetated to reduce the potential for erosion.

CONDITION 12. HAZARDOUS MATERIALS MANAGEMENT

No later than six months following issuance of the FERC license surrender order, the Licensee shall submit a Hazardous Materials Management Plan to the Deputy Director for review and approval. The Hazardous Materials Management Plan shall be developed in coordination with State Water Board staff. The Hazardous Materials Management Plan shall include the following: (a) proper disposal or abatement of hazardous materials and wastes that are encountered as part of decommissioning activities (e.g., asbestos tiles or building materials, batteries, etc.); (b) proper storage, containment, and response to spills of hazardous materials and wastes that are part of Project implementation (e.g., gasoline and diesel for vehicles, oil and other fluids for construction equipment, etc.); and (c) proper removal and disposal of septic tanks. At a minimum, the Hazardous Materials Management Plan shall include the requirements presented in this condition and:

- (1) The elements of the hazardous materials management description presented in Appendix O3 of the Licensee's 2018 Definite Plan, that influence water quality, as updated based on the requirements presented in this condition. If the Licensee proposes to change any elements material to water quality, the Hazardous Material Management Plan submittal shall highlight such changes and provide a rationale, including any new information relied on;
- (2) A list with contact information of federal, state, and local officials the Licensee will contact to respond in the event of a hazardous materials spill. The list and contact information shall be maintained and updated by the Licensee. In the event of a hazardous materials spill, at a minimum, the Licensee shall immediately inform the California Emergency Management Agency, CDFW, North Coast Regional Board, and the State Water Board staff of the magnitude, nature, time, date, location, and action taken for the spill;

Additionally, the Licensee shall provide support for why other appropriate BMPs from the Caltrans Manual are sufficient to protect water quality and beneficial uses.

- (3) An inventory of hazardous materials and wastes at each facility and the plan for final disposition of the hazardous materials and wastes;
- (4) 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 from Project activities. Onsite containment for storage of chemicals classified as hazardous shall be away from watercourses and include secondary containment and appropriate management as specified in California Code of Regulations, title 27, section 20320; and
- (5) Testing, monitoring, and reporting that will be implemented if a spill occurs to ensure water quality is not affected.

The Deputy Director may require modification as part of any approval. The Licensee shall file the Deputy Director's approval, together with any required modifications, with FERC. The Licensee shall implement the Hazardous Materials Management Plan upon receipt of Deputy Director and any other required approvals. Any changes to the Hazardous Materials Management Plan shall be approved by the Deputy Director prior to implementation.

For structures being removed, the Licensee shall inspect each structure prior to removal for hazardous materials (e.g. asbestos-containing material, lead-based paint, and polychlorinated biphenyls [PCBs]) and perform any necessary sampling or testing when inspection alone does not provide sufficient information to determine whether the material is hazardous. Any material with asbestos, lead, PCBs, or other hazardous waste shall be handled and disposed of as hazardous waste at approved hazardous waste facilities in accordance with applicable waste management regulations. Other deconstruction materials shall be disposed of as non-hazardous waste in accordance with Waste Disposal (Condition 11) provisions of this certification.

All hazardous materials removed from inside existing structures during Project implementation (e.g., paints, oils, and welding gases) shall be either returned to the vendor, recycled, or managed and disposed of as hazardous waste at an approved hazardous waste facility in accordance with applicable federal and state regulations. Transformer oils shall be tested for PCBs if no data exist. Any tanks that contained hazardous materials shall be decontaminated prior to disposal. Universal hazardous waste (e.g., lighting ballasts, mercury switches, and batteries) shall be handled in accordance with applicable federal and state universal waste regulations.

Existing septic tanks associated with Project facilities shall be decommissioned in place or removed and disposed of in accordance with the corrective action requirements specified in the State Water Board's *Water Quality Control Policy*

*for Siting, Design, Operation and Maintenance of Onsite Wastewater Treatment Systems (OWTS Policy)*³⁵ (State Water Board 2012).

CONDITION 13. HATCHERIES

No later than six months following issuance of a FERC license surrender order, the Licensee shall submit a Hatcheries Management and Operations Plan (Hatcheries Plan) to the Deputy Director for review and approval. The Hatcheries Plan shall be developed in consultation with staff from the State Water Board, North Coast Regional Board, CDFW, and NMFS. The Licensee shall solicit comments from the agencies listed above. Additionally, the Hatcheries Plan shall include the comments received during the consultation process and identify how the Licensee addressed the comments. The Deputy Director may require modifications as part of any approval. The Licensee shall file the Deputy Director-approved Hatcheries Plan, together with any required plan modifications, with FERC. The Licensee shall implement the Hatcheries Plan upon receipt of Deputy Director and any other required approvals. Following Deputy Director approval of the Hatcheries Plan, any changes to the Hatcheries Plan with the potential to increase impacts to water quality shall be approved by the Deputy Director prior to implementation. At a minimum, the Hatcheries Plan shall include:

- (1) The Licensee's plans to construct, modify, operate, maintain, and facilitate transfer of ownership and continued operation of the Fall Creek and Iron Gate hatcheries, as presented in Section 7.8 of the 2018 Definite Plan, and as updated based on the requirements in this certification. If the Licensee proposes to change any elements material to water quality, the Hatcheries Plan shall highlight such changes and provide a rationale, including any new information relied on;
- (2) Annual fish production goals that include the target production numbers by species, life stage, and hatcheries locations;
- (3) Identification of water supplies that will be used to operate the Iron Gate and Fall Creek hatcheries including: location; anticipated diversion rates (cfs) and total diversion amounts (annual and monthly); minimum amount of flow that will be bypassed below the diversions to provide volitional fish passage; and summaries of and compliance with any water right requirements associated with water diversions;
- (4) Implementation actions for protection of hatchery and natural fish populations (as impacted by hatchery operations) in the event water supply

³⁵ The OWTS Policy was adopted by the State Water Board on June 19, 2012 per Resolution No. 2012-0032; it was approved by the Office of Administrative Law on November 13, 2012; and consistent with OWTS Policy section 13.0, became effective on May 13, 2013. On April 17, 2018, per Resolution No. 2018-0019, the State Water Board amended the OWTS Policy renewed its conditional waiver.

to Iron Gate or Fall Creek hatcheries is unavailable due to drought or other limitations;

- (5) The proposed construction BMPs for ground-disturbing activities associated with construction of the hatcheries, including establishment of a 20-foot buffer around delineated wetlands, unless site-specific conditions require adjustment of the buffer in a manner that remains protective of delineated wetlands and is acceptable to a qualified and approved biologist. Construction associated with these activities shall be subject to the BMPs required under the Construction General Permit;
- (6) Details regarding a minimum flow in Bogus Creek of 4.5 cfs, unless it is determined that an alternative minimum flow is required to provide volitional fish migration for Chinook salmon, coho salmon, and steelhead. If the hatchery diversions cause a flow within Bogus Creek downstream of the bypass that is less than 4.5 cfs (or the minimum flow identified for each species during their migration period), hatchery operations shall be adjusted, in coordination with NMFS and CDFW, to reduce the percentage of flow diverted from Bogus Creek and protect of anadromous fish passage;
- (7) Expected duration of each hatchery's operations; and
- (8) Reporting details, such as the amount of water diverted at each hatchery, bypass flows, and reporting requirements under the NPDES permit.

Prior to operation of the Fall Creek and Iron Gate hatcheries, the Licensee shall ensure that each hatchery has obtained coverage under and complies with a NPDES permit issued by the North Coast Regional Board. If the closure of the hatcheries is anticipated while the license surrender order is still in effect, the Hatchery Plan shall be updated to include the proposal for decommissioning of the facilities.

CONDITION 14. RESTORATION

No later than six months following issuance of the FERC license surrender order, and prior to initiation of drawdown activities, the Licensee shall submit a Restoration Plan to the Deputy Director for review and approval. The Restoration Plan shall be developed in consultation with staff from the North Coast Regional Board, State Water Board, and CDFW. The Licensee shall solicit comments from the agencies listed above. Additionally, the Restoration Plan shall include comments received during the consultation process and identify how the Licensee has addressed the comments. The Deputy Director may require modifications as part of any approval. The Licensee shall file the Deputy-Director-approved Restoration Plan, together with any required plan modifications, with FERC. The Licensee shall implement the Restoration Plan upon receipt of Deputy Director and any other required approvals. Any changes to the Restoration Plan shall be approved by the Deputy Director prior to implementation. At a minimum, the Restoration Plan shall include:

- (1) The material elements of the Licensee's restoration plan for the Project, as presented in Section 6 of the Licensee's 2018 Definite Plan, and as

- updated based on the requirements in this condition. If the Licensee proposes to change any elements material to water quality, the Restoration Plan submittal shall highlight such changes and provide the rationale, including any new information relied on;
- (2) Detailed description of proposed restoration activities (e.g., grading, planting, swales, wetland construction, etc.) and preliminary map identifying proposed locations for restoration activities. The preliminary map shall be updated within two months following drawdown, as necessary. The description of proposed restoration activities shall include associated water quality protection measures the Licensee will implement as part of restoration;
 - (3) Exclusive use of native plants, with preference for plants that promote soil stabilization;
 - (4) Description and results of the Licensee's evaluation of the presence of wetlands that could be affected by the Project, including wetlands in the potential disposal areas;
 - (5) Description of measures the Licensee will implement to ensure no net loss of wetland or riparian habitat. Measures shall include establishment of a minimum 20-foot buffer around all delineated wetlands potentially affected by construction impacts (unless site-specific conditions require adjustment of the buffer in a manner that remains protective of delineated wetlands and is acceptable to a qualified and approved biologist) to deter heavy machinery from traversing the wetland and prevent runoff pollution associated with Project activities from directly entering wetlands;
 - (6) Description of how the Licensee will ensure floodplain connectivity within the reservoir footprint;
 - (7) Description of how the Licensee will monitor for and address any invasive weeds in the restored area;
 - (8) Plan for installation of large woody material in the Hydroelectric Reach in California that includes:
 - a. Number or volume of large woody material to be installed;
 - b. Placement of a portion of large woody material at or above the OHWM to create habitat at higher flows,
 - c. Consistency with practices in *California Salmonid Stream Habitat Restoration Manual* (CDFG 2010) or guidance provided through consultation with staff from CDFW, NMFS, North Coast Regional Board, and State Water Board; and
 - d. Timeline for placement of large woody material, which shall not occur until active dam and facilities removal work is complete; and
 - (9) Monitoring and reporting on the implementation of the Restoration Plan, including adaptive management measures that will be implemented over time to ensure successful restoration (e.g., measures to address the loss of newly planted vegetation, soil instability³⁶, etc.). Monitoring shall occur

³⁶ Adaptive management measures for soil stabilization may refer to the Slope Stability Monitoring Plan required in Slope Stability (Condition 18).

frequently enough to determine whether plantings are successful and to facilitate implementation of adaptive measures (e.g., supplemental irrigation, re-seeding, changes in plant types) to ensure rapid establishment of vegetation.

Within six months of concluding drawdown activities, and annually thereafter until otherwise directed by the Deputy Director, the Licensee shall provide a report to the Deputy Director documenting implementation of the Restoration Plan, including highlights of any problems encountered and adaptive management measures deployed or proposed to address the problems. The Licensee shall provide additional reports or information related to implementation of the Restoration Plan if requested by the Deputy Director.

CONDITION 15. WATER SUPPLY MONITORING AND MANAGEMENT

The Licensee shall implement the following measures to protect water supply and beneficial uses. The Licensee shall annually prepare, and submit to the Deputy Director, a Water Supply Management Report that includes the elements described below. The Deputy Director may require implementation of additional adaptive management measures informed by the report and associated monitoring results.

Surface Water Diversions: The Licensee shall identify all points of diversion on the Klamath River listed in the Electronic Water Rights Information Management System (eWRIMS). The Licensee shall contact all California water rights holders with points of diversion on the Klamath River to determine whether the water right holder is interested in working with the Licensee to evaluate potential Project impacts to the water right holder. If potential impacts are identified and if the water right holder is interested in working with the Licensee, the Licensee shall provide temporary accommodations (e.g., replacement water, settling basins, etc.) to address potential impacts. Following dam removal, the Licensee shall investigate any impacts reported by a diverter. If the investigation confirms an adverse impact has occurred as a result of dam removal, the Licensee shall implement measures to reduce impacts and allow the water right holder to divert water in the same manner (e.g., amounts, suitable quality, and timing) as before dam removal.

The year prior to and annually for the first two years following drawdown, the Licensee shall submit a Water Supply Management Report to the Deputy Director on implementation of the surface water supply activities described above. At a minimum, the report shall include: a map showing the location of potentially affected points of diversion; a description of the potential adverse effects; a description of proposed/implemented mitigation measures; and the number of water right holders who agreed to work with the Licensee to address potential water supply issues.

Groundwater: To determine Project effects on surrounding groundwater wells, the Licensee shall, within a 2.5-mile range of the reservoirs' OHWM, monitor

groundwater levels before, during, and after drawing down the reservoirs. To identify groundwater wells, the Licensee shall outreach to all residents and landowners within 2.5 miles of the California Project reservoirs to inquire about their groundwater wells. At least two months prior to commencing drawdown activities, the Licensee shall monitor groundwater levels at a minimum of 10 locations within 2.5 miles of the California reservoirs dispersed throughout the Hydroelectric Reach in California. The Licensee may begin groundwater elevation monitoring earlier, in order to integrate observations of natural seasonal fluctuations in groundwater elevation into the impact analysis.

The Licensee shall continue to monitor groundwater levels, at least monthly, until otherwise approved by the Deputy Director and for a term of at least two years following completion of drawdown of all Project reservoirs. Monitoring may occur at groundwater wells of landowners or residents with wells located within 2.5 miles of the California Project reservoirs who volunteer to allow testing or at other groundwater monitoring wells around the California Project reservoirs. Potential groundwater monitoring locations and measures to address potential water supply impacts are identified in Appendix N of the Licensee's 2018 Definite Plan. The Licensee shall provide the Deputy Director with the locations of groundwater wells that will be monitored per this condition, and the Deputy Director may require additional monitoring if the locations chosen do not provide sufficient information on potential impacts to groundwater levels. The Licensee shall submit an annual Groundwater Report to the Deputy Director, for a minimum of two years directly following completion of drawdown. Monitoring duration may be adjusted based on groundwater levels reported in the annual Groundwater Report, and as approved by the Deputy Director. At a minimum, the annual Water Supply Management Report shall include a section on groundwater that:

- Documents groundwater level monitoring results;
- Highlights any trends or significant changes in groundwater levels; and
- Summarizes actions the Licensee has or will implement to address any impacts to groundwater supply associated with Project implementation. Actions implemented by the Licensee shall ensure disruptions in groundwater supply determined to be a result of the Project are limited. Actions shall include, but are not limited to, providing temporary water until Project impacts are adequately addressed.

Fire Protection: The first annual Water Supply Management Report shall 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 Hydroelectric Reach.

If the Deputy Director finds that the measures undertaken to address water supply impacts are insufficient or additional reporting is needed, the Deputy

Director may require the Licensee to implement additional measures or continue reporting on implementation of this condition.

CONDITION 16. AMPHIBIAN AND REPTILE MANAGEMENT

No later than three months following issuance of a FERC license surrender order, the Licensee shall submit an Amphibian and Reptile Rescue and Relocation Plan (Amphibian and Reptile Plan) to the Deputy Director for review and approval. The Amphibian and Reptile Plan shall be developed in consultation with staff from CDFW, USFWS, and State Water Board. The Licensee shall solicit comments from the agencies listed above. Additionally, the Amphibian and Reptile Plan shall include comments received during the consultation process and identify how the Licensee has addressed the comments. The Deputy Director may require modifications as part of any approval. The Licensee shall file the Deputy-Director-approved Amphibian and Reptile Plan, together with any required modifications, with FERC. The Licensee shall implement the Amphibian and Reptile Plan upon receipt of Deputy Director and any other required approvals. Any changes to the Amphibian and Reptile Plan shall be approved by the Deputy Director prior to implementation.

The Amphibian and Reptile Plan shall address protection of amphibians and reptiles previously found in the areas of the Project affected by drawdown and land-disturbing activities that are listed under the Federal Endangered Species Act (ESA) or the California ESA, or are designated as Species of Special Concern by CDFW. These species may include, but are not limited to foothill yellow-legged frog, and western pond turtle. At a minimum the Amphibian and Reptile Plan shall include:

- (1) The amphibians and reptiles covered by the plan;
- (2) Surveys and protocols that will be implemented to identify and relocate amphibians and reptiles identified in the plan;
- (3) Protocols for relocation that will be implemented upon the incidental discovery of a listed species during surveys;
- (4) Identification of the minimum qualifications for the individual(s) that will conduct the surveys and relocations, if necessary;
- (5) Timing and locations where surveys will be conducted, including all areas of the Project affected by drawdown and land-disturbing activities in California with known amphibian or reptile habitat or presence;
- (6) Identification of potential relocation areas, which may include lower reaches of Klamath River tributaries with suitable habitat approved by USFWS and CDFW;
- (7) Pre-construction surveys and associated reporting for western pond turtles conducted by an on-site biologist approved by applicable agencies and familiar with western pond turtle ecology;
- (8) Provisions for rescue and relocation of western pond turtles after reservoir drawdown that includes survey timing to cover multiple life stages, survey frequency, survey locations, relocation areas with suitable habitat, survey

- methodology, and reporting of survey results within 60 days of the completion of surveys to applicable agencies and the State Water Board; and
- (9) Monitoring and reporting that will be implemented to document compliance with this condition, including notification and reporting identified by USFWS and CDFW through consultation to develop the plan. Reporting shall include a report submitted to applicable agencies within 30 days of completing the Project, regarding all species handled and relocated; location, date, time and duration of the handling; enumeration and identification of species handled; identification of species life stage; identification of capture personnel; the release location and time; stream, transport, and receiving water temperatures; and location, date, and time of release.

The Amphibian and Reptile Plan must be approved by the Deputy Director prior to drawdown, in-water work, and work in riparian areas. Prior to approval of the Amphibian and Reptile Plan, the Licensee may implement ground-disturbing activities occurring entirely above the OHWM, so long as a USFWS- and CDFW-approved biological monitor surveys the area, monitors construction, and takes appropriate actions to protect amphibians and reptiles.

CONDITION 17. BALD AND GOLDEN EAGLE MANAGEMENT

No later than three months following issuance of a FERC license surrender order, and prior to Project implementation, the Licensee shall submit a Bald and Golden Eagle Management Plan (Eagle Management Plan), to the Deputy Director for review and approval. The Eagle Management Plan shall be developed in consultation with staff from CDFW, USFWS, and State Water Board. The Licensee shall solicit comments from those agencies. Additionally, the Eagle Management Plan shall include comments received during the consultation process and identify how the Licensee has addressed the comments. The Deputy Director may require modifications as part of any approval. The Licensee shall file the Deputy-Director-approved Eagle Management Plan, together with any required modifications, with FERC. The Licensee shall implement the Eagle Management Plan upon receipt of Deputy Director and any other required approvals. Any changes to the Eagle Management Plan shall be approved by the Deputy Director prior to implementation.

The Eagle Management Plan shall include, at a minimum, the following:

- A two-year survey for eagle use patterns shall be conducted prior to construction activities.
 - The first-year survey shall determine bird use patterns at any facilities to be removed or modified during the time of year most likely to detect bird usage (completed by the Licensee in 2017).
 - The second-year survey shall include focused surveys (see below).

- Surveys shall be conducted by a qualified avian biologist, approved by CDFW and USFWS.
- A focused survey (two site visits) shall be conducted in a single nesting season within two years prior to drawdown to document the presence of nests. These focused surveys shall identify eagle nests within one mile of disturbance areas within the Limits of Work, including but not limited to demolition areas where there may be any loud noise disturbance (e.g., helicopter or plane, blasting, etc.). The early nesting season survey shall occur at a time when eagles are most likely to be found at the nest sites, and the second survey shall occur later in the season and prior to the fledglings leaving the nest to confirm nesting activity. All observations shall be reported to CDFW using the California Bald Eagle Nesting Territory Survey Form (CDFW 2017d).
- Within two weeks prior to commencing construction or ground-disturbing activities, the Licensee shall conduct at least one pre-construction survey within the survey area defined above.
- Wherever possible, clearing, cutting, and grubbing activities shall be conducted outside of the eagle nesting season (January 1 through August 31³⁷).
- If active eagle nests are documented during the surveys, a one-mile³⁸ restriction buffer shall be established around the nest to ensure that nests are not disturbed. This buffer may be reduced in coordination with USFWS and CDFW, while taking into consideration components such as proposed activity, distance to activity, terrain, and line of site. For example, in coordination with agencies, if a nest is not within line-of-site, meaning that trees or topographic features physically block the eagle's view of construction activities, the buffer could be reduced to 0.25-mile. Further reduction of buffers or allowance of limited activity inside of buffers could occur in coordination with an on-site biologist, CDFW, and the USFWS, while being consistent with the Licensee's proposed Eagle Avoidance and Minimization Plan, if it is determined that the activities shall not jeopardize nesting success. To reduce the potential for nesting in a previously identified active nest, measures may be implemented prior to the nesting season such as removing the nest or making the nest temporarily unavailable (e.g., placing cone or ball in nest) in coordination with an on-site biologist, CDFW, and the USFWS.
- Nests within a one-mile buffer shall be monitored by an USFWS- and CDFW-approved biologist when there is a potential for noise disturbance, in order to assess whether eagle activity patterns are normal, as compared with that observed during baseline surveys described above.

³⁷ Eagle breeding season of January 1 through August 31, as identified by A. Henderson, CDFW, Environmental Scientist, pers. comm, November 2017.

³⁸ Eagle nest restriction buffer of 1.0 mile, as identified by A. Henderson, CDFW, Environmental Scientist, pers. comm, November 2017.

- If activities are anticipated to result in take under the Bald and Golden Eagle Protection Act, it would be considered a significant impact and the Licensee shall coordinate appropriate measures, including procurement of any necessary take permits, with USFWS and CDFW. The Licensee shall report on the status of bald and golden eagle surveys within one month of survey completion to USFWS, CDFW, and State Water Board.
- Monitoring and reporting that will be implemented to document compliance with this condition, including notification and reporting identified by USFWS and CDFW through consultation to develop the Eagle Management Plan.

CONDITION 18. SLOPE STABILITY

The Licensee shall identify reservoir slopes and other Project areas prone to instability and implement site-specific measures to avoid potential slope erosion and associated increases in sedimentation to surface waters throughout Project implementation. Additionally, the Licensee shall monitor for and address slope instability throughout the term of the Project, including restoration activities. No later than three months following issuance of the FERC license surrender order and prior to starting drawdown, the Licensee shall submit a Slope Stability Monitoring Plan to the Deputy Director for review and approval. The Slope Stability Monitoring Plan shall be developed in consultation with State Water Board staff. The Deputy Director may require modifications as part of any approval. The Licensee shall file the Deputy-Director-approved Slope Stability Monitoring Plan, together with any required modifications, with FERC. The Licensee shall implement the Slope Stability Monitoring Plan upon receipt of Deputy Director and any other required approvals. Any changes to the Slope Stability Monitoring Plan shall be approved by the Deputy Director prior to implementation. At a minimum, the Slope Stability Monitoring Plan shall include:

- (1) The material elements of the Licensee's proposal related to stability of embankments and reservoir rims, as presented in the 2018 Definite Plan and the Licensee's commitment to implement final EIR Mitigation Measure GEO-1 (Slope Stabilization), and as updated based on the requirements presented in this condition. If the Licensee proposes to change any elements material to water quality, the Slope Stability Monitoring Plan shall highlight such changes and provide the rationale, including any new information relied on;
- (2) A list of slopes and Project areas prone to instability;
- (3) Number and location of piezometer wells the Licensee will use to monitor water levels and pore pressure;
- (4) Number and location of inclinometer installations to monitor slope stability;
- (5) A list of measures the Licensee will implement to prevent erosion and maintain soil stability;
- (6) A description of soil stability monitoring, including locations and schedule;

- (7) Visual monitoring for potential slumping, cracking, and other signs of slope instability throughout the Project area;
- (8) Potential measures the Licensee will implement to address soil instability;
- (9) Coordination with Reservoir Drawdown (Condition 3) to address the potential modification of drawdown rates to control slope instability if necessary to protect infrastructure, property, or resources;
- (10) Slope inspections during drawdown of the reservoirs and after storm events, and implementation of any necessary repairs, replacements, and/or additional measures to minimize potential slope instability effects on water quality based on inspection information; and
- (11) Submittal of the following reports to the Deputy Director until otherwise approved:
 - a. An annual report that summarizes: slope stability monitoring and inspection information; any repairs, replacements, or additional stabilization measures implemented; and any proposed changes to the Slope Stability Monitoring Plan; and
 - b. Monthly reports during the rainy season (October 16 – May 14) that identify any areas that have experienced slope instability, any actions taken to control and improve slope stability, and an assessment of the success of initial and any ongoing slope stability actions implemented.

Upon request, the Licensee shall provide additional information regarding slope stability measures undertaken to address identified slope instability. If monitoring and inspection indicate that the measures identified in the Slope Stability Monitoring Plan are insufficient to protect water quality, the Deputy Director may establish a timeframe and require the Licensee to re-consult on the Slope Stability Monitoring Plan, make changes, and resubmit the Slope Stability Monitoring Plan for Deputy Director approval.

CONDITION 19. RECREATION FACILITIES

No later than six months following issuance of the FERC license surrender order, the Licensee shall submit a Recreation Facilities Plan to the Deputy Director for review and approval. The Recreation Facilities Plan shall be developed in consultation with staff from the State Water Board, North Coast Regional Board, and CDFW. The Licensee shall include comments received from the agencies consulted during the consultation process and identify how the Licensee has addressed the comments. The Deputy Director may require modifications as part of any approval. The Licensee shall file the Deputy Director-approved Recreation Facilities Plan, together with any required modifications, with FERC. The Licensee shall implement the Recreation Facilities Plan upon receipt of Deputy Director and any other required approvals. Any changes to the Recreation Facilities Plan shall be approved by the Deputy Director prior to implementation. At a minimum, the Recreation Facilities Plan shall include:

- (1) The material elements of the Licensee's recreation proposal for the Project, as presented in Section 7.6 of the 2018 Definite Plan, and as updated based on the requirements presented in this condition. If the Licensee proposes to change any elements material to water quality, the Recreation Facilities Plan submittal shall highlight such changes and provide a rationale, including any new information relied on;
- (2) A list of recreation facilities associated with the Project;
- (3) Identification of recreation facilities that will be removed and a schedule for removal;
- (4) Identification of any recreation sites to be added, modified, or maintained following dam removal, including location, the types of facilities to be added, modified, or maintained, and the proposed schedule for completion of new facilities or modifications to existing facilities;
- (5) The Licensee's plans to facilitate transfer of ownership and/or operation of Project recreation facilities;
- (6) Proposed measures to protect water quality and beneficial uses during any construction, removal, maintenance, or other activities associated with the Project recreation facilities;
- (7) Water quality monitoring of Project recreation areas in compliance with this condition;
- (8) Public education signage regarding aquatic invasive species and proper boat cleaning at established public boat access locations or visitor information kiosks in the vicinity;
- (9) Installation, if necessary, and maintenance of boat cleaning stations at Project boat ramps for the removal of aquatic invasive species;
- (10) Signage posted at Project recreation facilities for water quality impairments (e.g., *E. coli* or fecal coliform and microcystin toxin) discovered through sampling under this condition or other efforts. If water quality monitoring indicates the impairments are an ongoing problem, the Licensee shall propose implementation of appropriate measures as part of the annual reporting requirement outlined in this condition; and
- (11) Annual reporting to the Deputy Director on implementation of the Recreation Facilities Plan that includes: the status of any proposed construction, removal, or modifications to Project recreation facilities; water quality monitoring results required per this condition; and any proposed modifications to the Recreation Facilities Plan requested by the Licensee.

Recreation Areas Water Quality Monitoring: The Licensee shall collect and analyze grab water samples as outlined below for protection of the recreational water contact (REC-1) beneficial use as defined in the North Coast Basin Plan. The Licensee may use the water quality results collected under the WQMP

(Condition 1) and other water quality monitoring efforts³⁹ in the Klamath River watershed that comply with Water Quality Monitoring and Adaptive Management (Condition 1) and the provisions of the Deputy Director approved WQMP, as appropriate.

For fecal coliform and *E.coli*:

Timing: Prior to drawdown, samples shall be collected during the 30-day period that spans the Independence Day holiday (June-July) and the Labor Day holiday (August-September). Following completion of drawdown, sampling shall be performed as necessary to monitor for water quality and beneficial use protection, as approved by the Deputy Director in the Recreation Facilities Plan.

Frequency: Project facilities shall be monitored twice every year until each recreation facility is transferred to a new owner or as otherwise approved by the Deputy Director in the Recreation Facilities Plan.

Location: Samples shall be collected at all Project recreation facilities that provide for recreational water contact unless otherwise approved by the Deputy Director in the Recreation Facilities Plan. Samples shall be collected at locations near restrooms, recreation facilities, and other high use areas.

Method: The Licensee shall use the five samples in 30-day methodology or other future protocol identified in the North Coast Basin Plan.

For microcystin toxin:

Prior to drawdown, the Licensee shall annually monitor for microcystin toxin at all Project recreation sites that provide for recreational water contact unless otherwise approved by the Deputy Director in the Recreation Facilities Plan. At a minimum, monitoring shall continue monthly (May through October) for two years following the completion of drawdown unless the recreation site is removed. For newly constructed or modified-existing recreation sites, the Licensee shall monitor microcystin toxins for a minimum of two year beginning with completion of construction or modifications, unless otherwise approved by the Deputy Director in the Recreation Facilities Plan.

The Licensee shall report monitoring results annually. Reporting shall: summarize monitoring results; highlight any exceedances of fecal coliform, *E. coli*, or microcystin toxin and propose adaptive management measures to address exceedances. Based on monitoring results, the Deputy Director may require the Licensee to modify monitoring frequency, methods, duration, or to implement additional adaptive management measures. The Licensee shall

³⁹ Other water quality efforts may include Interim Measure 15 as described in Appendix D of the Klamath Hydroelectric Settlement Agreement, as amended November 30, 2016.

implement changes upon receipt of Deputy Director direction and any other required approvals.

CONDITION 20. LIMITATIONS ON HYDROPOWER OPERATIONS

This water quality certification is for the proposed removal of Project facilities as described in the Licensee's application and shall not be construed as approval of more than incidental, short-term interim operation of the Project hydroelectric facilities until such removal can be implemented.

Not later than 24 months following issuance of the FERC license surrender order, if drawdown and dam removal are not initiated, the Licensee shall submit an Interim Hydropower Operations Plan (Operations Plan) to the Deputy Director for review and approval. The Operations Plan shall describe additional measures the Licensee will implement to protect water quality and fisheries in advance of drawdown and dam removal activities. The Operations Plan shall be developed in consultation with staff from the State Water Board, North Coast Regional Board, CDFW, NMFS, and USFWS. The Licensee shall solicit comments from the agencies listed above, and the Operations Plan shall include comments received during the consultation process and identify how the Licensee has addressed the comments. The Deputy Director may require modifications as part of any approval. The Licensee shall file the Deputy-Director-approved Operations Plan, together with any required plan modifications, with FERC. The Licensee shall implement the Operations Plan upon receipt of Deputy Director and any other required approvals.

Dam removal must be initiated no later than five years following issuance of the FERC license surrender order unless the Licensee can demonstrate to the satisfaction of the Executive Director of the State Water Board that the delay is due to factors outside of the Licensee's control.

CONDITION 21. WATER RIGHTS MODIFICATION

The Licensee shall provide the State Water Board with a description of the Licensee's proposal for the post-dam removal disposition of all water rights associated with Project facilities. Prior to changing any water diversion for implementation of the Project, the Licensee shall consult with State Water Board staff regarding potential modifications to or transfer of state-issued water right permits and licenses that may be required by the Project. The Licensee shall follow the procedures for any such modification, as described in the California Water Code and in California Code of Regulations, title 23. Nothing in this certification shall be construed as State Water Board approval of the validity of any water rights, including pre-1914 or riparian claims. The State Water Board has separate authority under the California Water Code to investigate and take enforcement action, if necessary, to prevent any unauthorized or threatened unauthorized diversion of water.

CONDITION 22. TRIBAL WATER QUALITY STANDARDS

Project implementation and compliance with the conditions in this certification are anticipated to result in improved compliance with downstream water quality standards for the Hoopa Valley Tribe, adopted in the *Water Quality Control Plan, Hoopa Valley Indian Reservation* (Hoopa Valley Tribe 2008)⁴⁰. The Yurok Tribe and Karuk Tribe have applied to the USEPA for treatment-as-a-state status under the Clean Water Act, and it is possible that other tribes may similarly apply for and receive such status.

To ensure that the requirements of this certification ultimately meet tribal Clean Water Act standards, the 32-month report on anticipated compliance under Compliance Schedule (Condition 2) shall be submitted to the Hoopa Valley Tribe and any other Native American tribes that have obtained treatment-as-a-state status. Any comments from such tribes received by the Deputy Director on the report shall be a factor in the Deputy Director's consideration of whether to require implementation of additional management measures.

Additionally, the Licensee shall submit to the Hoopa Valley Tribe, and any other tribe that has subsequently obtained treatment-as-a-state status, any request to end or modify monitoring under Water Quality Monitoring and Adaptive Management (Condition 1) at the location(s) closest to or within that tribe's reservation, along with a summary of that location's monitoring results and associated data, to date. Any comments from such tribes received by the Deputy Director on the report will be a factor in the Deputy Director's consideration of whether to approve the cessation or modification of monitoring at that location(s).

CONDITION 23. CONSULTATION REQUIREMENTS

For any condition that requires consultation with specific agencies, the Licensee may consult with additional parties (including, through "good neighbor" agreements or through consultation commitments under the Klamath Hydroelectric Settlement Agreement). The Licensee is particularly encouraged to consult with local agencies with expertise in siting issues and local conditions, and with tribes that have resources that may be affected by various plans or adaptive management measures. Such consultation is likely to result in plans that are better conceived and more likely to receive approval without the need for additional modification.

ADDITIONAL CONDITIONS (CONDITIONS 24-41)

CONDITION 24. The State Water Board's approval authority includes the authority to withhold approval or to require modification of a proposal or plan prior to approval. The State Water Board may take enforcement action if the Licensee

⁴⁰ See also a February 1, 2017, letter from Robert Franklin, Division Lead, Hoopa Tribal Fisheries – Water Division to Parker Thaler, State Water Board, Division of Water Rights.

fails to provide or implement a required plan in a timely manner. If a time extension is needed to submit a report or plan for Deputy Director approval, the Licensee shall submit a written request for the extension, with justification, to the Deputy Director no later than 60 days prior to the deadline. The Licensee shall file any Deputy-Director-approved time extensions with FERC.

CONDITION 25. The State Water Board reserves the authority to reopen this certification based on evidence that the Project may be contributing to fish passage impediment in the Hydroelectric Reach upstream of the California/Oregon Stateline.

CONDITION 26. The State Water Board reserves the authority to add to or modify the conditions of this certification to incorporate changes in technology, sampling, or methodologies.

CONDITION 27. The State Water Board shall provide notice and an opportunity to be heard in exercising its authority to add to or modify the conditions of this certification.

CONDITION 28. Notwithstanding any more specific conditions in this certification, the Project shall be operated in a manner consistent with all water quality standards and implementation plans adopted or approved pursuant to the Porter-Cologne Water Quality Control Act or section 303 of the Clean Water Act. The Licensee must take all reasonable measures to protect the beneficial uses of the Klamath River watershed.

CONDITION 29. Unless otherwise specified in this certification or at the request of the Deputy Director, data and/or reports shall be submitted electronically in a format accepted by the State Water Board to facilitate the incorporation of this information into public reports and the State Water Board's water quality database systems in compliance with California Water Code section 13167.

CONDITION 30. This certification does not authorize any act which results in the unauthorized taking of a threatened, endangered, or candidate species or any act which is now prohibited, or becomes prohibited in the future, under either the California ESA (Fish & Game Code §§ 2050-2097) or the federal ESA (16 U.S.C. §§ 1531 - 1544). If a "take" will result from any act authorized under this certification or water rights held by the Licensee, the Licensee must obtain applicable authorization for the take prior to any construction or operation of the portion of the Project that may result in a take. The Licensee is responsible for meeting all applicable requirements of the cited laws for the Project authorized under this certification.

CONDITION 31. The Licensee shall submit any change to the Project, including Project operation, implementation, technology changes or upgrades, or methodology, which would have a significant or material effect on the findings, conclusions, or conditions of this certification, to the Deputy Director for prior

review and written approval. The Deputy Director shall determine significance and may require consultation with state and/or federal agencies. If the Deputy Director is not notified of a change to the Project, it will be considered a violation of this certification. If such a change would also require submission to FERC, the change must first be submitted and approved by the Deputy Director.

CONDITION 32. In the event of any violation or threatened violation of the conditions of this certification, the violation or threatened violation is subject to any remedies, penalties, process, or sanctions as provided for under applicable state or federal law. For the purposes of section 401(d) of the Clean Water Act, the applicability of any state law authorizing remedies, penalties, process, or sanctions for the violation or threatened violation constitutes a limitation necessary to ensure compliance with the water quality standards and other pertinent requirements incorporated into this certification.

CONDITION 33. In response to a suspected violation of any condition of this certification, the State Water Board or North Coast Regional Board may require the holder of any federal permit or license subject to this certification to furnish, under penalty of perjury, any technical or monitoring reports the State Water Board deems appropriate, provided that the burden, including costs, of the reports shall bear a reasonable relationship to the need for the reports and the benefits to be obtained from the reports (California Water Code sections 1051, 13165, 13267 and 13383).

CONDITION 34. In response to any violation of the conditions of this certification, the State Water Board may add to or modify the conditions of this certification as appropriate to ensure compliance.

CONDITION 35. This certification shall not be construed as replacement or substitution for any necessary federal, state, and local Project approvals. The Licensee is responsible for compliance with all applicable federal, state, or local laws or ordinances and shall obtain authorization from applicable regulatory agencies prior to the commencement of Project activities.

CONDITION 36. Any requirement in this certification that refers to an agency whose authorities and responsibilities are transferred to or subsumed by another state or federal agency, will apply equally to the successor agency.

CONDITION 37. The Deputy Director and the Executive Officer shall be notified one week prior to the commencement of ground disturbing activities that may adversely affect water quality. Upon request, a construction schedule, and updates thereto, shall be provided to the State Water Board and North Coast Regional Board staff. The Licensee shall provide State Water Board and North Coast Regional Board staffs access to Project sites to document compliance with this certification.

CONDITION 38. This certification is not intended and shall not be construed to apply to any activity involving a hydroelectric facility and requiring a FERC license or an amendment to a FERC license unless the pertinent application for certification was filed pursuant to California Code of Regulations, title 23, section 3855, subdivision (b) and that application for certification specifically identified that a FERC license or amendment to a FERC license for a hydroelectric facility was being sought.

CONDITION 39. This certification is conditioned upon total payment of any fee required in California Code of Regulations, title 23, article 4.

CONDITION 40. This certification is subject to modification or revocation upon administrative or judicial review, including review and amendment pursuant to California Water Code, section 13330, and California Code of Regulations, title 23, division 3, chapter 28, article 6 (commencing with section 3867).

CONDITION 41. A copy of this certification shall be provided to any contractor and all subcontractors conducting Project-related work, and copies shall remain in their possession at the Project site(s). The Licensee shall be responsible for work conducted by its contractor, subcontractors, or other persons conducting Project-related work.

ORIGINALLY SIGNED BY ERIN RAGAZZI for
Eileen Sobeck
Executive Director

April 7, 2020
Date

ATTACHMENTS

ATTACHMENT 1: FIGURES

- Figure 1: Lower Klamath Project Location
- Figure 2: Lower Klamath Project Boundary
- Figure 3: J.C. Boyle Development Disposal Site
- Figure 4: Copco No. 1 and Copco No. 2 Development Disposal Site
- Figure 5: Iron Gate Development Disposal Site 1 of 2
- Figure 6: Iron Gate Development Disposal Site 2 of 2

ATTACHMENT 2: PROJECT SCHEDULE

ATTACHMENT 3: MITIGATION, MONITORING, OR REPORTING PROGRAM

ATTACHMENT 4: CEQA FINDINGS AND STATEMENTS OF OVERRIDING CONSIDERATIONS

ATTACHMENT 5: REFERENCES