CEQA Exemption Supplemental Information
Jeff L. Taylor Powerhouse Unit 4 Project

Kings River Conservation District
April 2022

1 Introduction

The Kings River Conservation District (KRCD), licensee of the Jeff L. Taylor - Pine Flat Hydroelectric Project No. 2741 (Hydroelectric Project), submitted to the Federal Energy Regulatory Commission (FERC or Commission) an application for a non-capacity amendment of the existing license. The application for amendment proposes an addition of a new turbine-generating unit (Unit 4) to the Jeff L. Taylor Powerhouse (Proposed Project).

2 Project Location

The Proposed Project is located in the City of Sanger, Fresno County, California, 30 miles east of the City of Fresno, on the north bank of the Kings River at approximately river mile 111,[1] 200 feet downstream of United States Department of Defense, Army Corps of Engineers' Pine Flat Dam. Figure 1 shows the Proposed Project's location in context to the region.

Figure 1. Proposed Project Location

[1] The Kings River diverges into multiple branches in in the San Joaquin Valley, with some water flowing south to the old Tulare Lake bed and the rest flowing north to the San Joaquin River. The river mile is calculated from the portion of the Kings River that confluences with the San Joaquin River upstream to Pine Flat Dam.

3 Description of Proposed Activities

The Proposed Project includes the addition of a fourth generating unit (Unit 4) to the Jeff L. Taylor Powerhouse. The new unit will increase the generating capacity of the Project by approximately 6.3 megawatts (MW) from 165 MW to 171.3 MW, an increase in name-plate generation capacity of 3.8 percent. The new unit will not increase the maximum 8,000 cubic feet per second (cfs) hydraulic capacity of the Hydroelectric Project.

The new unit would include: 1) a 66-inch-diameter extension that would divert flow from the existing Bypass System's Units 1 and 2, 66-inch-diameter pipe; 2) an outdoor Unit 4 Powerhouse that would contain a 6.3 MW Francis turbine and associated generator; 3) a generator lead and a step-up transformer consisting of one 6.6 megavolt ampere, three-phase unit at the new powerhouse; and 4) appurtenant equipment. The new unit would discharge at a maximum rate of 375 cfs into the Kings River via a draft tube outlet pipe penetrating the existing spray wall above the Kings River surface elevation (i.e., an aerial discharge). The total outfall for all units would remain the same, as this discharge is a diversion of flow from Units 1 and 2. Unit 4 would connect to the existing switchyard and would operate in coordination with operations of Units 1, 2 and 3 and the existing Bypass System to provide the required water discharge below Pine Flat Dam that is currently released through the Bypass System. Figure 2 shows KRCD's proposed Unit 4.

The anticipated total duration of construction, and commissioning is approximately 12 months, commencing after FERC amends KRCD's license to include the fourth unit, and detailed design, approval of detailed construction plans, acquisition of any additional required permits or approvals, and purchase of equipment are complete. The initial work to install the penstock for Unit 4 into the existing Bypass System will occur during a scheduled annual outage of Units 1 and 2 – a separate outage will not be needed. Unit 4 construction will not affect the Bypass System for Unit 3 and it will continue to operate to meet flow requirements and other downstream water requirements. There will not be any interruption to water flows below Pine Flat Dam because of construction.

Key construction activities would include the following:

- site preparation to excavate and install the turbine generator foundation;
- modification of existing Bypass System for Units 1 and 2 to add penstock extension piping and new gate valves for the addition of Unit 4;
- installation of the discharge piping through the spray wall and installation of seals;
- installation of the water-to-wire equipment package including the turbine generator unit, turbine shutoff valve, hydraulic power unit (HPU), generator breaker and main lead termination box, electrical distribution panels, and other miscellaneous equipment and structures associated with the water-to-wire package;
- excavation and installation of the generator step-up (GSU) foundation and transformer;
- trenching and installation of wiring from the Unit 4 generator to the GSU;
- relocation of the backup diesel generator and fuel tank;
- installation of the control cabinets in the existing control room;
- installation of conduits and wiring for control and instrumentation;

- start-up and commissioning of Unit 4; and
- site clean-up.

Figure 2. KRCD's Proposed New Unit 4

All work would occur within the FERC Project Boundary adjacent to the existing Jeff L. Taylor Powerhouse in areas previously disturbed for initial construction of the Hydroelectric Project and the Bypass System. No work would be required in the streambed because Unit 4 would discharge into the air above the surface of the Kings River.

The construction labor force is estimated to average about 25 persons over the total construction period. Equipment would be transported to the Jeff L. Taylor Powerhouse via State Highway 180 East from Fresno to N. Piedra Road and then to a secure entry gate to Pine Flat Dam and the Jeff L. Taylor Powerhouse. All access roads are anticipated to be suitable for the anticipated loads. No additional access roads would be required for the addition of Unit 4. It is anticipated that not more than 20 trailer ("low boy") truck roundtrips would be required to transport the turbine generator equipment, GSU and Unit 4 Powerhouse prefabricated building, piping and valves, and other heavy materials and equipment. Approximately 17 truckloads of ready-mixed concrete may be needed for equipment pads, foundations, and curbs. No changes in road conditions are anticipated as a result of the work.

At the site, typical heavy construction equipment that would be needed includes an excavator (backhoe), an air compressor, one or two dump and flatbed trucks for material and equipment

handling, two truck-mounted cranes, pickup trucks, a construction office trailer, and miscellaneous equipment. Smaller equipment would include hoists and platforms, concrete placing and drilling equipment, welding machines, pipe fitting equipment, light plant, and other miscellaneous equipment customary to the electrical, mechanical, and structural crafts.

No borrow areas are required because the work does not entail significant earthwork or placement of fill It is expected that the available space within the fenced plant area will be sufficient for laydown and staging of materials and equipment. All work would be confined to the Jeff L. Taylor Powerhouse and powerhouse yard. No undisturbed areas would be disturbed as a result of the work.

The addition of Unit 4 would have no effect on existing operations and maintenance of the Jeff L. Taylor - Pine Flat Hydroelectric Project with the exception that some water that previously passed through the Bypass System would pass thought Unit 4. KRCD would continue to adhere to the terms and conditions in the Project's FERC license and all related permits, approvals, and agreements.

4 CEQA Exemption Determination

Approval of the Proposed Project is a discretionary action pursuant to CEQA (Pub. Resources Code Section 21000 et seq.). KRCD has determined that the Proposed Project is exempt from CEQA, pursuant to the CEQA Guidelines, Section 15061(b)(3) General Rule Exemption or Common Sense Exemption. The General Rule Exemption or Common Sense Exemption applies to an activity "where is can be seen with certainty that there is no possibility that the activity in question may have a significant effect on the environment, the activity is not subject to CEQA" [CEQA Guidelines Section 15061(b)(3).

The Proposed Project would not be within, or in the vicinity of, an officially designated scenic vista or highway. The Project area is remote and is not visible to the public. The existing visual character of the Proposed Project site and its surroundings includes previously disturbed areas due to the construction of Pine Flat Dam and the Hydroelectric Project. No new sources of light or glare are included with the Proposed Project. Therefore, there would be no impacts related to aesthetics.

The Proposed Project area is identified as "Urban and Built-up Land" on the California Department of Conservation's Important Farmland Finder. No lands enrolled in a Williamson Act contract are located within the FERC Project boundary. No lands zoned as forest land or timberland are located within the Proposed Project area. There are no forest resources within or in the vicinity of the Proposed Project. Therefore, there would be no impacts to agriculture resources.

During construction, the Proposed Project would generate minor air and greenhouse gas (GHG) emissions from the use of heavy construction equipment and construction worker vehicles. However, these emissions would be temporary and would cease once construction is complete. The Proposed Project is not expected to generate air and GHG emissions during operations. Therefore, the impact on air quality and GHG emissions would have no possibility of a significant effect on the environment.

The Proposed Project would have no significant impact on water flow. During construction, KRCD would meet all flow requirements and continue to provide water for downstream consumptive uses as directed. Construction would have no effect on water flow requirements. No work would occur in the Kings River or Pine Flat Lake. Operation of the proposed Unit 4 would have no effect on water flow. No change would occur in the magnitude or timing of flow releases. The only difference would

be that some water that previously passed through the Bypass System would now pass though Unit 4.

Special-status aquatic species may occur downstream of Pine Flat Dam. However, the Proposed Project does not include any work in the Pine Flat Lake or the Kings River streambed. No special-status plant species have the potential to occur in the Proposed Project area. In addition, no critical habitat or sensitive environmental areas occur within or adjacent to the FERC Project Boundary. Potential habitat for special-status wildlife species such as San Joaquin kit fox (*Vulpes macrotis mutica*) occurs within the FERC Project Boundary, but none within the Proposed Project area.

Nesting birds (such as golden eagle [*Aquila chrysaetos*], bald eagle [*Haliaeetus leucocephalus*], white-tailed kite [*Elanus leucurus*], and Swainson's hawk [*Buteo swainsoni*]) and roosting bats (Townsend's big-eared bat [*Corynorhinus townsendii*], spotted bat [*Euderma maculatum*], and western mastiff bat [*Eumops perotis*]) have the potential to occur in the Proposed Project area. KRCD will follow best management practices that would prevent impacts on nesting birds and roosting bats. These practices include the following and are required during Proposed Project implementation:

1. Construction is not scheduled to begin within nesting bird season. However, if construction would be required to begin during the nesting bird season, KRCD will conduct nesting bird surveys in the work area no more than 2 weeks prior to construction. If any nests are located during pre-construction surveys, a qualified biologist will determine an appropriate buffer for the specific species around nests to prevent disturbance of nesting birds during construction and will monitor the nest for signs of disturbance during construction.
2. Bats are not known to be present in the area where construction would occur, and construction will not begin during the maternity or winter roosting season for bats. Roosting bats will be surveyed for at the same time as nesting birds and buffers established if any are located. Therefore, there would be no impacts to biological resources.

An archeological and historic built environment study was conducted within the FERC Project Boundary between May 2019 and January 2020. The study did not identify any tribal resources or archaeological sites (prehistoric or historic) within or adjacent to FERC Project Boundary. According to the study, the powerhouse does not meet the eligibility criteria for listing in the California Register of Historical Resources and National Register of Historic Places and, thus, is not considered a historical resource for the purposes of CEQA. Therefore, there would be no impact on cultural and tribal cultural resources.

The Proposed Project is an energy recovery (run-of-river) facility that generates electricity from water releases from Pine Flat Lake and would not result in wasteful, inefficient, or unnecessary consumption of energy resources. Therefore, there would be no impact on energy resources.

There are no known faults in the FERC Project Boundary or within a 5-mile radius of the Proposed Project. The Proposed Project area is not located within a fault zone, liquefaction zone, or landslide zone. Most of the area within the FERC Project Boundary has a low potential for erosion due to flat topography. KRCD would obtain and adhere to all necessary permits and approvals, including a Stormwater Pollution Prevention Plan, that would control surface erosion. Expansive soils are not located within the Proposed Project area. There is no possibility of encountering paleontological resources during construction because the Proposed Project would be located within previously disturbed areas. Therefore, there would be no impact on geology, soils, and paleontological resources.

The Proposed Project is not located on a site that is included on a list of hazardous materials sites compiled pursuant to Government Code Section 65962.5. In the unlikely event that any hazardous wastes are discovered during Proposed Project construction, such wastes would be handled and disposed of pursuant to applicable regulatory requirements. Implementation of KRCD's standard best management practices would prevent leakage of hazardous materials into water bodies by ensuring that all construction vehicles and equipment are in good working order (i.e., no leaks); placing drip pans or absorbent materials under vehicles and equipment when not in use; ensuring that all construction areas have proper spill clean-up materials (e.g., absorbent pads, sealed containers and booms). The Proposed Project would not result in safety-related hazards from being in the vicinity of a school or an airport. No road closures are anticipated that could interfere with an emergency response plan. Therefore, there would be no possibility of significant effects related to hazards and hazardous materials.

KRCD will prevent leakage/spillage of hazardous materials into water bodies. If maintenance or refueling of vehicles or equipment must occur on-site, KRCD will use a designated area and/or a secondary containment, located away from drainage courses, to prevent the runoff of storm water and the runoff of spills. All areas would be stabilized, including establishing any necessary drainage. KRCD would obtain and adhere to all necessary permits and approvals, including a Stormwater Pollution Prevention Plan, that would control surface erosion. Therefore, there would be no impact on hydrology.

The Proposed Project would have no effect on water quality. During construction, the efficacy of the Bypass System to provide cool, well-oxygenated water when needed would not be affected. As required by the FERC license, KRCD would continue to comply with and monitor flow and dissolved oxygen (DO) concentrations. Operation of the proposed Unit 4 would have no effect on water quality. No change would occur in water temperature or DO concentrations. Unit 4 would draw water off the Bypass System, so the cool water supplied by the Bypass System would also be discharged by Unit 4. Like the Bypass System that discharges well-oxygenated water due to an aerial discharge, Unit 4 would also have an aerial discharge that would assure the Unit 4 discharge is well-oxygenated.

The Proposed Project would not physically divide established communities, and moreover, there are no established communities or residential areas in or within the immediate vicinity of the Proposed Project area. The area within the FERC Project Boundary is zoned as agricultural (AE160) and resource conservation (RC40). The Proposed Project would be consistent with the zoning designation. Therefore, there would be no impact on land use and planning.

The Proposed Project area is not located within a Mineral Resource Zone, as mapped by the State of California. The Proposed Project is not within a principal mineral producing location in Fresno County. Therefore, there would be no impact on mineral resources.

During construction, the Proposed Project would result in a temporary increase in noise and groundborne vibration levels from the use of heavy construction equipment. However, there are no residential communities within the FERC Project boundary that could be affected by this increase. The Proposed Project is not expected to generate noise and groundborne vibration during operations. Therefore, the impact on the environment from noise would not be significant.

The Proposed Project will not induce population growth in the area or displace existing people or housing. Therefore, there would be no impact on population and housing.

The Proposed Project would not result in an increased population in the area. The Proposed Project would not result in increased demands on public services such as fire protection, police protection,

schools, or parks. No changes to any public facilities are proposed as part of this project. Therefore, there would be no impact on public services.

The area near the Jeff L. Taylor Pine Flat Hydroelectric Project is closed to public access, including fishing. No work is proposed to occur at the Hydroelectric Project's downstream Fishing Access area. Therefore, there would be no impact on recreational resources.

Local roads are fully adequate to accommodate the labor force and construction vehicles, and no additional access roads would be required during construction. No road closures are anticipated during construction. No changes in transportation patterns or road conditions are anticipated during construction and operation. Therefore, there would be no impact on transportation.

The Proposed Project would not require relocation or construction of new or expanded water, wastewater treatment, storm water drainage, electric power, natural gas, or telecommunications facilities. All waste material, including soils (if any), would be disposed of offsite in appropriate disposal areas and in accordance with statutes and regulations related to solid waste. Therefore, there would be no impact on utilities and service systems.

The area surrounding the Pine Flat Lake is within a high fire hazard severity zone as identified by the California Department of Forestry and Fire Protection. However, the Proposed Project itself is not located within a fire hazard severity zone. The Proposed Project does not include any features that could exacerbate fire risks in the surrounding area. Fire suppression equipment, including fire extinguishers would be kept on site during construction and operation in accordance with local fire codes and standards. Therefore, there would be no impact on wildfire.

For all the reasons stated above, the Proposed Project is exempt from CEQA.

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Attachment A. Initial Information Package

Jeff L. Taylor - Pine Flat Hydroelectric Project FERC Project No. 2741

Initial Information Package for Application for a Non-Capacity Amendment of License

Security Level: Public

Prepared by:
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September 2021

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List of Attachments

No.	Description

None.

List of Appendices

No.	Description
1	Draft Application for a Non-Capacity Amendment of License Dated May 25, 2021
2	Preliminary Detailed Design Drawing for Unit 4
3	Pertinent Hydrology Data
4	Pertinent Water Temperature, Dissolved Oxygen Concentration and Total Dissolved Gas Percent Saturation Data
5	Results of KRCD's Query of USFWS's Information for Planning and Consultation (Ipac) Website on August 10, 2021

Section 1.0
INTRODUCTION

In conformance with the regulations stated in Title 18 Code of Federal Regulations (C.F.R.) Section (§) 4.38(b)(1) and (2) and in support of the Kings River Conservation District (KRCD, Licensee or Applicant) Non-Capacity License Amendment Application (Application for Amendment) for the Jeff L. Taylor - Pine Flat Hydroelectric Project, Federal Energy Regulatory Commission (FERC or Commission) Project Number (No.) 2741 (Project), KRCD makes this Initial Information Package (IIP) available to agencies, Native American tribes and members of the public. KRCD proposes to amend its existing FERC license to add a new turbine-generating unit (Unit 4) to the Project. This constitutes a non-capacity amendment to the existing license, as defined in 18 C.F.R. Section 4.201(b). Addition of the new unit would increase the installed name-plate capacity of the Project, which has not been previously authorized by the Commission. The increase would be greater than 2 megawatts (MW) but would not increase the Project's maximum hydraulic capacity. KRCD does not intent to seek benefits under Section 201 of the Public Utility Regulatory Policies Act (Pub. L. 95–617, 92 Stat. 3117) for the new unit.

In early May 2021, KRCD contacted agencies and Native American tribes to advise them that KRCD intended to distribute a draft Application for Amendment and request that the agencies and tribes waive the requirements for FERC's three-stage consultation process, as described in 18 C.F.R. Section 4.38(b) and (c), and provide to KRCD comments on the draft Application for Amendment. On May 25, 2021, KRCD distributed the draft Application for Amendment to the agencies and tribes. In reply e-mails, the United States Department of Defense, Army Corps of Engineers' (USACE) agreed to waive the three-stage consultation process and stated it had no comments on the draft Application for Amendment; the United States Department of the Interior, Fish and Wildlife Service (USFWS) stated it deferred to the California Department of Fish and Wildlife (CDFW); CDFW stated that it did not agree to waive the three-stage consultation process; and the State Water Resources Control Board (Water Board) declined to comment until CDFW's issues were addressed. The United States Department of the Interior, National Park Service (NPS), the United States Department of Commerce, National Oceanic and Atmospheric Administration, National Marine Fisheries Service (NMFS) and the United States Environmental Protection Agency (USEPA) did not reply to KRCD's request for comments.

Based on these responses, KRCD is proceeding with the three-stage consultation process, which commences with the distribution of this IIP. KRCD will contact interested agencies and Native American tribes to offer a site visit and arrange a virtual joint meeting with interested agencies, tribes, and members of the public to explain KRCD's proposed Unit 4 and its potential environmental impacts, to review the information provided in this IIP, and to discuss any addition data that may be needed. The joint meeting will be recorded and held no early than 30 days and no later than 60 days after this IIP is distributed. At least 15 days in advance of the joint meeting, KRCD will place a notice of the meeting in the Fresno Bee, the news periodical serving the county in which the Project is located, and file with the Commission, copying agencies and Native American tribes, a notice of the joint meeting, including a meeting agenda. No later than 60 days

after the joint meeting, agencies, Native American tribes, and members of the public may provide written comments, consistent with the requirements at 18 C.F.R Section 4.38(b)(5) to:

David M. Merritt, General Manager
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In order to streamline as much as possible the pre-filing consultation process for this non-capacity related license amendment with no significant environmental impacts, KRCD is attaching (Appendix 1) for agency, Native American tribe and public review the Draft Application for Amendment that it previously circulated to agencies and Native American tribes for comment. Reviewing the IIP and the Draft Application for Amendment concurrently will save several months off the pre-filing process and will not prejudice any party. Since KRCD previously circulated the Draft Application for Amendment, this is the second opportunity agencies and Native American tribes will have had to review and comment on it. Further, KRCD does not expect to conduct additional studies in connection with its proposed amendment and has detailed in this IIP its planned measures to protect environmental resources during construction and operation of the new facilities. Accordingly, there is no need to hold the Draft Application for Amendment until several months from now and extend the pre-filing process for an additional 90 days. Per FERC's regulations at 18 CFR § 4.38(c)(5), agencies, Native American tribes and the public will have 90 days from now to comment on the Draft Application for Amendment. At that time, KRCD plans to file its final amendment application.

This IIP contains three sections. Section 1 describes the Project location, existing Project facilities and operations, and KRCD's proposed Unit 4 facilities and operations and resource protection measures. Section 2 provides a general description of the locale at the Project, a description of environmental and recreational resources potentially affected by construction and operations of KRCD's proposed Unit 4, and KRCD's assessment of potential environmental impacts related to the construction and operations of the proposed Unit 4. Section 3 includes full citations for all references cited in this IIP. Appendices to this IIP include KRCD's May 25, 2021, Draft Application for a Non-Capacity Amendment of License (Appendix 1), preliminary detailed design drawing for Unit 4 (Appendix 2), pertinent hydrology data (Appendix 3), pertinent water temperature, dissolved oxygen (DO) concentration and total dissolved gas (TDG) percent saturation data (Appendix 4) and results of KRCD's August 10, 2021, query of USFWS's Information for Planning and Consultation (Ipac) website.

1.1 Project Location

The Project is located in the City of Sanger, Fresno County, California, 30 miles east of the City of Fresno, on the north bank of the Kings River at approximately river mile 111,[1] 200 feet (ft)

[1] The Kings River diverges into multiple branches in in the San Joaquin Valley, with some water flowing south to the old Tulare Lake bed and the rest flowing north to the San Joaquin River. The river mile is calculated from the portion of the Kings River that confluences with the San Joaquin River to Pine Flat Dam.

downstream of USACE's Pine Flat Dam. Figure 1 shows the Project location in context to the region.

Figure 1-1. Location of the Jeff L. Taylor - Pine Flat Hydroelectric Project.

The 11.87-acre FERC Project Boundary includes 4.94 acres of federal lands administered by the USACE, 4.55 acres of State of California lands submerged by the Kings River, and 2.38 acres of Fresno County lands. Refer to Exhibit K-1 in Appendix 1 to this IIP for a map showing the FERC Project Boundary. Table 1-1 identifies by Public Land Survey System federal and non-federal land sections within the FERC Project Boundary.

Table 1-1. Township, Range and Section for federal and non-federal lands enclosed within the Jeff L. Taylor - Pine Flat Hydroelectric Project FERC Project Boundary.

Lands	Township	Range	Section	Acres
Federal Lands (USACE)	13S	24E	2	4.94
Non-Federal Lands	13S	24E	3	6.83
			Total	**11.87**

SOURCE: The National Map (USGS).

The area between Pine Flat Dam and USACE's Pine Flat Road Bridge is closed to public access by a USACE order and closed to public fishing by a California Fish and Game Commission regulation.

The lands within the FERC Project Boundary are zoned by Fresno County as AE160 (exclusive agricultural) and RC40 (resource conservation).[2]

The Project is accessed from the City of Fresno, California, by following California State Highway 180 east for approximately 18 miles to North Piedra Road, and then following North Piedra Road for approximately 12 miles to the gated entrance to the Jeff L. Taylor Powerhouse.

1.2 Description of Existing Project

The Project is an energy recovery (run-of-river) facility that generates electricity from water releases from Pine Flat Lake by USACE during mandatory flood control operations and as requested by the Kings River Water Association (KRWA)[3] through its Water Master for irrigation demand, except when releases are less than approximately 500 cubic feet per second (cfs), which is below the flow level needed to generate electricity with the existing units in the Jeff L. Taylor Powerhouse. On February 22, 1979, the Water Board issued to KRCD a Clean Water Act (CWA) Section 401 Water Quality Certificate (Certificate No. 78-11) for the Project, and on September 29, 1979, the Commission issued to KRCD the original license for the Project. The license expires on August 31, 2029.

Existing Project facilities include: 1) six fixed-wheel emergency gates (two per intake), each approximately 9 ft wide by 15 ft high located on USACE's intake and associated gate hoists controlled by equipment in USACE's hoist room located near the top of Pine Flat Dam; 2) three penstock extensions, one each from the three USACE 13.5-ft-diameter underground penstocks that were installed by the USACE in the Pine Flat Dam when it was constructed in 1954; 3) the outdoor Jeff L. Taylor Powerhouse, which contains three Francis turbines and associated generating units each with an installed name-plate capacity of 55 MW and each with air injection systems; 4) three generator leads and a step-up transformer bank at the powerhouse, consisting of three 70 megavolt amperes (MVA) single-phase units; 5) the North Riverside Access Park that contains an approximately 1,050-foot-long access road from North Piedra Road, a 0.5-acre parking area for 11 vehicles, five day use sites each with a picnic tables and a barbecue grill, a two-stall American with Disabilities Act (ADA)-compliant restroom, two interpretive kiosks, and visitor feedback stations. A non-Project 1.5-mile-long multi-purpose trail, of which 0.5 mile is ADA compliant, originates in the park and provides access to the Kings River; and 6) appurtenant equipment. The maximum hydraulic capacity of the existing Project is 8,000 cfs. Figure 1-2 shows the existing Project.

[2] County of Fresno GIS Portal.

[3] The KRWA was formed in 1927 and currently includes the following 28 members, which severally hold all water rights and storage rights within the Pine Flat Lake: Alta Irrigation District, Burrel Ditch Company, Clark's Fork Reclamation District #2069, Consolidated Irrigation District, Corcoran Irrigation Company, Crescent Canal Company, Empire West Side Irrigation District, Fresno Irrigation District, James Irrigation District, John Heinlen Mutual Water Company, KRCD, Laguna Irrigation District, Last Chance Water Ditch Company, Lemoore Canal & Irrigation Company, Liberty Canal Company, Liberty Mill Race Company, Lovelace Water Corporation, Peoples Ditch Company, Reed Ditch Company, Riverdale Irrigation District, Southeast Lake Water Company, Stinson Canal & Irrigation Company, Stratford Irrigation District, Tranquility Irrigation District, Tulare Lake Basin Water Storage District, Tulare Lake Canal Company, Tulare Lake Reclamation District #761, and Upper San Jose Water Company.

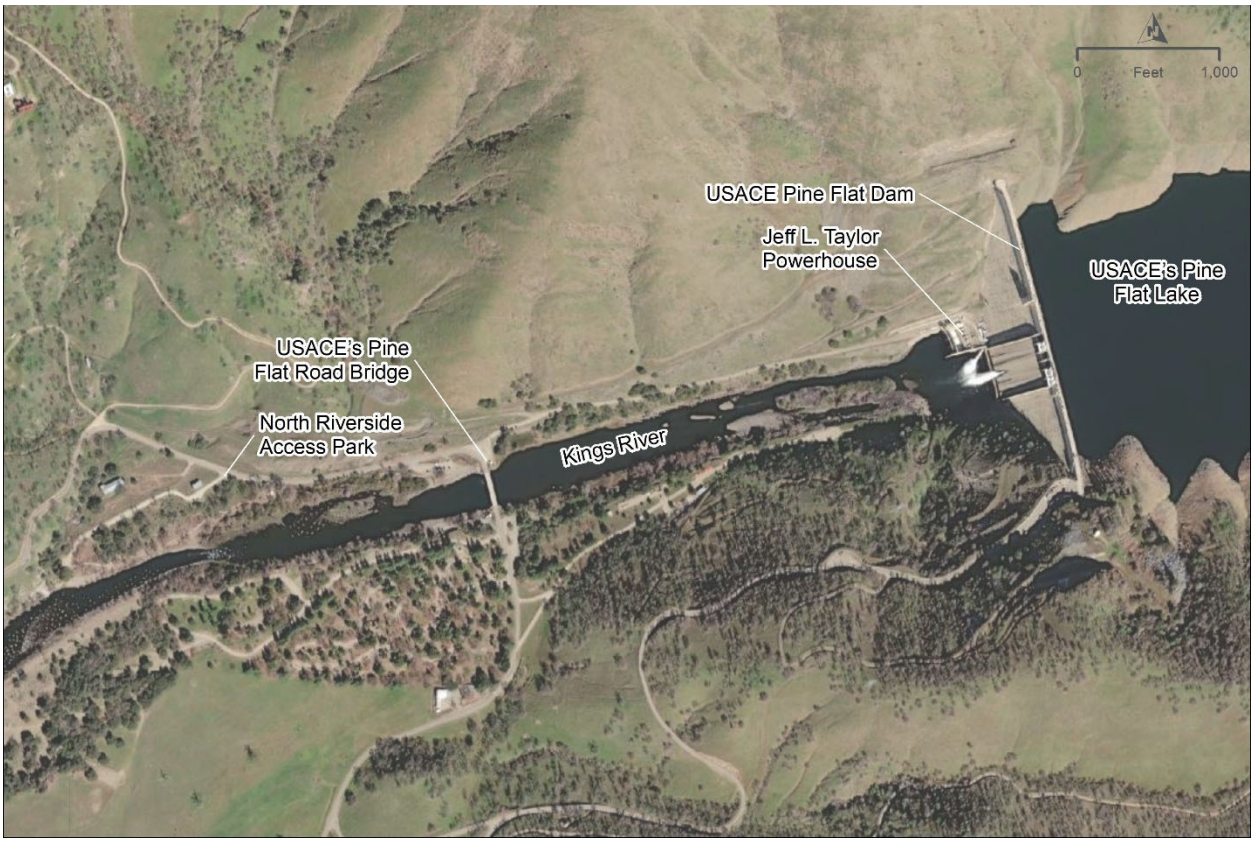


Figure 1-2. Map of Jeff L. Taylor - Pine Flat Hydroelectric Project facilities in relation to the Kings River and USACE's Pine Flat Dam and Pine Flat Road Bridge.

The existing Project does not include any dams, impoundments, transmission lines, or open water conduits. Pine Flat Dam and Lake were constructed by the USACE in 1954 to provide local and regional flood protection. Project power is provided from the Pine Flat Switchyard to the grid via California Department of Water Resources' (DWR) existing Pine Flat Transmission Line, FERC Project No. 2876, which interconnects with Pacific Gas and Electric Company's 230-kilovolt (kV) Balch #2-McCall Transmission Line. The only Project water conduits are the three penstock extensions described above.

Of note, USACE, through a Cooperative Agreement with KRCD as the local cost share provider (KRCD contributed 25% of the overall cost), constructed a Bypass System to improve water temperature downstream of Pine Flat Dam. Prior to the Bypass System, water released by the USACE that did not pass through the powerhouse was withdrawn from Pine Flat Lake via the Pine Flat Intake at an invert elevation of 740.0 ft, and water released by the Jeff L. Taylor Powerhouse was withdrawn from Pine Flat Lake via the intake's penstock at an invert elevation of 654.5 ft. The Bypass System withdraws water from Pine Flat Lake through the intake gate at an invert elevation of 654.5 ft and discharges the water into the air above the Kings River through Monovar[4]

[4] A Monovar valve consists of a fixed and sliding plate with a pattern of orifices in each plate. As the sliding plate is adjusted the orifices line up controlling flow through the valve. When the valve is fully open, the orifices in the fixed and siding plate are fully aligned to allow full flow through the valve.

energy dissipation valves. As a result, releases from the Bypass System are colder since they withdraw water from deeper in Pine Flat Lake. Figure 1-3 shows the Pine Flat intake, gates, and release points.

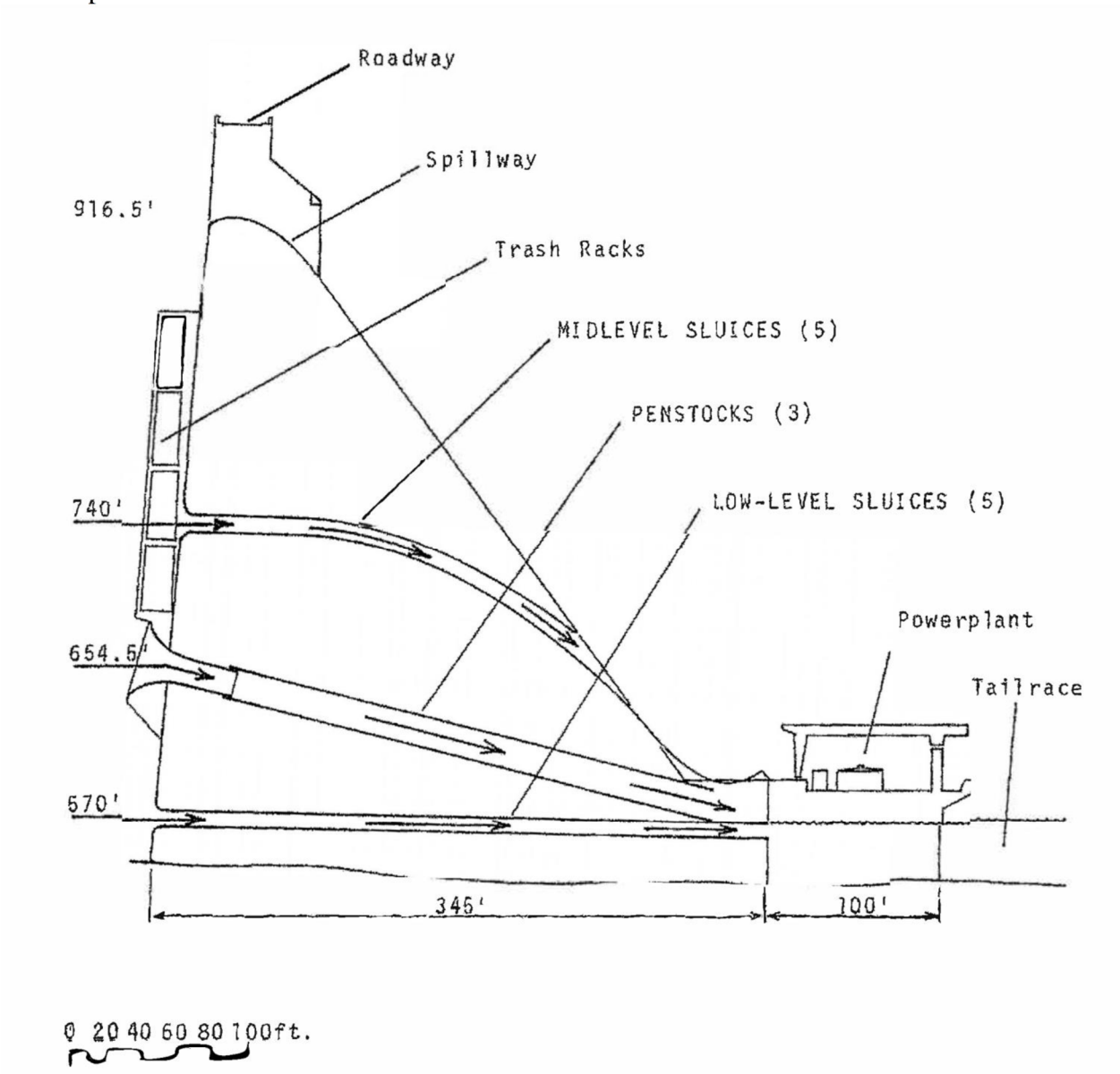


Figure 1-3. USACE's Pine Flat Intake, gates, and release points.
SOURCE: Adapted from Figure II-1 in Exhibit S of the Project's FERC license.

USACE was authorized to make the improvements by Section 1135 of the Water Resource Development Act of 1986, Public Law (PL) 99-662, and the Bypass System commenced operations in 2003. The non-Project Bypass System facilities consist of a 48-inch-diameter bypass line with a maximum capacity of 900 cfs from each of the three Project penstock extensions. The 48-inch-diamter pipes from Units No.1 and No. 2 penstock extensions combine into a single 66-inch-diameter line that discharges up to 600 cfs through a 66-inch Monovar valve into the air above

the Kings River. The bypass line from the Unit No.3 penstock extension discharges up to 300 cfs through a 48-inch Monovar valve into the air above the Kings River. Responsibility for the Bypass System operations, repair, and maintenance is delegated to KRCD under the Cooperative Agreement with the USACE. The Bypass System, existing Project facilities and KRCD's proposed Unit 4 are shown in Figure 1-4.

Figure 1-4. KRCD's proposed new Unit 4 at the Jeff L. Taylor Powerhouse. In this aerial image, USACE is releasing water from Pine Flat Lake into the Kings River through USACE's Bypass System and USACE's Pine Flat Dam sluice.

The Jeff L. Taylor Powerhouse has generated a Calendar Year (CY) annual average of 488,122,670 kilowatt-hours (kW-hrs) per year from CY 2016 through CY 2020. The Project predominately operates from April through September, with earlier or later operations depending on USACE and KRWA releases from Pine Flat Lake (Table 1-2).

Table 1-2. Monthly and annual gross generation in kilowatt-hours (kW-hrs) for the Jeff L. Taylor Powerhouse from Calendar Year (CY) 2016 through CY 2020.

Month	Monthly Generation (Gross kW-hrs)					Average Monthly Generation (kW-hrs)
	CY 2016	CY 2017	CY 2018	CY 2019	CY 2020	
January	0	7,058,500	0	0	0	1,411,700
February	0	70,989,200	0	0	0	14,197,840
March	46,000	121,382,200	0	72,020,000	0	38,689,640
April	9,221,700	102,292,700	20,966,400	60,300,000	1,721,770	38,900,514
May	39,833,400	118,027,700	78,703,100	119,800,000	39,071,150	79,087,070
June	84,856,600	138,093,100	110,497,300	135,930,000	86,902,680	111,255,936
July	79,655,800	142,040,100	92,281,000	144,610,000	90,318,720	109,781,124
August	20,298,200	103,612,100	29,472,400	106,320,000	23,981,540	56,736,848
September	4,469,400	55,833,300	8,162,300	44,820,000	735,790	22,804,158
October	0	34,853,800	0	35,920,000	0	14,154,760
November	0	5,275,400	0	240,000	0	1,103,080
December	0	0	0	0	0	0
Total Annual	238,381,100	899,458,100	340,082,500	719,960,000	242,731,650	--
Total Days in Operation	**176 days**	**304 days**	**170 days**	**238 days**	**131 days**	--
Average Annual	--					**488,122,670**

SOURCE: KRCD's annual generation reports filed with the Commission each year, which are available on FERC's Elibrary.

KRCD estimates that, on average, less than 1 kilowatt (kW) of Project power is used on-site to serve the Jeff L. Taylor Powerhouse.

The dependable capacity of a generating facility is defined as "*the generating capacity that the plant can deliver under the most adverse water supply conditions to meet the needs of an electric power system with a given maximum demand*." (Elliott et al. 1997). One of the critical parameters for defining dependable capacity is the period over which the capacity must be provided. Since Project generation is entirely dependent on USACE and KRWA releases of water from Pine Flat Lake (i.e., KRCD has no ability to require flow releases), the Project has no dependable capacity.

The Project's FERC license includes 45 articles. Of these, KRCD considers Articles 14, 28, 39, 44 and 45 "expired" or "out-of-date" because the article pertains to an activity that has been completed or is no longer pertinent. As a result, the existing license contains 40 articles that KRCD considers "active." The general subject that each of the 40 active articles addresses is listed in Table 1-3. In addition, the Project's FERC license includes Exhibits J (Location Map), K, (Site Plan), L (Design Drawings), M (General Specifications of Equipment), R (Recreation), and S (fish and wildlife measures). The Project also has an associated Emergency Action Plan.

Table 1-3. List of articles in the FERC license for the Jeff L. Taylor - Pine Flat Hydroelectric Project that KRCD considers "active."

Article	Subject	Article	Subject
1	Compliance with license	22	Fire control and suppression
2	No substantial changes without approval	23	Use of water for fire suppression
3	Conformity of construction with exhibits	24	Liability for destruction of U.S. property
4	FERC inspections and supervision	25	Construction of facilities by U.S.
5	Acquire title in fee or land use for project	26	Approvals for construction of facilities
6	Takeover by U.S.	27	Interference with U.S. communication lines / facilities
7	FERC determines cost of project	29	Disposal of mineral and vegetative material
8	Install and monitor stream gages	30	Operate project in good faith
9	Install additional capacity or other changes	31	Use or occupancy cease at end of license period
10	Coordination with other projects	32	License will not impair Federal Power Act

Table 1-3. (continued)

Article	Subject	Article	Subject
11	Headwater or other project benefits	33	Recreation Plan (Exhibit R)
12	Release of waters	34	Maintain dissolved oxygen concentrations at 7.0 mg/L or more when operating
13	Reasonable use of reservoir or lands	35	Maintain minimum flow of 25 cfs or more when operating
15	Protective devices for fish and wildlife	36	Install and maintain public safety devices
16	Free use to U.S. for fish and wildlife	37	Obtain USACE's approval prior to construction
17	Recreation facilities	38	No claim against U.S. related to Pine Flat Lake pool level
18	Public access to project waters	40	Payment to U.S.
19	Prevent soil erosion	41	Reimburse U.S related to Pine Flat Dam
20	Keep clear Project lands	42	File final design with FERC prior to construction
21	Payment for timber cleared from U.S. lands	43	Consult with SHPO prior to construction
Total = 40 Active Articles			

1.3 Description of KRCD's Proposed Unit 4

As stated above, KRCD proposes to add a fourth generating unit to the Project that will primarily utilize flows up to 375 cfs that cannot be used to generate power in the existing powerhouse and are currently discharged through the Bypass System. The new unit will increase the generating capacity of the Project by approximately 6.3 MW from 165 MW to 171.3 MW, an increase in name-plate generation capacity of 3.8 percent. The new unit will not increase the existing 8,000 cfs maximum hydraulic capacity of the Project.

The new Unit 4 would include: 1) a 66-inch-diameter extension from the existing Bypass System's Units 1 and 2 66-inch-diameter pipe; 2) an outdoor Unit 4 Powerhouse that would contain a 6.3 MW Francis turbine and associated generator; 3) a generator lead and a step-up transformer consisting of one 6.6 MVA, three-phase unit at the new powerhouse; and 4) appurtenant equipment. The new powerhouse would be located between the dam and the existing switchyard in the paved driveway above the Bypass System's piping walkways, and would be approximately 20 ft in height, allowing for ample clearance for a crane boom to access any valves or piping for the Bypass System that will be located behind the new structure. The new unit would discharge at a maximum rate of 375 cfs into the Kings River via a draft tube outlet pipe penetrating the existing spray wall above the Kings River surface elevation (i.e., an aerial discharge). Unit 4 would connect to the existing switchyard and would operate in coordination with operations of Units 1, 2 and 3 and the existing Bypass System to provide the required water discharge below Pine Flat Dam that is currently released through the Bypass System. Figure 1-4 shows KRCD's proposed Unit 4. Appendix 2 includes preliminary detailed design drawing for Unit 4.

No modifications are required to USACE's Pine Flat Dam, spillway, intake, or penstocks; Units 1, 2 or 3; or the non-Project Bypass System connected to Unit 3. No changes to flood control operations, Pine Flat Lake elevations, delivery of irrigation water flow, or instream flow would result from the addition of Unit 4.

The anticipated total duration of construction, and commissioning is approximately 12 months, commencing after FERC amends KRCD's license to include the fourth unit, and detailed design, approval of detailed construction plans, acquisition of any additional required permits or approvals, and purchase of equipment are complete. KRCD anticipates at this time that the initial work to install the penstock for Unit 4 into the existing Bypass System will occur during a

scheduled annual outage of Units 1 and 2 – a separate outage will not be needed. Unit 4 construction will not affect the Bypass System for Unit 3 and it will continue to operate to meet flow requirements and other downstream water requirements. There will not be any interruption to flows below Pine Flat Dam because of construction.

Key construction activities would include the following:

- site preparation to excavate and install the turbine generator foundation;
- modification of existing Bypass System for Units 1 and 2 to add penstock extension piping and new gate valves for the addition of Unit 4;
- installation of the discharge piping through the spray wall and installation of seals;
- installation of the water-to-wire equipment package including the turbine generator unit, turbine shutoff valve, hydraulic power unit (HPU), generator breaker and main lead termination box, electrical distribution panels, and other miscellaneous equipment and structures associated with the water-to-wire package;
- excavation and installation of the generator step-up (GSU) foundation and transformer;
- trenching and installation of wiring from the Unit 4 generator to the GSU;
- relocation of the backup diesel generator and fuel tank;
- installation of the control cabinets in the existing control room;
- installation of conduits and wiring for control and instrumentation;
- start-up and commissioning of Unit 4; and
- site clean-up.

All work would occur within the proposed FERC Project Boundary adjacent to the existing Jeff L. Taylor Powerhouse in areas previously disturbed for initial construction of the Project and the Bypass System. No work would be required in the streambed because Unit 4 would discharge into the air above the surface of Kings River.

The construction labor force is estimated to average about 25 persons over the total construction period. Equipment would be transported to the Jeff L. Taylor Powerhouse via State Highway 180 East from Fresno to N. Piedra Road and then to a secure entry gate to Pine Flat Dam and the Jeff L. Taylor Powerhouse. All access roads are suitable for the anticipated loads. No additional access roads would be required for the addition of Unit 4. It is anticipated that not more than 20 trailer ("low boy") truck roundtrips would be required to transport the turbine generator equipment, GSU and Unit 4 Powerhouse prefabricated building, piping and valves, and other heavy materials and equipment. Approximately 17 truckloads of ready-mixed concrete may be needed for equipment pads, foundations, and curbs. No changes in road conditions are anticipated as a result of the work.

At the site, typical heavy construction equipment that would be needed includes an excavator (backhoe), an air compressor, one or two dump and flatbed trucks for material and equipment handling, two truck-mounted cranes, pickup trucks, a construction office trailer, and miscellaneous

equipment. Smaller equipment would include hoists and platforms, concrete placing and drilling equipment, a welding machine, pipe fitting equipment, light plant, and other miscellaneous equipment customary to the electrical, mechanical, and structural crafts.

No borrow areas are anticipated to be required because the work does not entail significant earthwork. It is expected that the available space within the fenced plant area will be sufficient for laydown and staging of materials and equipment. All work would be confined to the Jeff L. Taylor Powerhouse and powerhouse yard. No undisturbed areas are anticipated to be disturbed as a result of the work.

KRCD's proposed measures to protect environmental resources during construction and operations of Unit 4 are:

- Prior to any construction-related ground disturbing activities related to Unit 4:
  - KRCD will obtain all necessary permits and approvals for construction of Unit 4 and will adhere to the conditions in any relevant permits and approvals, including a CWA Section 401 WQC if needed, and will adhere to all conditions in the existing FERC license and relevant agreements, including flow requirements.
  - As lead agency, KRCD will comply with the appropriate provisions of the California Environmental Quality Act.
  - If construction occurs during the nesting bird season (between January 1 and September 1), KRCD will conduct nesting bird surveys in the work area within 2 weeks of beginning construction. If nesting birds are located, buffers will be developed around nests to prevent disturbance of the nesting birds during the term of construction.
  - Within 2 weeks of beginning construction, KRCD will survey the work area for evidence of bat use. If any bat roost evidence is located within 500 ft of the work area, Best Management Practices will be developed and implemented to prevent impacts to roosting bats during the term of construction.
  - Construction work activities will be conducted in a manner that prevents the introduction, transfer, and spread of invasive species, including plants, animals, and microbes (e.g., algae, fungi, parasites, mussels, and bacteria), from one work site and/or waterbody to another. Prior to entering the work area, KRCD will inspect the equipment to be used for invasive species and, if any signs of invasive species are found, the equipment shall be sent offsite to be cleaned to remove those species. All visible soil/mud, plant materials, and animal remnants on equipment will be removed prior to entering and exiting the work site.
  - Leaks and spills into water bodies will be prevented by ensuring that all construction vehicles and equipment are in good working order (i.e., no leaks); placing drip pans or absorbent materials under vehicles and equipment when not in use; ensuring that all construction areas have proper spill clean-up materials (e.g., absorbent pads, sealed containers and booms) to contain the movement of any spilled substances; preventing any other substances which could be hazardous to aquatic life from contaminating the soil and/or entering the waters of the state; and if maintenance or refueling of vehicles

or equipment must occur on-site, using a designated area and/or a secondary containment, located away from drainage courses, to prevent the runoff of storm water and the runoff of spills.

- During operations of Unit 4:
  - KRCD will adhere to the conditions in the Project's FERC license and relevant permits and agreements.

Section 2.0
ENVIRONMENTAL RESOURCES

This section provides a general description of the locale at the Project (Section 2.1), a description of environmental resources potentially affected by KRCD's proposed Application for Amendment (i.e., the environmental baseline) (Section 2.2), and KRCD's assessment of the environmental impacts associated with construction and operation of its proposed Unit 4, including protection measures proposed by KRCD in Section 1.3 (Section 1.3).

KRCD does not propose any additional data gathering. Existing information is adequate to assess potential effects of construction and operation of Unit 4 and to inform any requirements.

2.1 General Description of the Locale

The Project area is remote with no residential or commercial developments within or adjacent to the FERC Project Boundary. The area between Pine Flat Dam and USACE's Pine Flat Road Bridge is closed to public access by a USACE order and closed to public fishing by a California Fish and Game Commission regulation.

The topography in the Project area is generally flat with sparse vegetation including live oaks (*Quercus* spp.), California buckeyes (*Aesculus californica*) and grassland. The area in the immediate vicinity of the Project has been disturbed due to the construction of Pine Flat Dam and the Project.

The Koppen Climate Classification subtype for the Project area is BSk - tropical and subtropical steppe climate. This climate type occurs primarily on the periphery of the true deserts in low-latitude semiarid steppe regions. It is transitional to the tropical wet-dry climate on the equatorward side and to the Mediterranean climate on its poleward margin, with a cooler, wetter winter resulting from the higher latitude and mid-latitude frontal cyclone activity. Annual precipitation totals are greater than in tropical and subtropical desert climates. Yearly variations in amount are not as extreme as in the true deserts but are nevertheless large. The average temperature for the year in Fresno is 64.4 degrees Fahrenheit (°F) (18 degrees Centigrade, or °C). The warmest month, on average, is July with an average temperature of 83.0°F (28.3°C) and the coolest month on average is December, with an average temperature of 46.5°F (8.1°C). The highest recorded temperature in Fresno is 113.0°F (45°C), which was recorded in July. The lowest recorded temperature in Fresno is 18.0°F (-7.8°C), which was recorded in December. The average amount of precipitation, which occurs as rain, for the year in Fresno is 11.5 inches. The month with the most precipitation on average is January with 2.2 inches of precipitation. The month with the least precipitation on average is July with an average of 0.0 inch. On average, the area records 48.1 days of precipitation, with the most precipitation occurring in February with 8.6 days and the least precipitation occurring in July with 0.2 day.

2.2 Potentially Affected Resources

2.2.1 Geology and Soils

The Project's FERC license includes one article (i.e., 19) that pertains, in part, to the control of erosion.

2.2.1.2 Geology and Soils Conditions

The Project is located within the southern portion of the Central Valley of California, also known as the San Joaquin Valley, of which it lies in the eastern edge. A steep canyon of the Kings River lies just below the dam, with elevation at the river around the North Riverside Access Park at approximately 560 feet and at the top of the Pine Flat Dam around 972 feet (TopoZone 2021).

Within and adjacent to the FERC Project Boundary, there are four main rock types: 1) Pre-Cretaceous metavolcanic rocks; 2) Mesozoic intrusive rocks; 3) Mesozoic basic intrusive rocks; and 4) recent (Quaternary) alluvium. The metavolcanic rocks are made up of amphibolite, mica schist, metarhyolite and other metamorphized tuffs and volcanic flows. The two Mesozoic rock types are both granitic, though there's little information on the intrusive rocks except that they vary from granite to gabbro. The basic intrusive rocks are various kinds of gabbro, anorthosite and mafic plutonic rocks. The recent rocks are stream alluvium on the margins of the Central Valley, coarse granitic fanglomerate and talus and slope wash (CDC 2019).

Multiple soil types occur within and adjacent to the FERC Project Boundary, but four dominate the area: 1) Daulton rocky fine sandy loam; 2) Merced clay; 3) Tujunga and Hanford soils; and 4) Hanford sandy loam (NRCS 2019). Most of the area within the FERC Project Boundary has a low potential for erosion due to flat topography.

There are no known faults in the FERC Project Boundary or within a five-mile radius (USGS 2021).

2.2.2 Water Resources

The Project's FERC license includes five articles (i.e., 8, 12, 19, 34, and 35) that pertain to water resources. Of specific relevance are articles 34 and 35. Article 34 pertains to dissolved oxygen (DO) concentration in Kings River downstream of the Project, and the article states:

> Upon commencement of commercial operation of the project, the Licensee shall install and operate continuously dissolved oxygen monitoring equipment in the Kings River at the Pine Flat Road bridge. The Licensee shall maintain records of the monitoring data and shall file with the California Department of Fish and Game and the Commission an annual summary at the end of each year after the commencement of commercial operation, and summaries for other intervals when requested, which shall include observed daily minimum, maximum, and average dissolved oxygen concentrations. If the results of the monitoring indicate that any change in project works or operation is necessary to maintain a minimum dissolved

> oxygen concentration of 7.0 mg/1, the Licensee shall promptly file for approval its proposal for the change.

The compliance point for Article 34 DO concentration requirement is at the Pine Flat Road Bridge. In compliance with the article, KRCD installed and operates a continuously DO monitoring equipment, which monitors DO concentrations in milligrams per liter (mg/L) at USACE's Pine Flat Bridge, and files with the Commission annual reports regarding DO monitoring. In addition, though not required by article 34, KRCD installed and operates a TDG sensor that continuously records percent saturation at the bridge.

Article 35, as amended on November 19, 1993, establishes flow requirements and states:

> Pending further order by the Commission, on its own motion or at the request of others, when flows are available for project operation and the Licensee has control over release of these flows, the Licensee shall discharge from the project a continuous minimum flow of 25 cfs, for the purpose of protecting fish and wildlife resources. These flows may be modified temporarily: (1) during and to the extent required by operating emergencies beyond the control of the licensee; and (2) for fishery management purposes, upon mutual agreement between the licensee and the California Department of Fish and Game.

The compliance point for KRCD's Article 35 flow requirement is at the Jeff L. Taylor Powerhouse, where flow is measured by acoustic velocity meters.

2.2.2.1 Hydrology

USACE's Pine Flat Dam, which is not part of the Project or under FERC's jurisdiction, is a 455-ft-high concrete gravity dam that impounds USACE's Pine Flat Lake, which at its normal operations elevation of 955 ft has a maximum storage capacity of 1,000,000 acre-feet (ac-ft). The dam's spillway consists of six bays each controlled by 36- by 42-ft-wide Tainter gates[5] and the spillway has a capacity of 391,000 cfs. The dam also includes a multiport intake that is shown in Figure 1-3, and three 13.5-ft-diameter penstocks, each of which has a maximum capacity of 3,000 cfs. The drainage area upstream of the dam is 1,545 square miles. As stated above, all releases from Pine Flat Dam are made by the USACE as requested by the KRWA through its Water Master for irrigation demand, except during mandatory flood control operations when all releases are determined by the USACE.

On May 28, 1999, the KRWA, California Department of Fish and Game, now CDFW, and KRCD entered into the Kings River Fisheries Management Program (KRFMP) Framework Agreement (Framework Agreement) (KRWA et al. 1999).[6] The agreement is a voluntary program with the goals of balancing the fishery needs with other beneficial uses of the Kings River while maintaining established water and storage rights and is not part of the Project's FERC license. The agreement pertains to ramping rates for flow releases of less than 300 cfs from Pine Flat Dam and flow requirements at Piedra, Dennis Cut, and upstream and downstream of the Fresno Weir (Figure 2-1).

[5] A Tainter gate is a type of radial arm floodgate used in dams to control water flow.
[6] The Framework Agreement superseded a September 11, 1964, entered into by KRWA and CDFG.

The Framework Agreement runs in perpetuity, and the funding commitment has a 10-year-long term that is renewable. Currently, KRWA, CDFW and KRCD are in the third 10-year-long term, which expires in June 2029, for funding.

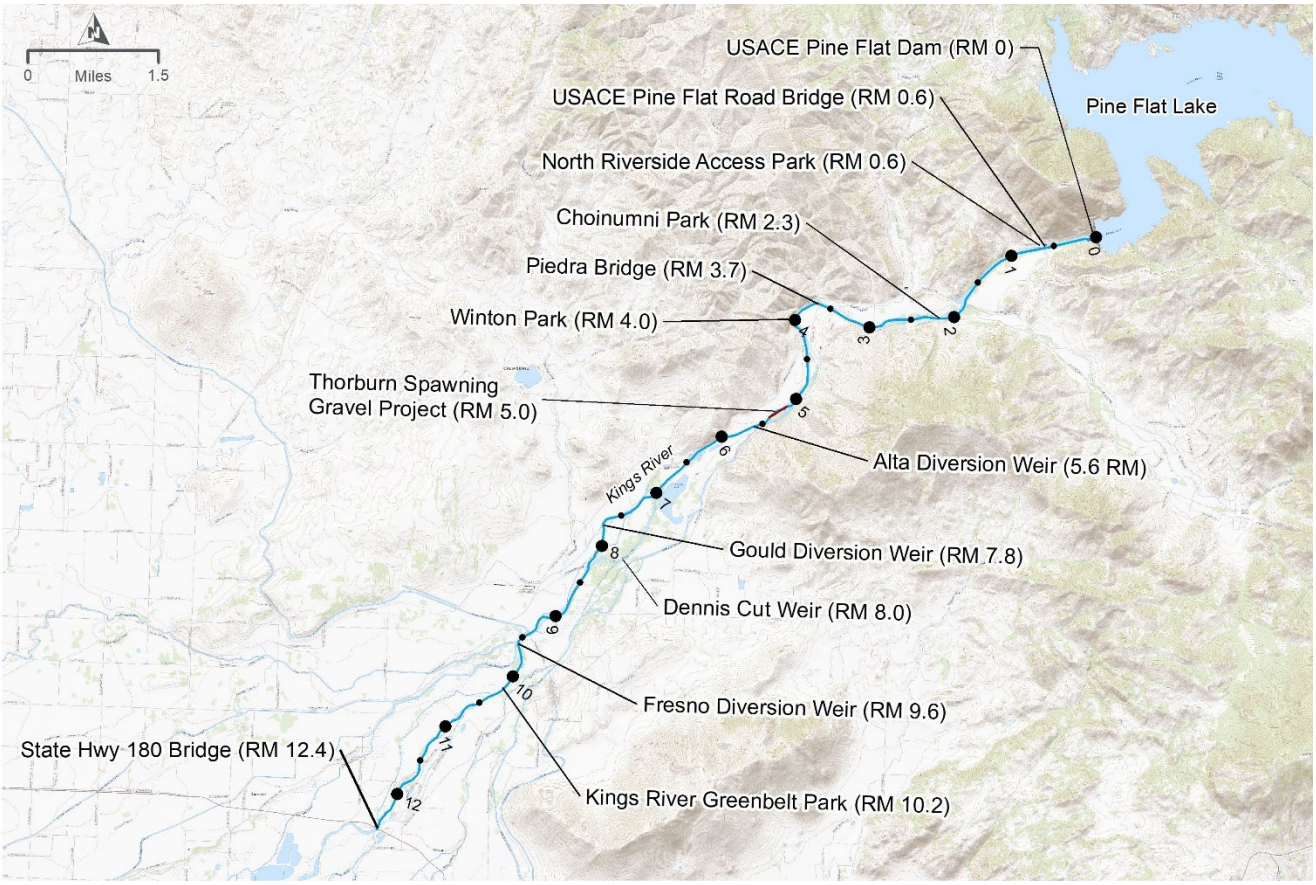
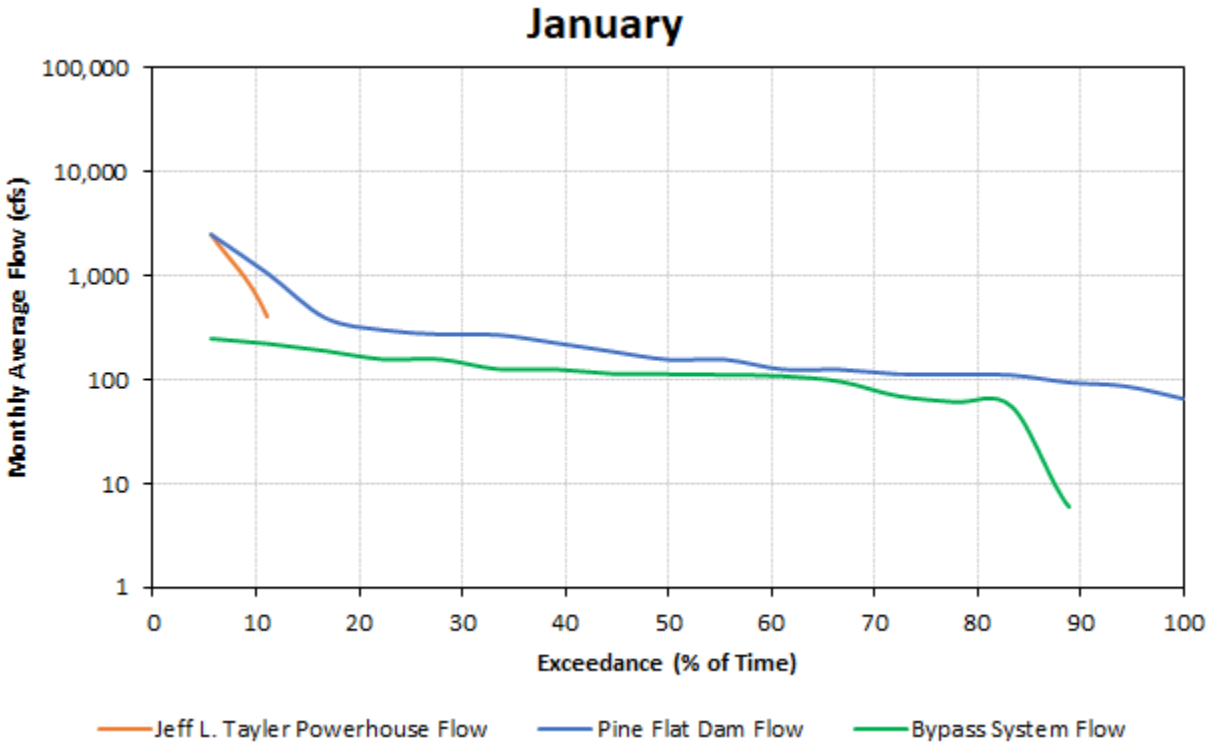
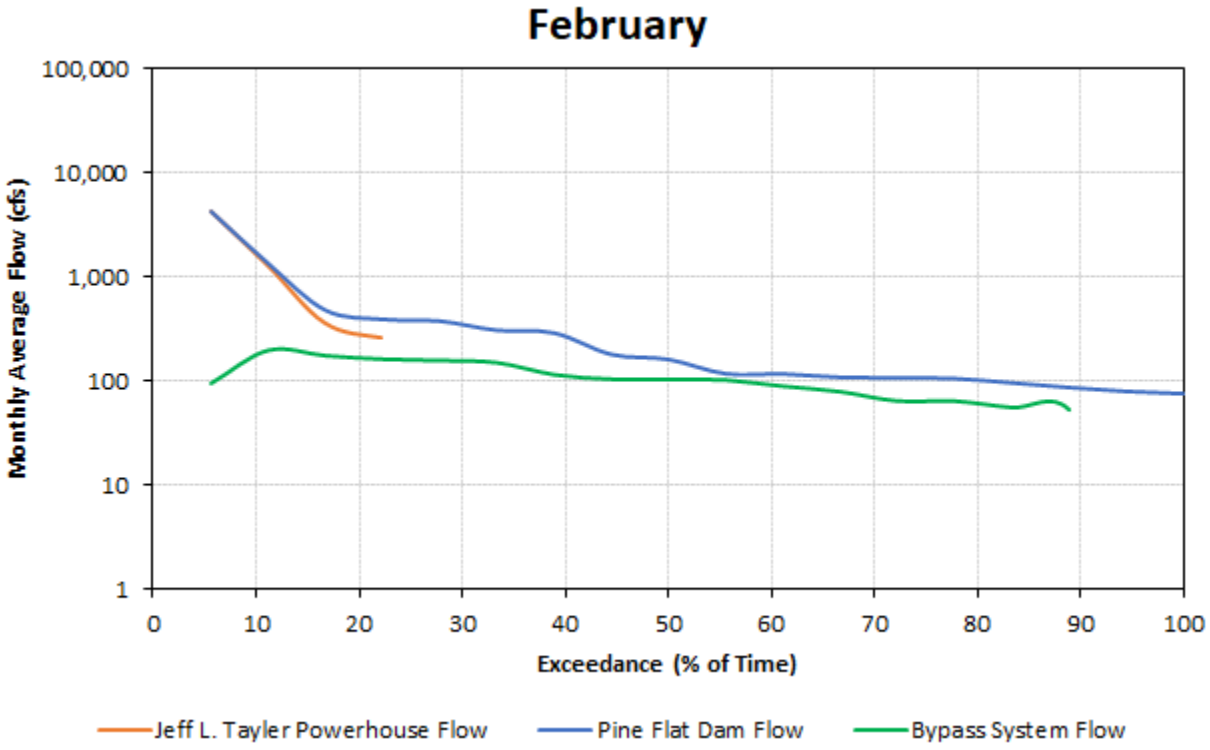


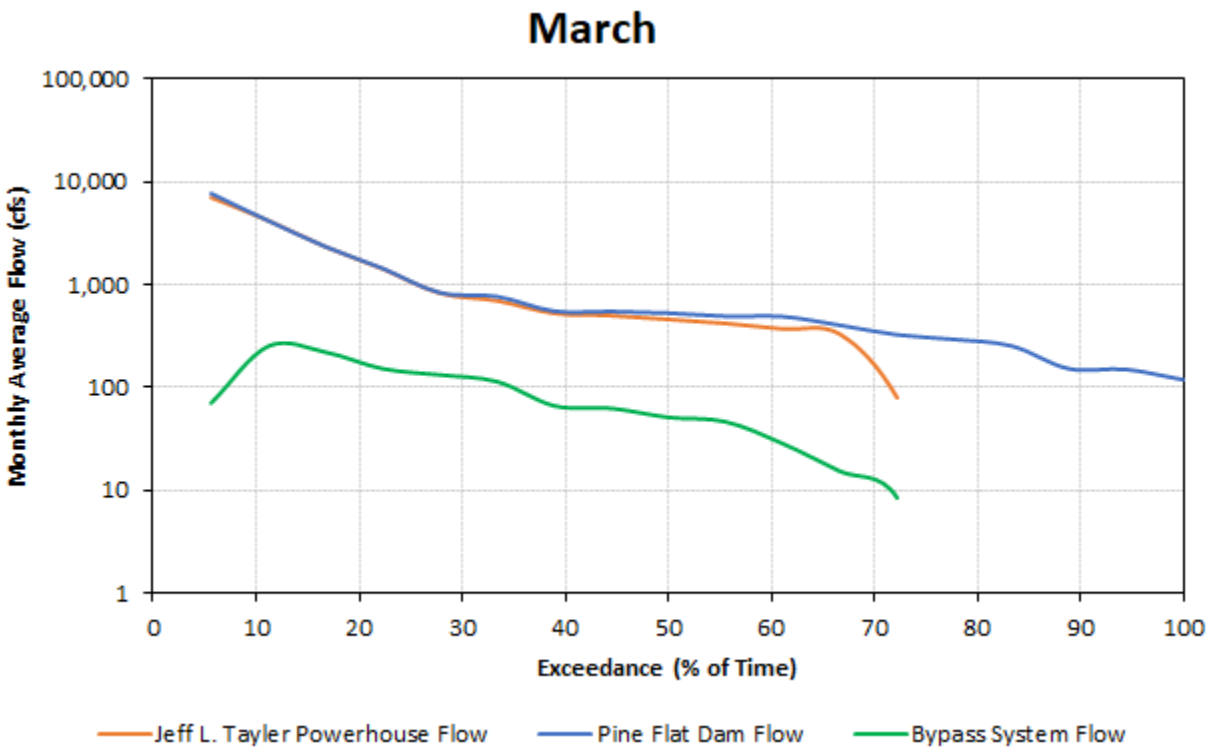
Figure 2.1. Map showing 12.4-mile-long section of Kings River from USACE's Pine Flat Dam to State Highway 180 in Fresno, California.

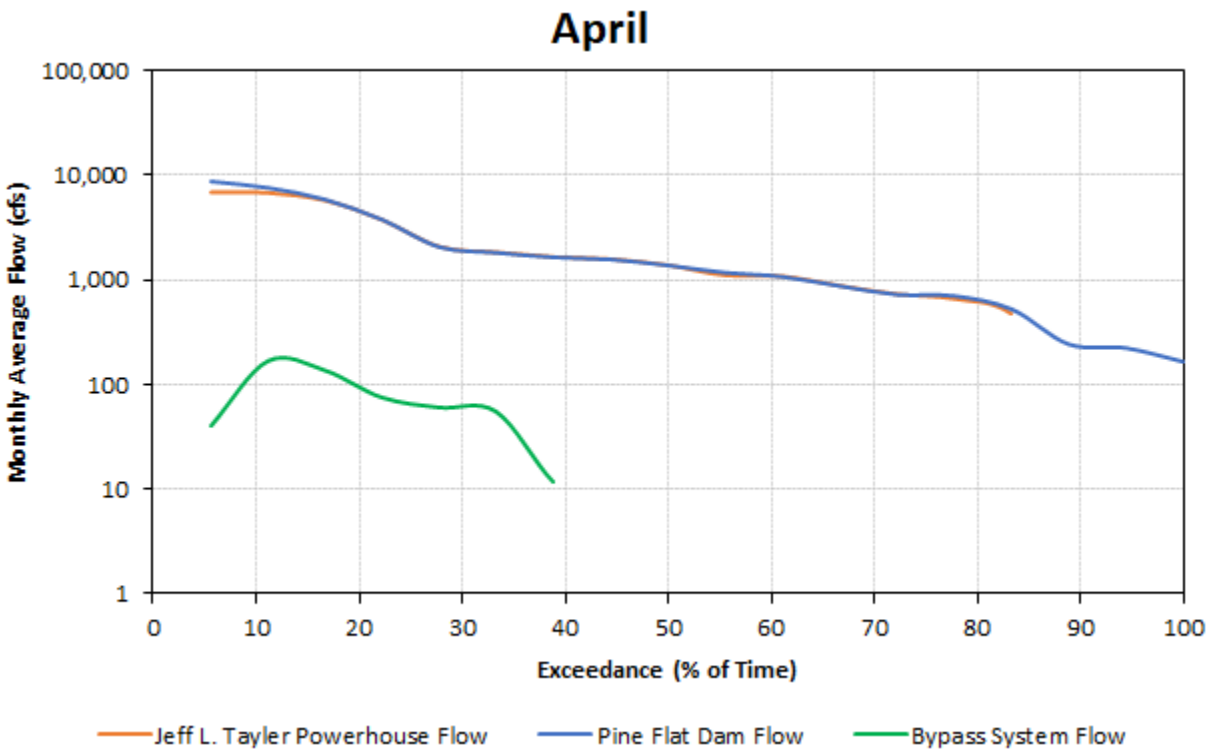
Figure 2-2 shows monthly duration curves from Water Year (WY) 2003 through WY 2020 for average daily flow for the combined releases from Pine Flat Dam and Spillway, the Jeff L. Taylor Powerhouse, and the Bypass System. The flows were calculated by subtracting from average daily flows reported by USACE at its flow gage located at the Pine Flat Road Bridge[7] measured average daily flows for Mill Creek that enter the Kings River between Pine Flat Dam and USACE's Pine Flat Road Bridge. The exceedance plots in Figure 2-2 are on a logarithmic scale to best show the full range of flows for each month. From WY 2003 through WY 2020, the minimum, average and maximum flow at the gage were 65, 2,388 and 11,542 cfs, respectively. Flow data used to prepare the flow duration curves in Figure 2.2 are provided in Appendix 3 to this IIP.

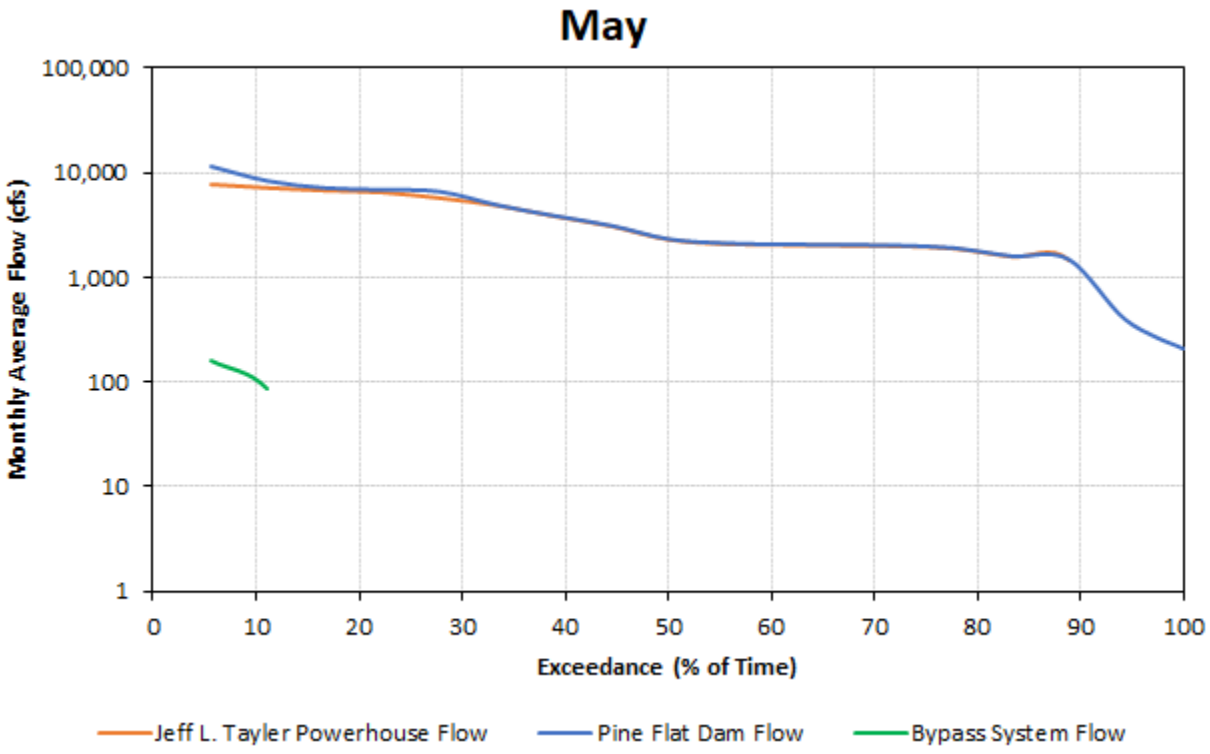
[7] The United States Geological Survey (USGS) maintained this gage as USGS Gage 11221500, *Kings River Below Pine Flat Dam, CA*, from January 1, 1954, through October 4, 1990. In October 1990, the USACE assumed the maintenance, operation, and reporting responsibility for the gage, which USACE refers to as "PNFQ". Gage data are publicly available at https://www.spk-wc.usace.army.mil/reports/monthly.html.

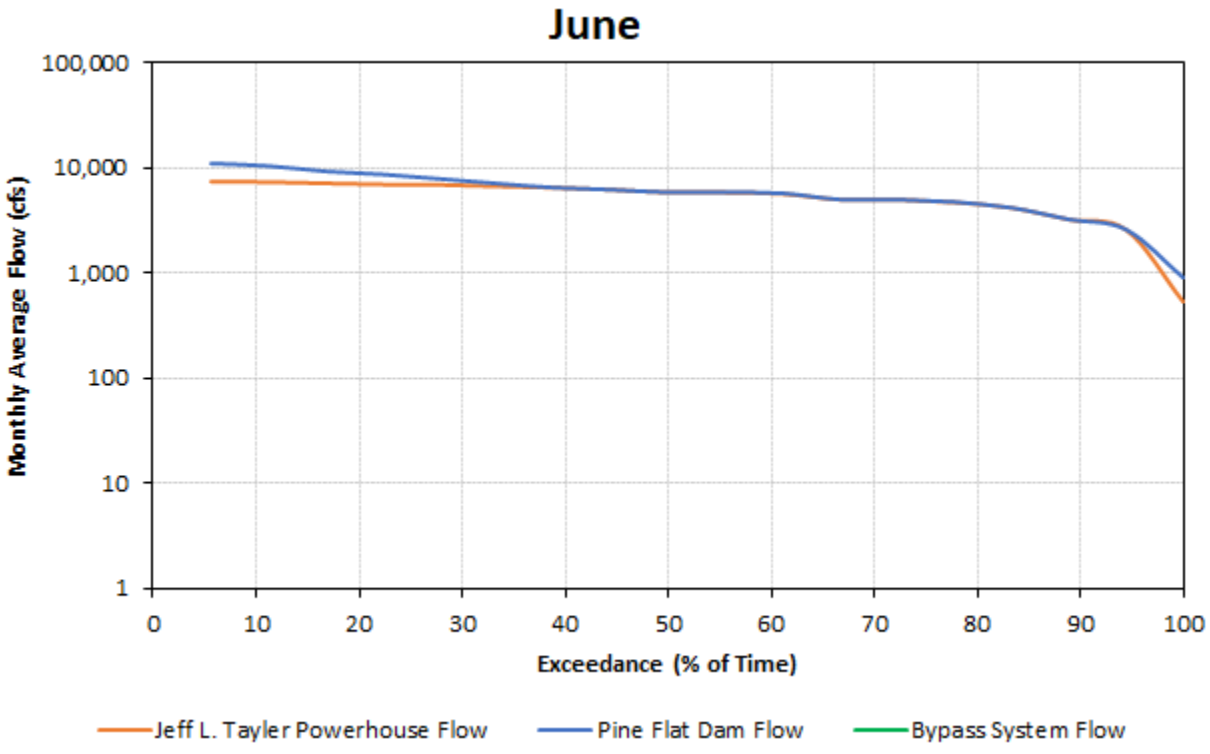


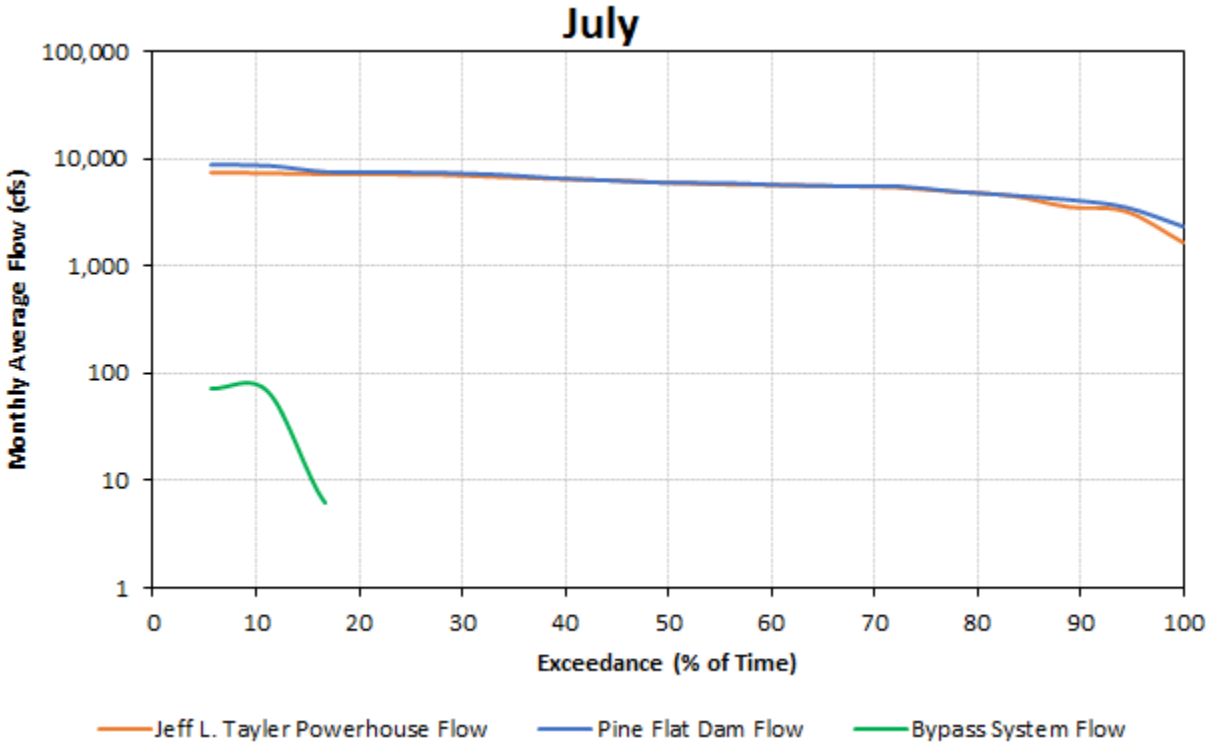


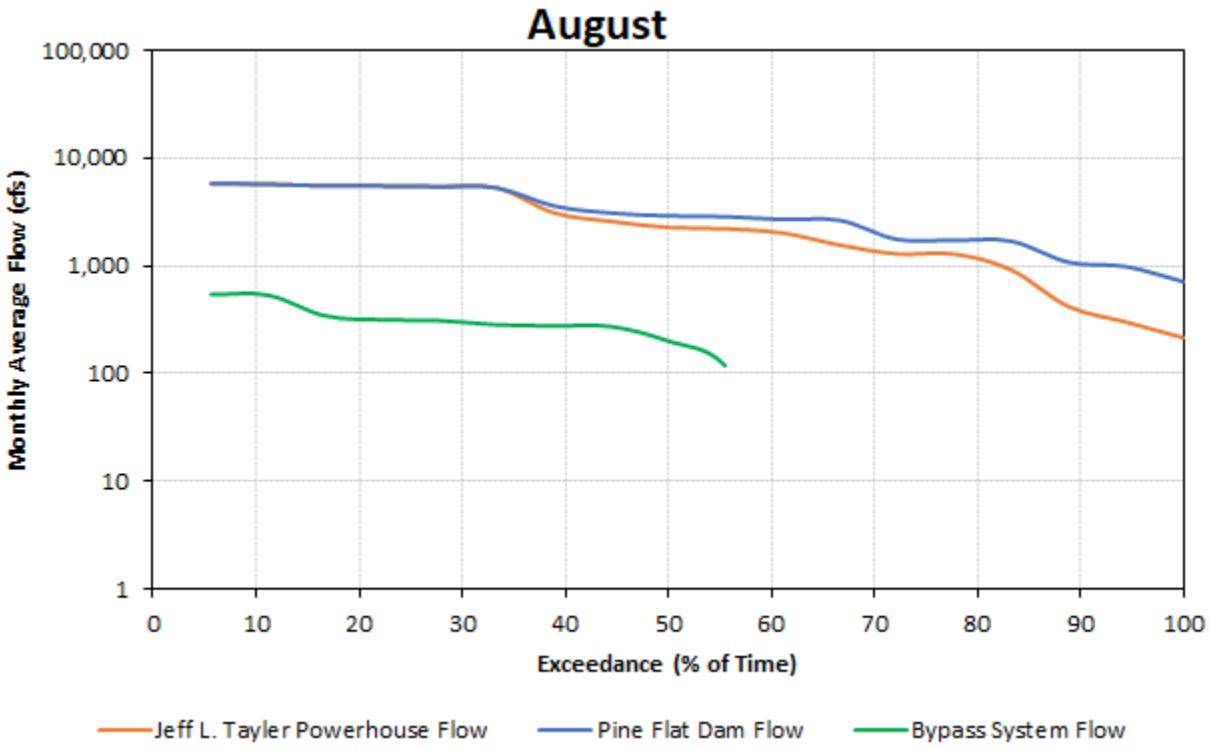


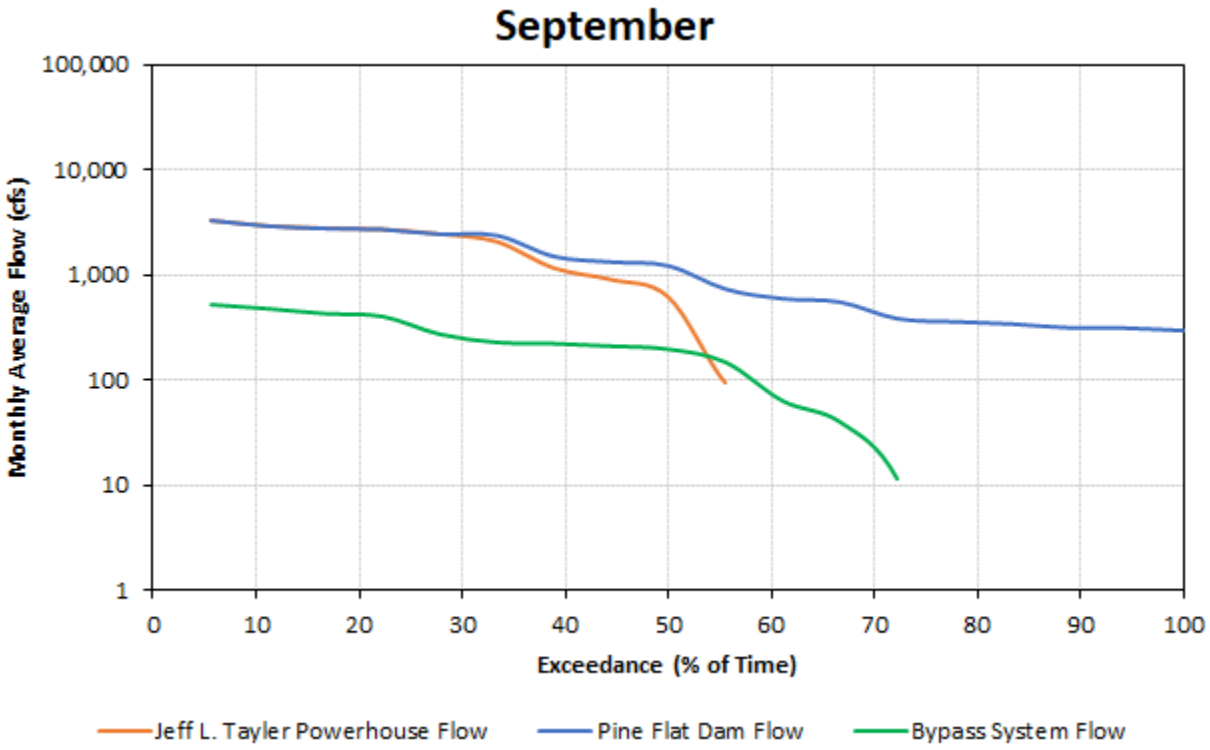


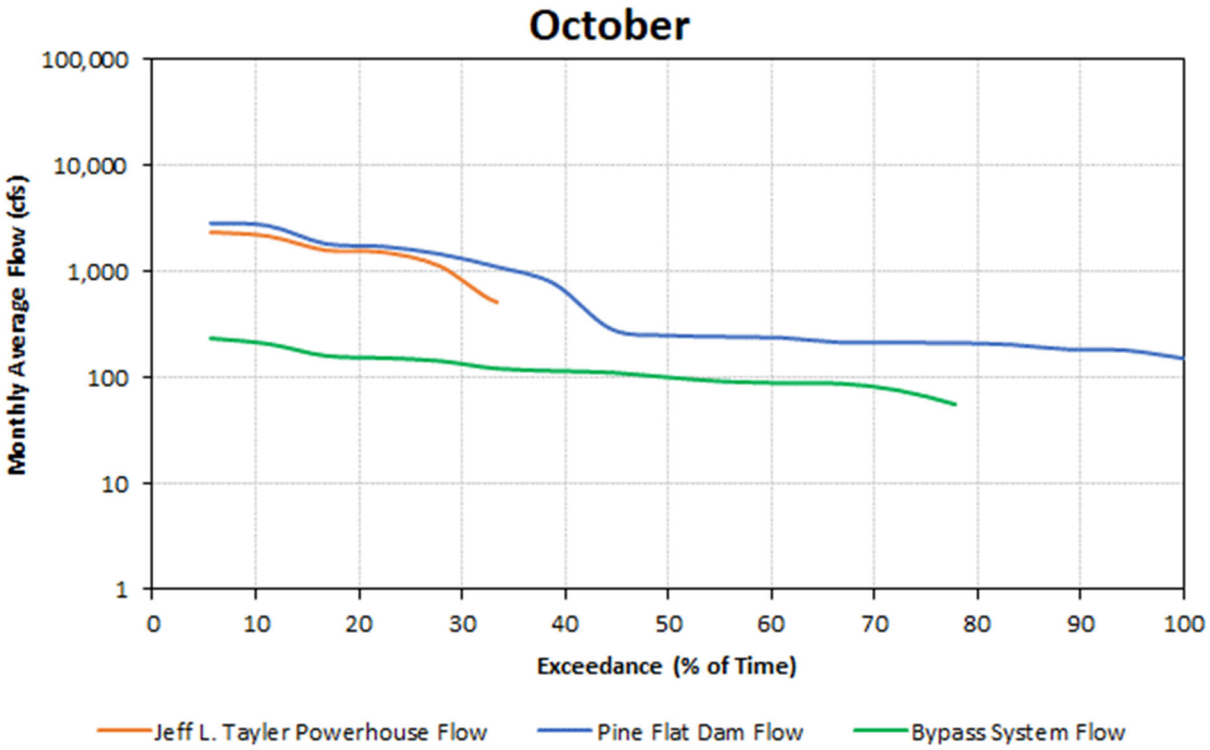












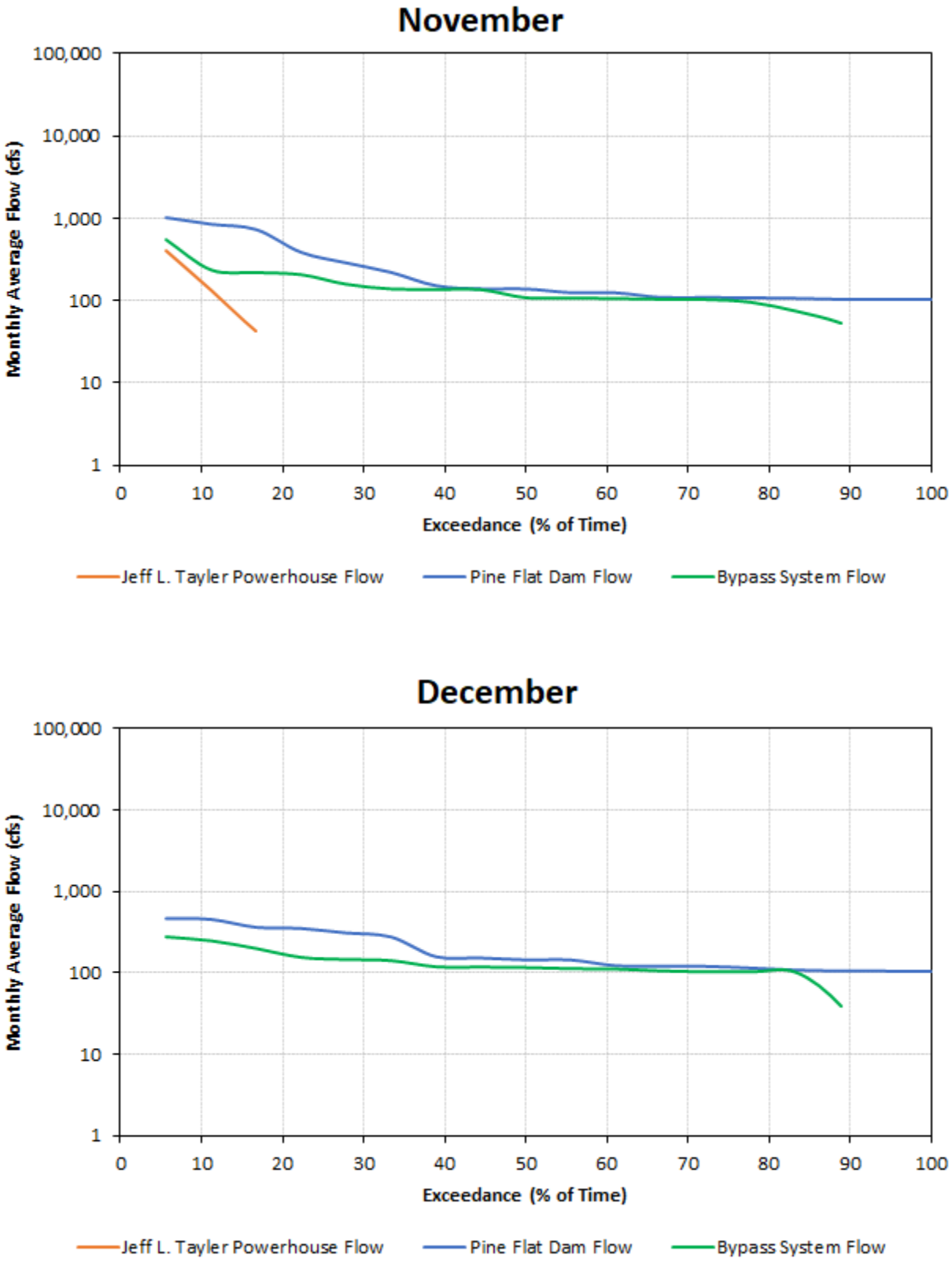


Figure 2-2. Monthly flow duration curves for Water Year 2003 through Water Year 2020.
SOURCE: Average daily flow data in Appendix 3 to this IIP.

In addition, Figure 2-2 provides monthly flow duration curves for the portion of the flow at the Pine Flat Road Bridge that passes through the Jeff L. Taylor Powerhouse (i.e., Pine Flat Powerhouse Flow in the figure) and through USACE's Bypass System (i.e., Bypass Flow in the figure). KRCD's acoustic flow meters measure flow though the powerhouse penstocks and flow through the Bypass System penstocks continuously, and these flows are to calculate average daily flow. As reference, the maximum capacity of the powerhouse and the Bypass System are 8,000 cfs and 900 cfs, respectively. During WY 2003 through 2020, the Bypass System did not operate in June and Jeff L. Taylor Powerhouse did not operate in December, consistent with the overall water supply operation of Pine Flat Dam. From WY 2003 through WY 2020, the minimum, average and maximum flow through the powerhouse were zero, 1,890 and 7,834 cfs, respectively, and minimum, average, and maximum flow through the Bypass System were zero, 88 and 549 cfs, respectively. Refer to Appendix 3 to this IIP for powerhouse and Bypass System flow data.

2.2.2.2 Water Rights

KRCD holds all necessary water rights to operate the Project at its full capacity. Table 2-1 provides a listing of these water rights.

Table 2-1. Water-right licenses held by KRCD for operation of the Project for power generation.

Priority (date)	Statement of Water Diversion and Use (Riparian)	SWRCB Designation (license)	Source (waterbody)	Direct Diversion and Amount & Place of Diversion Storage	Season (period)	Place of Beneficial Use (powerhouse)
June 28, 1991	Power	12885	Kings River	7,900 cfs Maximum 2,732,000 ac-ft Maximum	January 1 through December 31	Jeff L. Taylor (Pine Flat) Powerhouse

2.2.2.3 Water Quality

2.2.2.3.1 Applicable Water Quality Standards and Impairment Status

The Project is a non-consumptive use of Kings River basin water: all water that passes through the Project is returned to the Kings River. Beneficial uses of surface water designated by the Central Valley Regional Water Quality Control Board's (CVRWQCB) Water Quality Control Plan for the Tulare Lake Basin, or Basin Plan (CVRWQCB 2018) in the Kings River from Pine Flat to Friant-Kern (Hydrologic Units 552, 551) are listed in Table 2-2.

Table 2-2. Designated beneficial uses of surface water in the Kings River from Pine Flat Dam to Friant-Kern.[1]

Beneficial Use	Beneficial Use Description
Municipal and Domestic Supply (MUN)	Uses of water for community, military, or individual water supply systems, including, but not limited to, drinking water supply.
Agricultural Supply (AGR)	Uses of water for farming, horticulture, or ranching, including, but not limited to, irrigation, stock watering, or support of vegetation for range grazing.
Hydropower Generation (POW)	Uses of water for hydropower generation.
Water Contact Recreation (REC-1)	Uses of water for recreational activities involving body contact with water, where ingestion of water is reasonably possible. These uses include, but are not limited to, swimming, wading, water-skiing, skin and scuba diving, surfing, white water activities, fishing, or use of natural hot springs.

Table 2-2 (continued)

Beneficial Use	Beneficial Use Description
Non-Contact Water Recreation (REC-2)	Uses of water for recreational activities involving proximity to water, but where there is generally no body contact with water, nor any likelihood of ingestion of water. These uses include, but are not limited to, picnicking, sunbathing, hiking, beachcombing, camping, boating, tidepool and marine life study, hunting, sightseeing, or aesthetic enjoyment in conjunction with the above activities.
Warm Freshwater Habitat (WARM)	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. WARM includes support for reproduction and early development of warm water fish.
Cold Freshwater Habitat (COLD)	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.
Wildlife Habitat (WILD)	Uses of water that support terrestrial or wetland ecosystems, including, but not limited to, preservation and enhancement of terrestrial habitats or wetlands, vegetation, wildlife (e.g., mammals, birds, reptiles, amphibians, invertebrates), or wildlife water and food sources.
Spawning, Reproduction, and/or Early Development (SPWN)	Uses of water that support high quality aquatic habitats suitable for reproduction and early development of fish. SPWN shall be limited to cold water fisheries.
Ground Water Recharge (GWR)	Uses of water for natural or artificial recharge of ground water for purposes of future extraction, maintenance of water quality, or halting of saltwater intrusion into freshwater aquifers.
Freshwater Replenishment (FRSH)	Uses of water for natural or artificial maintenance of surface water quantity or quality.

SOURCE: CVRWQCB (2018)

Basin Plan water quality objectives are established with consideration of past, present, and probable future beneficial uses; environmental characteristics of the hydrographic unit; water quality conditions that can reasonably be achieved; economic considerations; the need for housing development; and the need to develop and use recycled water. Water quality objectives relevant to the Kings River in the Project area are shown in Table 2-3.

Table 2-3. Basin Plan Water Quality Objectives for the Kings River from Pine Flat Dam to Friant-Kern.[1]

Parameter	Water Quality Objective
Ammonia	No concentrations of un-ionized ammonia exceeding 0.025 mg/l, or which adversely affects beneficial uses.
Bacteria	No fecal coliform concentrations above a mean of 200/100 ml in five samples over 30 days, or more than ten percent of any samples taken during 30 days over 400/100 ml.
Biostimulatory substances	No biostimulatory substances in concentrations that promote aquatic growth to the extent that such growth cause nuisance or adversely affect beneficial uses.
Chemical Constituents	No chemical constituents in concentrations that adversely affect beneficial uses.
Color	No discoloration that causes nuisance or adversely affects beneficial uses.
Dissolved oxygen	Waste discharges shall not cause the monthly median DO concentration in the main water mass (at centroid of flow) of streams to fall below 85 percent of saturation concentration, and the 95th percentile concentration to fall below 75 percent of saturation concentration. No dissolved oxygen concentrations below 9 mg/L If ambient dissolved oxygen is below the objective, discharges cannot cause a further decrease.
Floating material	No floating material in amounts that cause nuisance or adversely affect beneficial uses.
Oil and Grease	No oils, greases, waxes, or other materials in concentrations that cause nuisance, result in a film or coating on the surface of the water or on objects in the water, or otherwise adversely affect beneficial uses.
pH	No pH depressed below 6.5 or raised above 8.3 or altered by more than 0.3 from ambient.
Pesticides	No pesticides in concentrations that adversely affect beneficial uses.
Radioactivity	Radionuclides shall not be present in concentrations that are deleterious to human, plant, animal, or aquatic life nor which result in the accumulation of radionuclides in the food web to an extent that presents a hazard to human, plant, animal, or aquatic life.
Salinity	Waters shall be maintained as close to natural concentrations of dissolved matter as is reasonable considering careful use of the water resources. The maximum electrical conductivity objective is 100 µmhos/cm.
Sediment	No suspended sediment loads or suspended sediment discharge rates altered in a manner that causes nuisance or adversely affects beneficial uses.
Settleable material	No substances in concentrations that result in the deposition of material that causes nuisance or adversely affects beneficial uses.
Suspended material	No suspended material in concentrations that cause nuisance or adversely affect beneficial uses.
Tastes and Odors	Waters shall not contain taste- or odor-producing substances in concentrations that cause nuisance, adversely affect beneficial uses, or impart undesirable tastes or odors to fish flesh or other edible products of aquatic origin or to domestic or municipal water supplies.

Table 2-3. (continued)

Parameter	Water Quality Objective
Temperature	Natural temperatures of waters shall not be altered unless it can be demonstrated to the satisfaction of Central Valley Regional Water Quality Control Board (CVRWQCB) that the alteration does not adversely affect beneficial uses. Elevated temperature wastes shall not cause the temperature to rise more than 5 degrees Fahrenheit above the natural receiving water temperature.
Toxicity	All waters shall be maintained free of toxic substances in concentrations that produce detrimental physiological responses in human, plant, animal, or aquatic life. This objective applies regardless of whether the toxicity is caused by a single substance or the interactive effect of multiple substances. Compliance with this objective will be determined by analyses of indicator organisms, species diversity, population density, growth anomalies, biotoxicity tests of appropriate duration, or other methods as specified by the CVRWQB. The CVRWQB will also consider all material and relevant information submitted by the discharger and other interested parties and numerical criteria and guidelines for toxic substances developed by the State Water Board, the California Office of Environmental Health Hazard Assessment, the State Water Board Division of Drinking Water Programs the U.S. Food and Drug Administration, the National Academy of Sciences, the U. S. Environmental Protection Agency, and other appropriate organizations to evaluate compliance with this objective. The survival of aquatic life in surface waters subjected to a waste discharge or other controllable water quality factors shall not be less than that for the same water body in areas unaffected by the waste discharge, or, when necessary, for other control water that is consistent with the requirements for "dilution water" as described in Standard Methods for the Examination of Water and Wastewater, 18th Edition. As a minimum, compliance shall be evaluated with a 96-hour bioassay. In addition, effluent limits based upon acute biotoxicity tests of effluents will be prescribed where appropriate; additional numerical receiving water quality objectives for specific toxicants will be established as sufficient data become available; and source control of toxic substances will be encouraged.
Turbidity	No changes in turbidity that cause nuisance or adversely affect beneficial uses. Increases in turbidity attributable to controllable water quality factors shall not exceed the following limits: where natural turbidity is between 0 and 5 NTUs, increases shall not exceed 1 NTU.

SOURCE: CVRWQCB (2018)

The Kings River from Pine Flat Dam to Island Weir, which is approximately 44 miles downstream of the State Highway 180 Bridge, is on the California's CWA Section 303(d) list of impaired waters for Toxicity and Alkalinity as calcium carbonate ($CaCO_3$). The SWRCB expects to issue total daily maximum loads (TMDL) for Toxicity in 2021 and for Alkalinity in 2027.[8] The Project does not add any toxic or alkaline material to discharge waters from the Jeff L. Taylor Powerhouse.

2.2.2.3.2 General Water Quality

Water quality monitoring downstream of Pine Flat Dam has focused on water temperature and DO monitored once every 10 minutes at the Pine Flat Road Bridge. Figure 2-3 shows average daily water temperatures at the bridge from Calendar Year (CY) 2016 through CY 2020. Water temperatures have a seasonal pattern, with lowest temperatures occurring during the winter and early spring and increasing during the spring and summer months, with the greatest increase in seasonal temperatures occurring during the late summer and early fall. Average daily water temperatures were always less than 20°C except for five days in August 2020 and four days in September 2020 when the average daily water temperature peaked in both instances at 20.6°C. (Figure 2-3). Over the five-year-long period, the instantaneous minimum and maximum water temperatures were 6.5°C and 21.5°C, respectively, both of which occurred when the Jeff L. Taylor Powerhouse was not operating (Table 2-4).

[8] From the 2014/16 USEPA approved list at https://www.waterboards.ca.gov/water_issues/programs/tmdl/integrated2014_2016.shtml accessed on July 30, 2021.

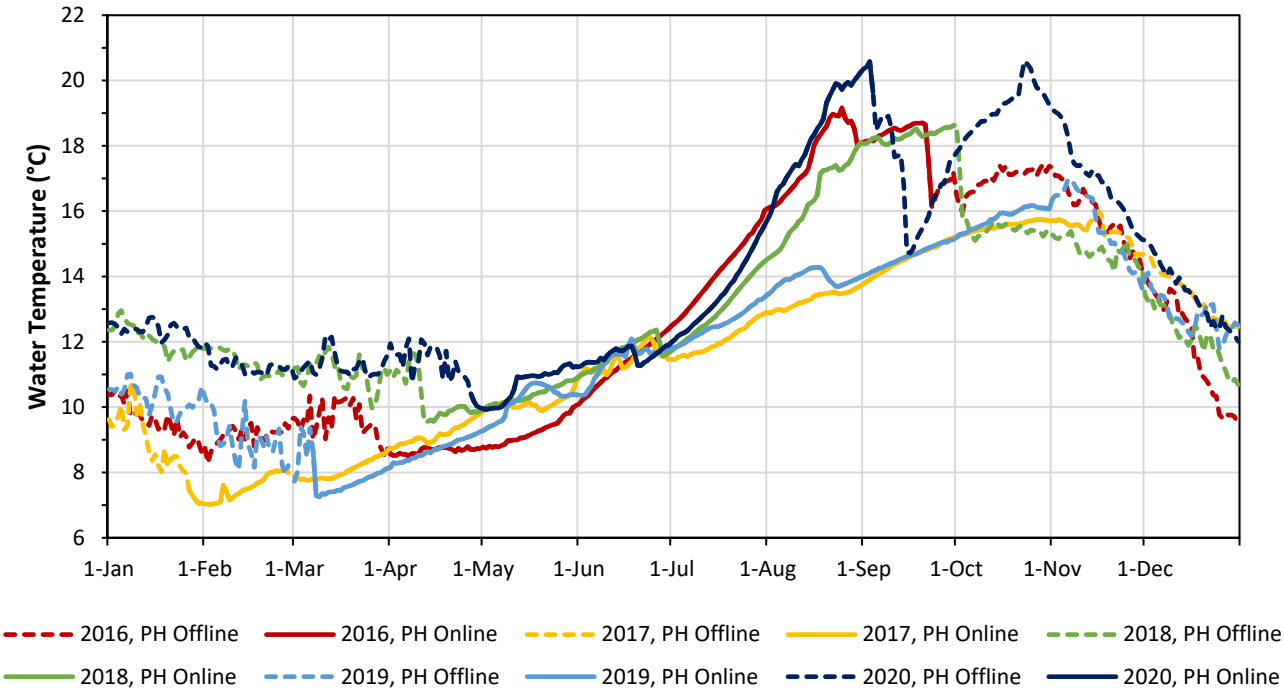


Figure 2-3. Average daily water temperature with and without the Jeff L. Taylor Powerhouse in operations at the Pine Flat Road Bridge downstream of Pine Flat Dam for Calendar Year 2016 through Calendar Year 2020.
SOURCE: Water temperature data in Appendix 4 to this IIP.

Table 2-4. Annual minimum, maximum and average water temperatures with and without the Jeff L. Taylor Powerhouse in operations at the Pine Flat Road Bridge downstream of Pine Flat Dam for Calendar Year 2016 through Calendar Year 2020.

Calendar Year	Water Temperature When Jeff L. Taylor Powerhouse Not Operating (°C)			Water Temperature When Jeff L. Taylor Powerhouse Operating (°C)		
	Instantaneous Minimum	Instantaneous Maximum	Period Average	Instantaneous Minimum	Instantaneous Maximum	Period Average
2016	7.1	20.5	12.4	8.2	20.0	13.0
2017	6.5	16.4	12.4	6.7	15.9	11.4
2018	8.9	19.6	12.7	9.2	19.3	13.5
2019	6.5	17.3	11.8	7.1	16.7	12.0
2020	9.2	21.5	14.1	9.8	21.1	13.6

SOURCE: Water temperature data in Appendix 4 to this IIP.

Figure 2-4 shows average daily DO concentrations at the Pine Flat Road Bridge from CY 2016 through CY 2020. Table 2-5 shows the annual minimum, maximum and average DO concentrations and TDG percent saturation for the same CYs when the Jeff L. Powerhouse was operating and when the powerhouse was not operating. During this period, when the powerhouse was not in operation, DO concentration ranged from an instantaneous minimum of 6.3 mg/L to an instantaneous maximum of 14.1 mg/L and TDG percent saturation ranged from an instantaneous minimum of 62.9 percent to an instantaneous maximum of 130.4 percent. When the powerhouse was in operation, TDG percent saturation ranged from an instantaneous minimum of 54.7 percent to an instantaneous maximum of 115.0 percent, and the instantaneous DO concentration was always greater than 7 mg/L except for the

events listed below. In each case, KRCD made every effort to immediately increase DO concentrations. Actions most often utilized included adjusting flows through the Bypass System and decreasing turbine flow and power generation.

- In 2016 for eight days (i.e., seven days in August and on September 23) when the powerhouse went off-line. During these events, daily DO concentrations briefly dipped below 7.0 mg/L. The lowest DO concentration during these instances was 5.1 mg/L.
- In 2017 for five days (i.e., one day in June, three days in October and one day in November). During these events, daily DO concentrations briefly dipped below 7.0 mg/L, with the lowest DO concentration during these instances of 6.5 mg/L.
- In 2018 for eight days in August when DO concentrations dipped below 7.0 mg/l for brief periods lasting between 20 and 190 minutes. The lowest DO concentration during these events was 5.4 mg/L.
- In 2019 for one day in October when DO concentrations dipped below 7.0 mg/l for approximately 90 minutes. The lowest DO concentration during this event was 6.9 mg/L.
- In 2020, on two days in August when DO concentrations were less than less than 7.0 mg/L for about an hour in each day. The lowest DO concentration during these events was 6.8 mg/L.

The events were reported to the Commission in KRCD's annual Dissolved Oxygen Monitoring Final Reports. In each case, the Commission determined the event did not constitute a violation of Article 34 in the license because the event was brief and resulted in minor DO concentration deviations, and KRCD took immediate action to increase DO concentrations which minimized the duration of the event and, in most cases, maintained daily average DO concentrations above 7.0 mg/L.

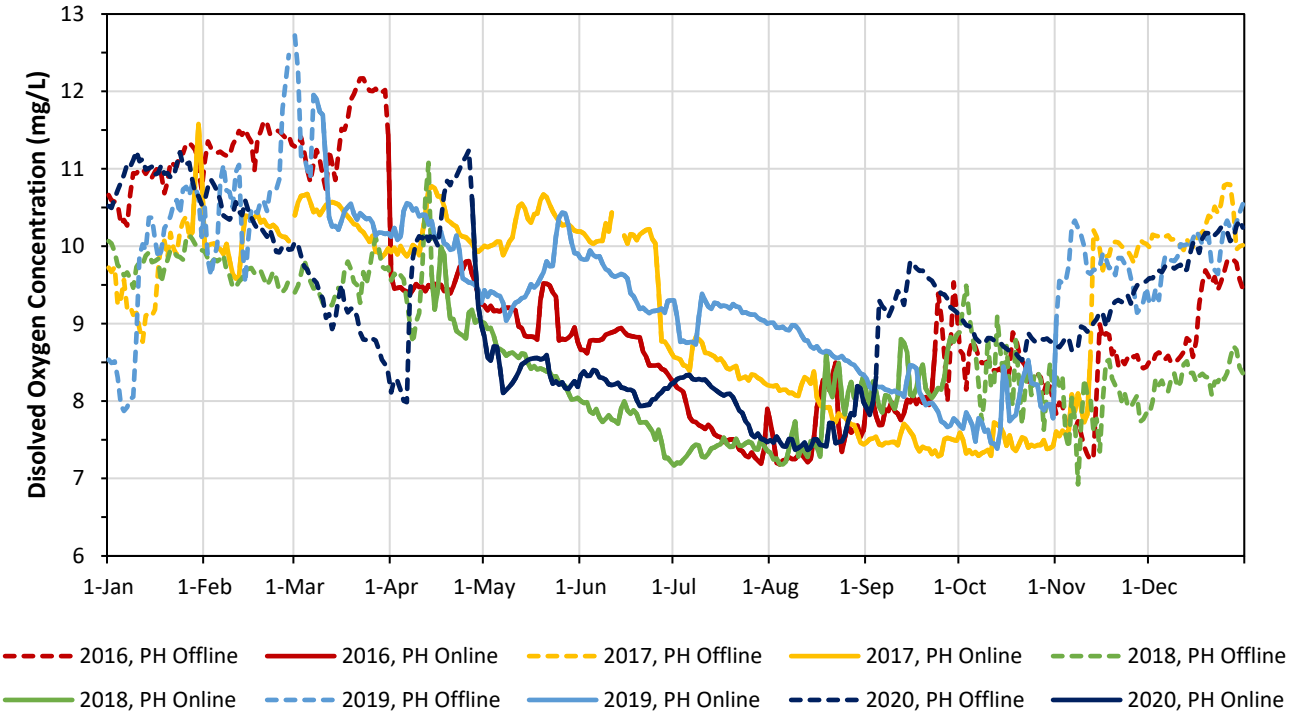


Figure 2-4. Average daily dissolved oxygen concentration with and without the Jeff L. Taylor Powerhouse in operations at the Pine Flat Road Bridge downstream of Pine Flat Dam for Calendar Year 2015 through Calendar Year 2020.

SOURCE: DO concentration and TDG concentrations in Appendix 4 to this IIP.

Table 2-5. Annual minimum, maximum and average dissolved oxygen concentrations with and without the Jeff L. Taylor Powerhouse in operations at the Pine Flat Road Bridge downstream of Pine Flat Dam for Calendar Year 2016 through Calendar Year 2020.

Calendar Year	Dissolved Oxygen Concentrations When Jeff L. Taylor Powerhouse Not Operating			Dissolved Oxygen Concentrations When Jeff L. Taylor Powerhouse Operating		
	Instantaneous Minimum	Instantaneous Maximum	Period Average	Instantaneous Minimum	Instantaneous Maximum	Period Average
DISSOLVED OXYGEN (MILLIGRAMS PER LITER)						
2016	6.7	14.1	9.9	5.1	12.0	8.4
2017	8.3	13.1	9.9	6.5	13.8	9.1
2018	6.3	11.4	9.0	5.4	10.9	8.0
2019	7.2	13.1	10.1	6.9	13.4	9.2
2020	7.5	11.8	9.7	6.8	11.5	8.1
TOTAL DISSOLVED GAS (PERCENT SATURATION)						
2016	68.1	130.4	92.6	54.7	106.6	80.4
2017	72.7	111.1	93.8	63.6	115.0	83.4
2018	62.9	105.3	85.6	56.7	104.5	78.1
2019	66.0	115.6	93.8	70.6	118.7	85.4
2020	68.1	115.0	95.3	70.7	104.5	78.7

SOURCE: DO concentration and TDG concentration data in Appendix 4 to this IIP.

2.2.2.4 Other Water Resources-Related Available Information

Other information regarding water resources downstream of Pine Flat Dam has been prepared by or for the Framework Agreement's Technical Steering Committee (TSC) comprised of KRWA, CDFW and

KRCD. The information is available at KRFMP's https://krfmp.org/resources/reports-documents-test website and includes:

- Water Quality Monitoring Report 2004-2005 (TSC 2006). This report concludes at page 23: "*Results of the 2004-2005 pilot-scale water quality monitoring program provided no evidence to suggest that water quality conditions are a significant factor affecting habitat quality or the health and survival of rainbow trout, macroinvertebrates, or other aquatic organisms inhabiting the Kings River between Pine Flat Dam and Highway 180.*"

2.2.2.5 Specific Water Quality Issue Raised by CDFW

In its July 1, 2021, reply to KRCD's request for waiver of the 3-stage consultation process, CDFW raised a specific concern related to water quality stating:

> First, CDFW believes that water quality objectives for temperature and dissolved oxygen are currently being met by blending flows from the turbine bypass with flows from low-level and mid-level outlets or ports. The practice of blending ports has been used mainly to boost dissolved oxygen. However, with the addition of a new turbine, KRCD will not have the same incentive to blend ports to meet water quality objectives downstream. Therefore, CDFW needs assurances from KRCD that the practice of blending ports will continue after the license amendment. The addition of a turbine generator unit unto the turbine bypass will allow KRCD to generate year-round and this increases the likelihood of cold-water pool depletion and/or supersaturation. Therefore, CDFW needs to ensure that downstream river conditions will remain as beneficial as possible after the addition of a new turbine to the Project. We are interested in water quality data to assess possible impacts.

The Project's FERC license's Article 34 requires during Project operations that KRCD maintain a minimum DO concentration of 7.0 mg/1 at the Pine Flat Road Bridge, and the Framework Agreement's paragraphs 1(c) and 1(d) require KRWA and KRCD to work with CDFW to maintain the temperature control pool in Pine Flat Lake and manage water temperatures downstream of Pine Flat Dam. The addition of Unit 4 will in no way diminish KRCD's incentive to comply with the FERC license or adhere to the Framework Agreement. No change would occur in the magnitude or timing of flows in the Kings River downstream of Pine Flat Dam. The only difference would be that some water that previously would have passed through the Bypass System would now pass though Unit 4. No change would occur in water temperature because Unit 4 would draw water off the Bypass System, so the cool water supplied by the Bypass System now would also be discharged by Unit 4. No change would occur in DO concentration because, like the Bypass System that discharges well-oxygenated water due to an aerial discharge through the Monovar valve, Unit 4 would also have an aerial discharge. KRCD fully anticipates that the water temperatures and DO concentrations under existing conditions that are shown in Figures 2-3 and 2-4 are typical of water temperatures and DO concentrations that would occur with Unit 4 in operations. Further as required by Article 34 in the license, KRCD would continue to monitor and report DO concentrations downstream of the Project, and as required by the Framework Agreement, KRWA and KRCD would continue to monitor and report water temperatures downstream of the Pine Flat Dam.

2.2.3 Fish and Aquatic Resources

The Project's FERC license includes two articles (i.e., 15 and 16) and Exhibit S related to fish and aquatic resources. Pages S-II-10 through S-II-12 in Exhibit S require KRCD to conduct within the first 5 years of Project operations three fish studies: 1) Turbine Mortality Study; 2) Rainbow Trout Population Study; and 3) White Catfish Population Study. These studies were completed.

2.2.3.1 Special-Status Aquatic Species[9]

On August 10, 2021, KRCD queried USFWS's iPac website (USFWS 2021) (Appendix 5) and reviewed CDFW's California Natural Diversity Database (CNDDB) (CDFW 2021) and USACE's 2001 Final Environmental Impact Statement/Environmental Impact Report for Pine Flat Dam Fish and Wildlife Habitat Restoration (USACE 2001) to generate a list of special-status aquatic species with the potential to occur within the 12.4-mile-long section of the Kings River from Pine Flat Dam to the State Highway 180 Bridge. As a result of this query and these reviews, KRCD determined one special-status aquatic species is known to occur in the reach and four more may occur. Hardhead, (*Mylopharodon conocephalus*), which CDFW considers a Species of Special Concern, has been observed in the lower end of the reach near Wildwood. Kern Brook lamprey (*Lampetra hubbsi*) and riffle sculpin (*Cottus gulosus*), which CDFW considers Species of Special Concern, were reported to occur in the reach in the past. However, fish sampling for the past 13 years has collected only small lamprey and sculpins and these specimens have been identified to genera only (e.g., *Lampetra* sp. and *Cottus* sp.) due to the lack of distinguishing morphological characteristics that would allow positive identification to species. Kern Brook lamprey has a relatively small range, which includes the reach, though the nearest known occurrence of the species is some 70 miles northwest (CDFW 2021). The riffle sculpin's range also includes the reach, though the nearest known occurrence is approximately 76 miles northwest of the reach (CDFW 2021). Therefore, the occurrence of these two fish species in the reach is unlikely but cannot be ruled out. Southwestern pond turtle (*Emys pallida*), a Species of Special Concern, is likely to occur in the reach. Southwestern pond turtle is frequently seen in Pine Flat Reservoir (California Watchable Wildlife 2021, CDFW 2021). The last special-status aquatic species with the potential to occur on the reach is foothill yellow-legged frog (*Rana boylii*), which is listed as endangered under the California Endangered Species Act (CESA). No documented occurrences of foothill yellow-legged frog occur in the reach, and the closest known occurrence, per the CNNDB, is roughly 1 mile north of the Project (CDFW 2021). Therefore, KRCD cannot exclude it from consideration.

No aquatic species or critical habitat protected under the Endangered Species Act (ESA)[10] or aquatic species fully protected species under California law are known to occur in the 12.4-mile-long reach.

[9] Special-status aquatic species were defined as aquatic species that meet one or more of the following criteria: 1) listed by the California Fish and Game Commission on its State and Federally Listed Endangered, Threatened, and Rare Plants of California; 2) listed or proposed for listing under the federal Endangered Species Act; 3) listed by CDFW as a Species of Special Concern; 4) listed under the California Endangered Species Act as endangered or threatened; and 5) Listed by California as Fully Protected.

[10] Two ESA-listed aquatic species were listed on the USFWS iPac report that KRCD obtained: California red-legged frog (*Rana draytonii*) and giant gartersnake (*Thamnophis gigas*), but the Project is well outside the known range for both species (Nafis 2021). In addition, a third ESA-listed species, California tiger salamander (*Ambystoma californiense*), which is also listed under CESA, was listed on the USFWS iPac report that KRCD obtained. KRCD excluded the California tiger salamander for further consideration because suitable habitat for the species (i.e., it breeds in fish-free ephemeral ponds which form in winter and dry in summer. Some also breed in slow streams and semi-permanent waters, including cattle ponds) does not occur within or adjacent to the FERC Project Boundary and these-type habitats along the reach are not affected by the Project.

Nor does the reach encompass any essential fish habitat (EFH) protected under the Magnuson-Stevens Fishery Conservation and Management Act or environmentally sensitive areas.

2.2.3.2 Fishery Management and Stocking

CDFW manages a put-and-take trout fishery in the Kings River downstream of Pine Flat Dam. California Fish and Game Commission's restrictions are:

> 1) Kings River from Pine Flat Dam downstream to U. S. Army Corps of Engineers Bridge on Pine Flat Road - Closed to all fishing all year.
>
> 2) Kings River from the U.S. Army Corps of Engineers Bridge on Pine Flat Road downstream to Cobbles (Alta) Weir. Open All Year - 5 Trout Limit.
>
> 3) Kings River Thorburn Spawning Channel, the 2,200-footlong channel located 5 miles downstream from Pine Flat Dam, and the reach of river within a 200-foot radius of the channel exit. Closed to all fishing all year.
>
> 4) Kings River, from Cobbles (Alta) Weir downstream to the Highway 180 crossing. - Open all year. Only artificial lures with barbless hooks may be used - catch and release.
>
> 5) Kings River from the Highway 180 crossing downstream. Open all year - 5 trout limit.

Since 2007, CDFW has stocked rainbow trout (*Oncorhynchus mykiss*) and brook trout (*Salvelinus fontinalis*) in the Kings River downstream of Pine Flat Dam. In addition, as required by paragraph 1(j) in the Framework Agreement, CDFW in cooperation with KRWA, KRCD, and appropriate fishing organizations implement a focused supplemental rainbow trout stocking program. The program is designed to provide an attractive trout fishery and emphasizes stocking in the main channel and channels that flow into or out of the main channel, and stocking "put-and-grow" sub-catchable fish and eggs that can mature into a sustaining population of adult fish whenever appropriate. The supplemental stocking program is in addition to CDFW's existing stocking program. Table 2-6 provides a summary of fish stocking in the reach from 2007 through 2020. CDFW stocks on a weekly basis downstream to Reedley Beach, and the Framework Agreement and KRCD stock between October and April.

Table 2-6. Fish stocking in the Kings River downstream of Pine Flat Dam from 2007 through 2020.

Calendar Year	Trout Species	CDFW Regular Stocking (size)[1]				Kings River Fisheries Management Program Supplemental Stocking (size)[2]		
		Sub-Catchable (pounds)	Catchable (pounds)	Super-Catchable (pounds)	Trophy (pounds)	Catchable (pounds)	Super-Catchable (pounds)	Trout Egg Incubator Program / Incubated Eggs - Released at Fry Stage (number)
2007	Rainbow	2,000	19,364	3,234	6,240	No Stocking Occurred		166,000
2008	Rainbow	3,430	17,030	3,100	8,000			150,000
2009	Rainbow	2,560	18,200	5,300	6,550			300,000
2010	Rainbow	2,200	17,700	3,320	1,000			300,000
	Brook		600	2,900				
2011	Rainbow	2,000	14,300	7,000				150,000
	Brook		5,000					

Table 2-6. (continued)

Calendar Year	Trout Species	CDFW Regular Stocking (size)[1]				Kings River Fisheries Management Program Supplemental Stocking (size)[2]		
		Sub-Catchable (pounds)	Catchable (pounds)	Super-Catchable (pounds)	Trophy (pounds)	Catchable (pounds)	Super-Catchable (pounds)	Trout Egg Incubator Program / Incubated Eggs - Released at Fry Stage (number)
2012	Rainbow		18,800	7,000	2,600	No Stocking Occurred		150,000
	Brook		1,400	100				
2013	Rainbow	4,370	9,800	6,075	5,325			482,000
	Brook		6,300	500				
2014	Rainbow	3,000	13,300	6,200				300,000
	Brook		800	2,800				
2015	Rainbow	2,605	6,800	2,300				300,000
	Brook			1,100				
2016	Rainbow		13,170	9,250				304,000
	Brook							
2017	Rainbow		6,000	2,400	2,000			374,000
	Brook		1,600	4,920				
2018	Rainbow		24,834	1,350	3,325	8,800		220,000
2019	Rainbow	4,821	13,470	3,600	2,300	17,200		337,000
	Brook			1,000				
2020	Rainbow	3,460	16,750	1,500		13,700	2,000	226,000
	Brook		7,450					

[1] SOURCE: Johnson, Kenneth. California Department of Fish and Wildlife. Trout Planting Data from 2001 - 2016, December 7, 2017, Kings River Conservation District, California.

[2] SOURCE: Kings River Fisheries Management Program Annual Technical Report (Water Year 2014-2018, 2018-2019, 2019-2020). Kings River Conservation District Environmental Resource Division, https://krfmp.org/resources/reports-documents-test/. Accessed 13 Aug. 2021.

2.2.3.3 Fish Community

As required by paragraph 1(k) in the MOU between CDFW and KRCD, KRWA, CDFW and KRCD monitor the fish community in the Kings River from Pine Flat Dam to Wildwood. Beginning in 1996, six sites were sampled in most years, with a few extra sites in some years. Figure 2-5 shows the locations of the six sites that have been monitored routinely for fish from 1996 through 2019. The sites correspond to three reaches where substantial flow changes may occur: 1) the Upper Reach between Pine Flat Dam and the Alta Diversion Weir; 2) the Middle Reach between the Alta Diversion Weir and the Fresno Weir; and 3) the Lower Reach downstream of the Fresno Weir. Neither the Alta Diversion Weir or Fresno Weir are part of the Project or under FERC's jurisdiction.

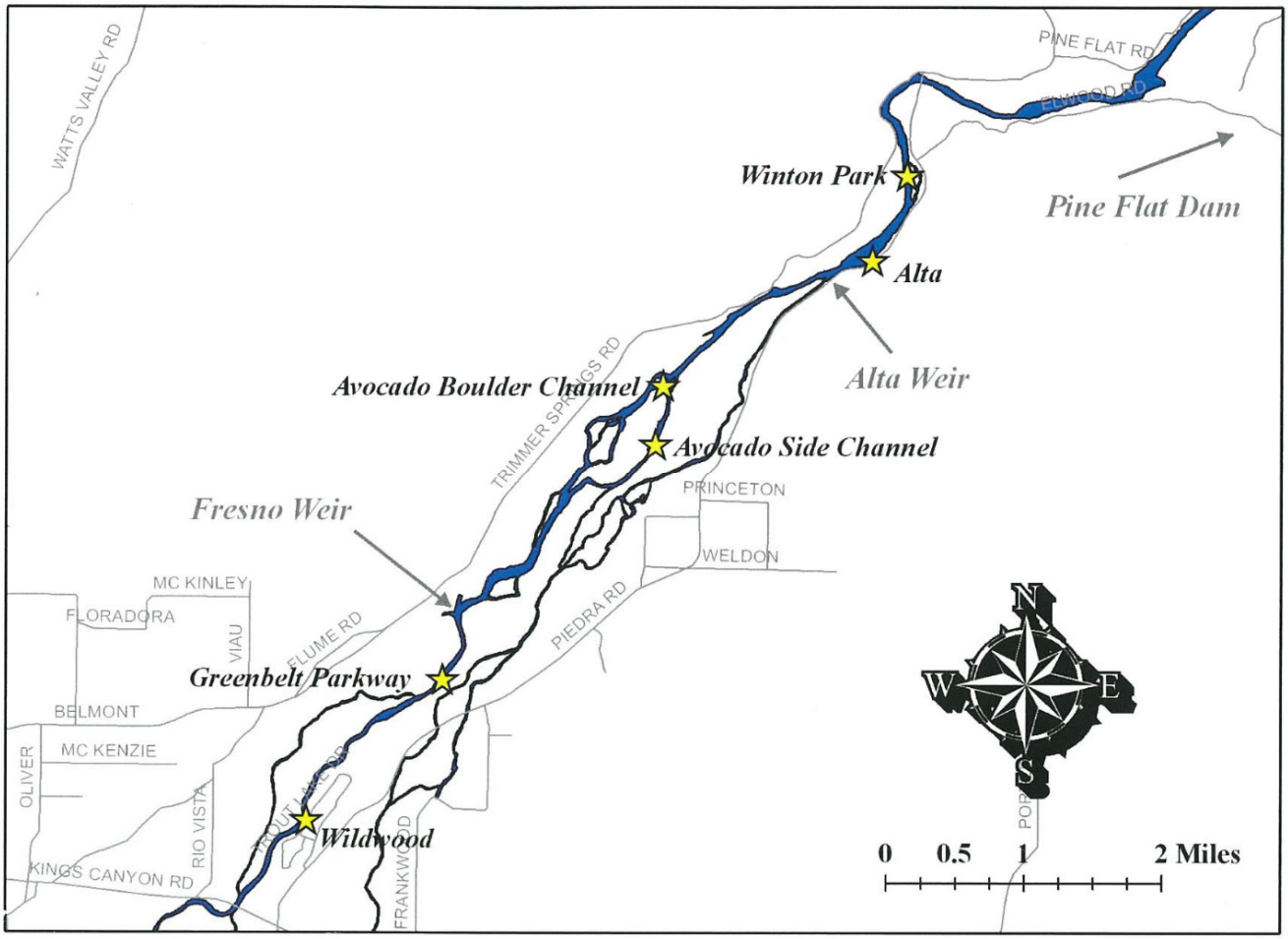


Figure 2-5. Location of KRCD's Winton Park, Alta, Avocado Boulder Channel, Avocado Side Channel, Greenbelt Parkway and Wildwood fish monitoring sites sampled from 2007 through 2019.
SOURCE: From Figure 2 in 2019 KRCD's Lower Kings River Annual Trout and Non-Game Fish Population Survey report.

A three-pass mark-and-recapture electrofishing survey was employed from 1983 until 1989. Starting in 1990, the survey method was modified to a single pass count of captured trout using only a single block seine net at the upstream end of the sample reach. In 2007, the survey method was modified to include a full biomass three-pass removal with upstream and downstream block seines; and identifying, measuring, and weighing every fish sampled.

In addition, under the Framework Agreement, KRWA, in cooperation with CDFW, conducted snorkeling surveys upstream and downstream of the Alta Diversion Weir in 2019.

Summaries of KRCD's electrofishing data from 2007, when the sampling method was standardized, through 2019 and KRWA's snorkeling data from 2019 are provided by reach below. Since each electrofishing site is approximately 300 ft in length, comparison between sites is appropriate.

Upper Reach (Winton Park and Alta Fish Monitoring Sites)

The River Channel below Pine Flat Dam receives flow from Pine Flat Dam and the Jeff L. Taylor Powerhouse releases. Unimpaired tributaries downstream of Pine Flat may also contribute flow to the river and are considered in determining minimum releases from Pine Flat Dam. Minimum combined flow from these sources is 100 cfs, of which 50 cfs must come from Pine Flat. As described above, the minimum flow requirement in the Project's FERC license is 25 cfs when the Jeff L Taylor Powerhouse is operating.

Tables 2-7 and 2-8 present fish population estimates by sampling site for the Winton Park and Alta monitoring sites, respectively. Collectively, a total of 15 fish taxa was collected over the 13 years of monitoring, including seven native taxa that were collected at both the Winton Park and Alta monitoring sites and eight introduced fish taxa.[11] In most years, the catch at each site was numerically dominated by a combination of five native taxa: 1) sculpin sp. (*Cottus* sp.); 2) Sacramento pikeminnow (*Ptychocheilus oregonensis*); 3) Sacramento sucker (*Catostomus occidentalis*); 4) Lamprey sp. (*Lampetra* sp.); and 5) California roach (*Hesperoleucus symmetricus*), with the latter two taxa more abundant at the downstream Alta site. Rainbow trout and hatchery trout accounted for very small portions of the catch in each year.

Table 2-7. Fish population estimates by maximum likelihood at the Winton Park electrofishing site from 2007 through 2019.[1]

Common Name *Scientific Name*	Calendar Year												
	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019
NATIVE TO KINGS RIVER													
California roach *Hesperoleucus symmetricus*	3			6	18			26	34	11			
Lamprey sp. *Lampetra* sp.	1	2	4					3	2	3		2	6
Rainbow trout *Oncorhynchus mykiss*	24	7	7	8		11	3		1			1	1
Sacramento pikeminnow *Ptychocheilus oregonensis*	113	91	14	13	50	1	194	208	141	78	No Data[2]	6	59
Sacramento sucker *Catostomus occidentalis*	838	107	35	41	284	128	394	121	538	844		402	66
Sculpin sp. *Cottus* sp.	440	176	330	529	326	372	521	396	164	230		724	455
Three-spined stickleback *Gasterosteus aculeatus*	10		1	20	40		15	46	75	158		16	9
INTRODUCED TO KINGS RIVER													
Brook trout *Salvelinus fontinalis*				1									
Catfish sp. *Ameiurus sp.*													3
Green sunfish *Lepomis cyanellus*					1						No Data[2]		
Hatchery-reared rainbow trout (*O. mykiss*)	9		1	1						2		4	
Mosquitofish *Gambusia affinis*									2				

[11] Although more than one species of sculpin, lamprey, and catfish may have been collected during any monitoring event, due to the difficulty in identifying small individuals of these species, they were classified within their respective genus unless a definitive identification occurred.

Table 2-7. (continued)

Common Name *Scientific Name*	Calendar Year												
	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019
INTRODUCED TO KINGS RIVER (continued)													
White catfish *Ameiurus catus*								2			No Data[2]		
Site Total	**1,438**	**383**	**392**	**619**	**718**	**512**	**1,127**	**802**	**957**	**1,326**	**--**	**1,155**	**599**
Taxa per Year	**8**	**5**	**7**	**8**	**5**	**4**	**5**	**7**	**8**	**7**	**--**	**7**	**7**
Total Taxa	**13**												

[1] SOURCE: KRCD's Lower Kings River Annual Trout and Non-Game Fish Population Survey reports available at https://krfmp.org/resources/reports-documents-test/. Population estimates at the 300-ft-long site were produced using Microfish 3.0 (Van Deveeter J.S. 2014).

[2] The site was not sampled in 2017 for safety reasons due to higher than normal instream flow resulting from unusually wet hydrologic conditions.

Table 2-8. Fish population estimates at the Alta electrofishing site from 2007 through 2019.[1]

Common Name *Scientific Name*	Calendar Year												
	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019
NATIVE TO KINGS RIVER													
California roach *Hesperoleucus symmetricus*	3	6	150	22	7	39	54	152	189	376	No Data[2]	6	No Data[2]
Lamprey sp. *Lampetra* sp.	407	70	86	141	49	154	35	159	160	165		81	
Rainbow trout *Oncorhynchus mykiss*	4	4	1		3	3						2	
Sacramento pikeminnow *Ptychocheilus oregonensis*	27	15	65	13	23	21	172	55	247	78		14	
Sacramento sucker *Catostomus occidentalis*	535	231	141	207	112	466	268	99	536	556		510	
Sculpin sp. *Cottus* sp.	617	175	384	332	229	469	191	61	10	30		779	
Three-spined stickleback *Gasterosteus aculeatus*	46	36	57	122	50	54	64	258	31	117		10	
INTRODUCED TO KINGS RIVER													
Bass sp. *Micropterus* sp.									1		No Data[2]		No Data[2]
Brook trout *Salvelinus fontinalis*				7	1								
Hatchery-reared rainbow trout (*O. mykiss*)	29		1	1			1					4	
Mosquitofish *Gambusia affinis*		2					1	1	23	17			
Site Total	**1,668**	**539**	**885**	**845**	**474**	**1,206**	**786**	**785**	**1,197**	**1,339**	**--**	**1,406**	**--**
Taxa per Year	**8**	**8**	**8**	**8**	**8**	**7**	**8**	**7**	**8**	**7**	**--**	**8**	**--**
Total Taxa	**11**												

[1] SOURCE: KRCD's Lower Kings River Annual Trout and Non-Game Fish Population Survey reports available at https://krfmp.org/resources/reports-documents-test/. Population estimates at the 300-ft-long site were produced using Microfish 3.0 (Van Deveeter J.S. 2014).

[2] The site was not sampled in 2017 for safety reasons due to higher than normal instream flow resulting from unusually wet hydrologic conditions.

KRWA's 2019 snorkeling survey confirmed the species composition and relative abundance of fishes observed in electrofishing monitoring. Based on the snorkeling, KRWA estimated the population of rainbow trout in this reach was 109 fish per mile in November 2019, with the majority of rainbow trout in runs and riffles. (FISHBIO 2020.)

Middle Reach (Avocado Boulder Channel and Avocado Side Channel Monitoring Sites)

The first diversion point on the river is at Cobbles Weir, which diverts water into a side channel of the river known as the "76" channel, upwards of 900 cfs may be diverted from the "76" Channel at the Alta Canal Headgate. Additional flow in the "76" channel may return to the main channel at a confluence

below the Fresno Weir. The main River Channel continues to receive flow minus diversions. Below Cobbles Weir, flow may be diverted from the river at Dennis Cut and Gould Weir. Minimum flow in Dennis Cut is 5 cfs. Diversions at Gould Weir, into the Gould Canal Headgate may be up to about 400 cfs. The Project's FERC license does not include flow requirements in this reach.

Tables 2-9 and 2-10 present fish population estimates by sampling site for the Avocado Boulder Channel and Avocado Side Channel monitoring sites, respectively. A total of 14 fish taxa was collected over the 13 years of monitoring at both sites, including seven native fish taxa that were collected at both the sites and seven introduced fish taxa. In most years, the catch at each site was numerically dominated by a combination of six native taxa: 1) sculpin sp.; 2) Sacramento pikeminnow; 3) Sacramento sucker; 4) Lamprey sp.; 5) California roach; and 6) three-spined stickleback (*Gasterosteus aculeatus*). Rainbow trout and hatchery trout accounted for very small portions of the catch in each year.

Table 2-9. Fish population estimates at the Avocado Boulder Channel electrofishing site from 2007 through 2019.[1]

Common Name *Scientific Name*	**Calendar Year**												
	2007	**2008**	**2009**	**2010**	**2011**	**2012**	**2013**	**2014**	**2015**	**2016**	**2017**	**2018**	**2019**
NATIVE TO KINGS RIVER													
California roach *Hesperoleucus symmetricus*	20	126	45	79	24	348	192	249	350	491	No Data[2]	70	12
Lamprey sp. *Lampetra* sp.	5	6	5	7	27	24	7	43	38	35		10	8
Rainbow trout *Oncorhynchus mykiss*	8	7	11		5	12	4		1	2		7	3
Sacramento pikeminnow *Ptychocheilus oregonensis*	112	389	154	40	10	46	353	311	501	232		27	8
Sacramento sucker *Catostomus occidentalis*	573	261	268	162	88	415	282	169	366	1,034		517	210
Sculpin sp. *Cottus* sp.	201	147	268	239	87	302	305	141	27	26		156	68
Three-spined stickleback *Gasterosteus aculeatus*	7	27	31	4	9	6	6	55	21	142		24	13
INTRODUCED TO KINGS RIVER													
Bass sp. *Micropterus* sp.								1			No Data[2]		
Hatchery-reared rainbow trout (*O. mykiss*)	2	1		2	6	3	1	1	1	8		4	41
White catfish *Ameiurus catus*		1						2					
Site Total	**928**	**965**	**782**	**533**	**256**	**1,156**	**1,150**	**972**	**1,305**	**1,970**	**--**	**815**	**363**
Taxa per Year	**8**	**9**	**7**	**6**	**8**	**8**	**8**	**9**	**8**	**8**		**8**	**8**
Total Taxa	**14**												

[1] SOURCE: KRCD's Lower Kings River Annual Trout and Non-Game Fish Population Survey reports available at https://krfmp.org/resources/reports-documents-test/. Population estimates at the 300-ft-long site were produced using Microfish 3.0 (Van Deveeter J.S. 2014).

[2] The site was not sampled in 2017 for safety reasons due to higher than normal instream flow resulting from unusually wet hydrologic conditions.

Table 2-10. Fish population estimates at the Avocado Side Channel Alta electrofishing site from 2007 through 2019.[1]

Common Name *Scientific Name*	**Calendar Year**												
	2007	**2008**	**2009**	**2010**	**2011**	**2012**	**2013**	**2014**	**2015**	**2016**	**2017[2]**	**2018**	**2019**
NATIVE TO KINGS RIVER													
California roach *Hesperoleucus symmetricus*	82	46	6	5	39	45	263	104	253	283	118	11	25
Lamprey sp. *Lampetra* sp.	204	112	118	42	135	114	105	210	54	386		181	169
Rainbow trout *Oncorhynchus mykiss*		8	2	3	4	9	4			4	6	8	10

Table 2-10. (continued)

Common Name *Scientific Name*	Calendar Year												
	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017[2]	2018	2019
NATIVE TO KINGS RIVER (continued)													
Sacramento pikeminnow *Ptychocheilus oregonensis*	170	53	31	7	2	254	183	86	185	10	42	5	4
Sacramento sucker *Catostomus occidentalis*	372	112	137	45	54	319	88	71	268	291	361	552	155
Sculpin sp. *Cottus* sp.	350	73	137	101	159	212	218	107	8	4	172	209	169
Three-spined stickleback *Gasterosteus aculeatus*	21	25	21		4	36	10	60	20	559	83	107	9
INTRODUCED TO KINGS RIVER													
Bass sp. *Micropterus sp.*									1			1	
Brook trout *Salvelinus fontinalis*				1									
Catfish sp. *Cottus* sp.													2
Hatchery-reared rainbow trout (*O. mykiss*)			8		1		1			2	5	3	8
Largemouth bass *Micropterus salmoides*			1										
Mosquitofish *Gambusia affinis*						9		2					
White catfish *Ameiurus catus*		1						2					
Site Total	**1,199**	**430**	**461**	**204**	**398**	**998**	**872**	**642**	**789**	**1.539**	**787**	**1,077**	**551**
Taxa per Year	**6**	**8**	**8**	**7**	**8**	**8**	**8**	**8**	**7**	**8**		**9**	
Total Taxa	**13**												

[1] SOURCE: KRCD's Lower Kings River Annual Trout and Non-Game Fish Population Survey reports available at https://krfmp.org/resources/reports-documents-test/. Population estimates at the 300-ft-long site were produced using Microfish 3.0 (Van Deveeter J.S. 2014).

[2] Unlike in other years, KRCD reported a range of maximum probability for population estimates in 2017. Th number provided here is the midpoint in the reported range.

As with the Upper Reach, KRWA's 2019 snorkeling survey confirmed the species composition and relative abundance of fishes observed in electrofishing monitoring. Based on the snorkeling, KRWA estimated the population of rainbow trout in the Middle Reach was 174 fish per mile in November 2019, with the majority of rainbow trout in runs and riffles. (FISHBIO 2020.)

Lower Reach (Greenbelt Parkway and Wildwood Monitoring Sites)

Minimum flow at Fresno Weir is 95 cfs. Two diversions at Fresno Weir are Fresno Canal and Consolidated Canal, with a combined diversion capacity upwards of 3,200 cfs. The River Channel below Fresno Weir receives flow minus these diversions. Minimum flows in the river below Fresno Weir range from 35 to 45 cfs, depending on the time of year. Additional flow below Fresno Weir may occur to meet irrigation demand or flood flow requirements. The Project's FERC license does not include flow requirements in this reach.

Tables 2-11 and 2-12 present fish population estimates by sampling site for the Greenbelt Parkway and Wildwood monitoring sites, respectively. At both sites, a total of 18 fish taxa was collected over the 13 years of monitoring, including eight native fish taxa that were collected at both the sites and hardhead that was collected at the Greenbelt Parkway site, and 10 introduced fish taxa. In most years, the catch at each site was numerically dominated by a combination of five native fish taxa: 1) sculpin sp.; 2)

Sacramento pikeminnow; 3) Sacramento sucker; 4) Lamprey sp.; and 5) California roach. Rainbow trout and hatchery trout accounted for very small portions of the catch in each year.

Table 2-11. Fish population estimates at the Greenbelt Parkway electrofishing site from 2007 through 2019.[1]

Common Name *Scientific Name*	Calendar Year												
	2007	**2008**	**2009**	**2010**	**2011**	**2012**	**2013**	**2014**	**2015**	**2016**	**2017[2]**	**2018**	**2019**
NATIVE TO KINGS RIVER													
California roach *Hesperoleucus symmetricus*	177	253	56	75	41	146	297	228	113	114	197	96	10
Rainbow trout *Oncorhynchus mykiss*	3	1				1							
Hardhead *Mylopharodon conocephalus*												1	
Lamprey sp. *Lampetra* sp.	3	2	1	1		4	5	5		2	15	6	2
Sacramento pikeminnow *Ptychocheilus oregonensis*	382	160	114	59	18	69	1,255	150	175	56	32		22
Sacramento sucker *Catostomus occidentalis*	344	119	89	14	14	108	69	34	24	574	197	156	102
Sculpin sp. *Cottus* sp.	219	29	89	85	150	130	195	36	7	37	164	261	71
Three-spined stickleback *Gasterosteus aculeatus*			5		1	4	28	6		6	121	28	5
INTRODUCED TO KINGS RIVER													
Bass sp. *Micropterus* sp.								27	56	15	4	1	
Bluegill *Lepomis macrochirus*			1							3			
Bullheads *Ameiurus* sp.			1										
Catfish sp. *Ameiurus* sp.									2			1	1
Green sunfish *Lepomis cyanellus*											6		
Hatchery-reared rainbow trout (*O. mykiss*)											1		
Largemouth bass *Micropterus salmoides*			1										
Mosquitofish *Gambusia affinis*								3	20	1			
Smallmouth bass *Micropterus dolomieu*			2				5						
White catfish *Ameiurus catus*		1	1			1	3	15					
Site Total	**1,128**	**565**	**360**	**234**	**224**	**463**	**1,857**	**504**	**397**	**808**	**737**	**550**	**213**
Taxa per Year	**6**	**7**	**11**	**5**	**5**	**8**	**8**	**9**	**7**	**9**	**9**	**8**	**7**
Total Taxa	**19**												

[1] SOURCE: KRCD's Lower Kings River Annual Trout and Non-Game Fish Population Survey reports available at https://krfmp.org/resources/reports-documents-test/. Population estimates at the 300-ft-long site were produced using Microfish 3.0 (Van Deveeter J.S. 2014).

[2] Unlike in other years, KRCD reported a range of maximum probability for population estimates in 2017. Th number provided here is the midpoint in the reported range.

Table 2-12. Fish population estimates at the Wildwood electrofishing site from 2007 through 2019.[1]

Common Name *Scientific Name*	Calendar Year												
	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017[2]	2018	2019
NATIVE TO KINGS RIVER													
California roach *Hesperoleucus symmetricus*	57	433	440	564	390	545	480	517	1,060	922	No Data[2]	513	154
Rainbow trout *Oncorhynchus mykiss*										1			
Lamprey sp. *Lampetra* sp.	8		1	13				1	1			9	12
Sacramento pikeminnow *Ptychocheilus oregonensis*	1,441	194	181	108	8	531	908	328	161	66		59	9
Sacramento sucker *Catostomus occidentalis*	368	24	95	133	156	760	202	93	25	827		506	401
Sculpin sp. *Cottus* sp.	353	84	95	93	150	127	152	62	6	1		165	144
Three-spined stickleback *Gasterosteus aculeatus*	22	55	25	69	3	30	150	164	40	175		12	6
INTRODUCED TO KINGS RIVER													
Bass sp. *Micropterus* sp.								1	4	1	No Data[2]		
Catfish sp. *Ameiurus* sp.													1
Mosquitofish *Gambusia affinis*								13	19	21			
Site Total	**2,249**	**790**	**837**	**980**	**707**	**1,993**	**1,892**	**1,179**	**1,316**	**2,014**	**--**	**1,264**	**727**
Taxa per Year	**6**	**5**	**6**	**6**	**5**	**5**	**5**	**8**	**8**	**7**	**--**	**6**	**7**
Total Taxa	**14**												

[1] SOURCE: KRCD's Lower Kings River Annual Trout and Non-Game Fish Population Survey reports available at https://krfmp.org/resources/reports-documents-test/. Population estimates at the 300-ft-long site were produced using Microfish 3.0 (Van Deveeter J.S. 2014).

[2] The site was not sampled in 2017 for safety reasons due to higher than normal instream flow resulting from unusually wet hydrologic conditions.

KRWA's 2019 snorkeling survey did not include the Lower Reach (FISHBIO 2020).

2.2.3.4 Other Fish-Related Available Information

Other information regarding fishes downstream of Pine Flat Dam has been prepared by or for the Framework Agreement's Technical Steering Committee comprised of KRWA, CDFW and KRCD. The information is available at KRFMP's https://krfmp.org/resources/reports-documents-test website and includes:

- Analysis of the Condition of Rainbow Trout Collected from the Kings River Downstream of Pine Flat Dam 1983-2005 (Hanson Environmental, Inc. 2005). Page 5 of the report states: "*Analysis of the length-weight relationship (Figure 2) and condition factors for rainbow trout (Table 1) collected from the Kings River over the 23-year period from 1983 through 2005 consistently were within the range of values reflecting healthy trout, in good condition.*"
- Movement of Resident Rainbow Trout: Movement in Response to Temperature, Flow, Management Zone and Weirs in the Kings River Below Pine Flat Dam 2012 (TRC 2012a). Page 1 of the report states "*Results showed that the study population contained both sedentary and mobile trout. Trout were observed having traveled total distances ranging from a minimum of 0 m to a maximum of 30,195 m; upstream, downstream or a combination*

of both. No correlation was found amid dependent variables; direction, rate, or distance moved with independent variables; size class, water temperatures or flow, indicating that trout were not displaced from the fishery by changes in seasonal discharge. In addition, three of the five diversion weirs evaluated did not present an upstream obstacle to study trout of either size class. In all, no determinate cause for trout movement or relocation was identified among the tested variables."

- Harvest of Rainbow Trout: The Effects of Time, Flow, Size Class, Planting Location and Management Zone on Trout Harvest in the Kings River Below Pine Flat Dam 2012 (TRC 2012b). Page 1 of the reports states "*Results of our three year telemetry investigation found that on average* [stocked] *trout reside in the fishery for approximately 54 days prior to harvest. Of those caught 59% were classified as large or trophy sized and 41% were classified as small or catchable sized. Not surprisingly, the majority of trout harvested from the fishery were in easy to access Put and Take management zones during river flows which measured 500 cfs or below.*"

- Habitat Selection Report: The effects of flow and size-class on habitat use by rainbow trout within the Kings River downstream of the Pine Flat Dam 2012 (TRC 2011). Page 1 of the report states "*We quantified the amount of availability for seven habitat types (pools, runs, riffles, boulder projects, glides, weirs, and side channels) across three different flows (100-249 cfs, 250-999 cfs, and ≥ 1,000 cfs) for a 9.4 mile reach of the Kings River below Pine Flat Dam. Use of habitat types by rainbow trout Oncorhynchus mykiss was quantified using relocation data collected from trout implanted with radio transmitters. The effects of flow and trout size-class were tested on the use of available habitat across the three flow stages. Use varied from strong avoidance to strong preference depending on habitat type, size-class, and flow. In general, trout avoided boulder projects and side channels at low flow. Weirs and side channels were avoided at intermediate flows and runs and side channels were avoided at high flows. We also found that roughly half of the trout in our study chose a single habitat type and location for the duration of their residency while the other half chose multiple habitat types and locations*."

- Habitat Selection, Behavioral Movement, and Fate of Adult Rainbow Trout within the Kings River Downstream of Pine Flat Dam 2012, Summary Report (TRC 2012c). This report summarizes the three above reports.

- Kings River Genetics Study Program Year, Program Year 2011-15 (TRC Undated). Page 4 of the report states "*Samples taken below Pine Flat Dam showed an elevated level of genetic variation indicating that there is little to no inbreeding occurring in the fishery. The levels of genetic variation were slightly higher in the samples taken below the* [Pine Flat] *reservoir than from those taken above. Pairwise population genetic differentiation, as estimated by FST was 0.037 (95% confidence interval: 0.022-0.053) (Aguilar, 2014), indicating that genetic differences between the above dam population and below dam population are minimal*."

- Lower Kings River Fishery Habitat Characteristic and Identification of Habitat Enhancement Opportunities 2019 (Cramer Fish Sciences 2019). Page viii of the report states "*At flows of 100 cfs, the model predicts ~40-70 acres of river channel meet spawning depth and velocity preferences of Rainbow Trout. At 250 cfs, this increases to ~70-100 acres.*

However, the substrate analysis implies that less than 25% of bed surface particles within areas that meet spawning depth and velocities could be mobilized by spawning Rainbow Trout (substrate is too large). Although some variability in grainsize was observed along the stream corridor, oversized material appears to be a chronic issue throughout the study reach. Shear stress predictions, coupled with reduced sediment recruitment from upstream (reservoir storage), suggest that at 8,800 cfs the current channel configuration does not facilitate persistence of Rainbow Trout spawning gravels within the study reach. For a minimum viable population of 833 spawners (Population 1), our model predicts ~ 0.5 acres (SD 0.3) of spawning habitat is needed. For a harvestable population (Population 2) that supports past angling pressure (1,600-2,300 spawners; 35,000 harvestable fish annually), the model predicts ~2.6 acres (SD 1.9) of suitable spawning habitat is required."

2.2.3.5 Benthic Macroinvertebrates

As part of the Framework Agreement, the Technical Steering Committee conducted a benthic macroinvertebrate (BMI) study downstream of Pine Flat Dam in 2006 and 2007. The resulting report entitled Results of Macroinvertebrate Sampling on the Kings River below Pine Flat Dam (TRC 2009) is available at KRFMP's https://krfmp.org/resources/reports-documents-test website. A total of 54 BMI samples was collected and processed to identify and enumerate the BMI collected. Page 10 of the report provides the following summary:

> Overall, results of the 2006-2007 lower Kings River macroinvertebrate surveys show that the river supports a diverse assemblage of macroinvertebrates. Important components of the community in terms of both habitat indicators, and as a prey base for resident trout and other fish, are the Ephemeroptera (mayfly), Plecoptera (stonefly), and Trichoptera (caddisfly) insects that together comprise the EPT taxa. On the lower Kings River, the percent composition of the macroinvertebrate community comprised of the EPT taxa ranged from 36% to 66% of the macroinvertebrates in the February 2006 survey (Table 6), 48% to 76% in the November 2006 survey (Table 7), and 51% to 70% in the January 2007 survey (Table 8). The values of the ETP taxa (% index) were higher in all surveys on the lower Kings River during 2006 and 2007 than 75% of the studies from other Central Valley rivers and streams (Appendix A; Tables 25-27). These results are consistent with results of the length-weight (condition factor) analysis that showed rainbow trout inhabiting the lower Kings River were in good condition. In addition, growth rates for resident rainbow trout have been found to be relatively high, which supports the finding that the macroinvertebrate community inhabiting the river is relatively diverse (the diversity index for the river was consistently higher than the majority of other Central Valley rivers and streams; Tables 25-27) and provides a prey resource for trout and other fish species. These findings are further reinforced by the Central Valley IBI analysis which rates the Kings River BMI sampling sites as Fair or Good.

2.2.4 Terrestrial Resources

The Project's FERC license includes two articles (i.e., 15 and 16) and Exhibit S related to terrestrial resources. Pages S-III-3 and S-III-4 in Exhibit S of the Project's FERC license requires KRCD to conduct three wildlife studies: 1) Noise; 2) Habitat Loss; and 3) Raptor Electrocution. These studies were completed.

2.2.4.1 Special-Status Terrestrial Species and Sensitive Areas[12]

On August 10, 2021, KRCD queried USFWS's iPac (USFWS 2021) shown in Appendix 5 to this IIP, CDFW's CNDDB (CDFW 2021), and California Native Plant Society's Inventory of Rare and Endangered Plants of California (CNPS 2021) databases to generate a list of special-status plants and terrestrial species with the potential to occur within the FERC Project Boundary. KRCD identified 28 special-status terrestrial species with the potential to occur on the Project. This included 15 special-status plants and 13 special-status wildlife species.

Table 2-13 provides for each of the special-status plant species: 1) status; 2) flowering period; 3) elevation range; 4) habitat requirements; and 5) presence of habitat. No ESA-designated critical habitat was identified within or adjacent to the FERC Project Boundary. No sensitive environmental areas occur within or adjacent to the FERC Project Boundary.

Table 2-13. Special-status plant species with the potential to occur within the FERC Project Boundary.

Common Name *Scientific Name*	Status[1]	Flowering Period	Elevation Range (ft)	Habitat Requirements	Habitat Present Within FERC Project Boundary?
tree anemone *Carpenteria californica*	ST CRPR 1B.2	Apr-Jul	1,100–4,400	Usually, granitic soils in chaparral and cismontane woodland	No. Granitic soils absent
succulent owl's-clover *Castilleja campestris* var. *succulenta*	FT, SE, CRPR 1B.2	Mar-May	160–2,460	Vernal pools that are often acidic.	No. Vernal pools absent.
Slender clarkia *Clarkia exilis*	CRPR 4.3	Apr-May	395-3,280	Cismontane woodland	Yes.
Streambank spring beauty *Claytonia parviflora* ssp. *grandiflora*	CRPR 4.2	Feb-May	820-3,935	Rocky soils in cismontane woodland	No. Required rocky soils absent.
Small-flowered morning-glory *Convolvulus simulans*	CRPR 4.2	Mar-Jul	100-2,430	Chapparal (openings); coastal scrub, and valley and foothill grassland in serpentine soils.	No. Serpentine soils absent.
Kings River buckwheat *Eriogonum nudum* var. *regirivum*	CRPR 1B.2	Aug-Nov	490-985	Cismontane woodland (carbonate, rocky)	No. Carbonate, rocky soils absent.
Spiny-sepaled button-celery *Eryngium spinosepalum*	CRPR 1B.2	Apr-May	260-740	Valley/foothill grassland, vernal pools	No. Vernal pools absent.

[12] Special-status terrestrial species were defined as plant or animal species that meet one or more of the following criteria: 1) listed by the California Fish and Game Commission on its State and Federally Listed Endangered, Threatened, and Rare Plants of California, including those plants that are state-listed rare or a state candidate for listing under the Native Species Plant Protection Act of 1977; 2) listed or proposed for listing under the ESA; 3) listed by the California Native Plant Society (CNPS) on its Inventory of Rare and Endangered Plants, including species that are rated as CNPS 1A or CNPS 1B through 4B; 4) listed by CDFW as a Species of Special Concern; 5) listed under the CESA as endangered or threatened; 6) listed by the State of California as Fully Protected; and 6) covered under the Bald and Golden Eagle Protection Act.

Table 2-13. (continued)

Common Name *Scientific Name*	Status[1]	Flowering Period	Elevation Range (ft)	Habitat Requirements	Habitat Present Within FERC Project Boundary?
Sierra Nevada monkeyflower *Erythranthe sierrae*	CRPR 4.2	Mar-Jul	605-7,495	Granitic sandy to gravelly soils in vernally wet depressions, swales, or streambanks in openings of cismontane woodland, lower montane coniferous forest, meadows, and seeps	No. Soils and wet areas absent.
Winter's sunflower *Helianthus winteri*	CRPR 1B.2	Jan-Dec	410-1,510	Granitic or rocky soils in cismontane woodland; valley and foothill grassland.	No. Rocky soils absent.
California satintail *Imperata brevifolia*	CRPR 2B.1	Sept-May	Up to 4,000	Mesic soils in chaparral, coastal scrub, Mojavean desert scrub, riparian scrub, meadows, and seeps (often alkali).	No. Not a mesic area.
Forked hare-leaf *Lagophylla dichotoma*	CRPR 1B.1	Apr-May	150-1100	Cismontane woodland; valley and foothill grassland; sometimes clay.	Yes.
Madera leptosiphon *Leptosiphon serrulatus*	CRPR 1B.2	Apr-May	990–4,300	Cismontane woodland, lower montane coniferous forest	No. Outside of known elevation range.
adobe navarretia *Navarretia nigelliformis* ssp. *nigelliformis*	CRPR 4.2	Apr-Jun	328–3,280	Clay, sometimes serpentine soils in vernally mesic grassland and vernal pools.	No. Vernal pools absent.
Sanford's arrowhead *Sagittaria sanfordii*	CRPR 1B.2	May-Oct	Up to 2,300	Fresh water marshes and swamps that are typically shallow.	No. Marshes and swamps absent.
Keck's checkerbloom *Sidalcea keckii*	FE & CRPR 1B.1	Apr-May	245–2,135	Cismontane woodland, valley and foothill grassland, serpentine, or clay soils	No. Soils absent.
Total	**15 = Special-Status Plant Species**				**13 = No Habitat** **2 = Habitat**

[1] Special status:
FE = listed under the Endangered Species Act as endangered
FT = listed under the federal Endangered Species Act as threatened
SE = listed on the California Endangered Species Act as endangered
ST = listed on the California Endangered Species Act as threatened
CRPR 1B = California Rare Plant Rank, endangered in California and elsewhere
CRPR 2 = California Rare Plant Rank, rare/threatened/endangered in California only
CRPR 3 = California Rare Plant Rank, plants requiring further information (.1 after CNPS rating indicates a species that is seriously endangered in California, .2 after CNPS rating indicates a species that is fairly endangered in California, .3 after CNPS rating indicates a species that is not very endangered in California)

As shown in Table 2-13, of the 15 special-status plant species with the potential to occur within the FERC Project Boundary, two have suitable habitat present within the FERC Project Boundary. KRCD census conducted on May 6 and 29, 2020, which followed CDFW's protocol (CDFW 2018) for focused plant surveys, found no special-status plants within or adjacent to the FERC Project Boundary.

Based on the database queries and the vegetation mapping within the FERC Project Boundary discussed above, 13 special-status wildlife species were determined to have the potential to occur within or adjacent to the FERC Project Boundary. Table 2-14 provides for each of the special-status wildlife

species: 1) status; 2) flowering period; 3) elevation range; 4) habitat requirements; and 5) recorded occurrence in the Project Vicinity.

Table 2-14. Special-status wildlife species with the potential to occur within the FERC Project Boundary.

Common Name *Scientific Name*[1]	Status[1, 2]	Habitat Requirements	Habitat Present Within FERC Project Boundary?
INVERTEBRATE			
Crotch bumble bee *Bombus crotchii*	SCE	Inhabits open grassland and scrub habitats. Nesting occurs underground. This species is classified as a short-tongued species, whose food plants include those in the following genera: *Asclepias, Chaenactis, Lupinus, Medicago, Phacelia, and Salvia* (Williams et al. 2014).	Yes. Suitable habitat for this species may be present.
vernal pool fairy shrimp *Branchinecta lynchi*	FT	Endemic to the grasslands of the Central Valley and the Central and South Coast Range mountains of California, and the Agate Desert of southern Oregon. Found only in cool water vernal pools and vernal pool-like habitats; does not occur in riverine, marine, or other permanent bodies of water (USFWS 2007).	No. Vernal pools absent.
valley elderberry longhorn beetle *Desmocerus californicus dimorphus*	FT	Dependent on host plant, elderberry (*Sambucus* spp.), which most commonly grows in riparian woodlands, but also in some upland habitats such as oak savannas and annual grasslands. Current presumed range in Central Valley extends from Shasta County south to Fresno County, including the valley floor and lower foothills up to about 500 feet in elevation (USFWS 2017).	No. Elderberry shrubs absent.
vernal pool tadpole shrimp *Lepidurus packardi*	FE	Found only in ephemeral freshwater habitats, including alkaline pools, clay flats, vernal lakes, vernal pools, vernal swales, and other seasonal wetlands. Patchily distributed across the Central Valley from Shasta County south to Tulare County with isolated occurrences in the East Bay Area (USFWS 2007).	No. Vernal pools absent.
BIRD			
golden eagle *Aquila chrysaetos*	BGEPA & FP	Uncommon resident in hills and mountains throughout California, and an uncommon migrant and winter resident in the Central Valley and Mojave Desert. Prefers rolling foothills and mountain terrain, wide arid plateaus deeply cut by streams and canyons, open mountain slopes, cliffs, and rock outcrops. (CDFW 2020).	Yes. Suitable habitat for this species is present.
Swainson's hawk *Buteo swainsoni*	ST	Nests in oak savanna and cottonwood riparian areas adjacent to foraging habitat of grasslands, agricultural fields, and pastures where they often follow farm equipment to gather killed and maimed rodents. Increasingly also nests in sparse stands of gum trees (*Eucalyptus* spp.) and Australian pines (*Casuarina equisetifoli*a) and often forage along roadsides and grassy highway medians. Breeding resident in the Central Valley, Klamath Basin, Northeastern Plateau, and in juniper-sagebrush flats of Lassen County. Limited breeding reported from Lanfair Valley, Owens Valley, Fish Lake Valley, and Antelope Valley. Winters primarily in Argentina, with most birds absent from California October through February, though a few overwinter in the Sacramento-San Joaquin River Delta. Prolific migrant through southern California in spring and fall, with large mixed-age groups of birds frequently observed kettling high overhead on thermals or foraging together on freshly cut agricultural fields (CDFW 2020).	Yes. Suitable habitat for this species is present.
white-tailed kite *Elanus leucurus*	FP	Fairly common resident of the Central Valley, coast, and Coast Range Mountains. Nests in oak savanna, oak and willow riparian, and other open areas with scattered trees near foraging habitat. Forages in open grasslands, meadows, farmlands, and emergent wetlands. Often seen hover foraging over roadsides or grassy highway medians (CDFW 2020).	Yes. Suitable habitat for this species is present.
bald eagle *Haliaeetus leucocephalus*	SE, BGEPA & FP	Permanent resident in the highest Coast Range mountains, across the Cascade Range, and down the Sierra Nevada to the eastern Transverse Ranges of San Bernardino and Riverside Counties. Uncommon migrant and winter visitor to lowland rivers, lakes, and reservoirs. Nests in large, old-growth, or dominant live trees with open branchwork, especially ponderosa pine (Pinus ponderosa). Requires large bodies of water or rivers with abundant fish, and adjacent snags (CDFW 2020).	Yes. Suitable habitat for this species is present.

Table 2-14. (continued)

Common Name *Scientific Name*[1]	Status[1, 2]	Habitat Requirements	Habitat Present Within FERC Project Boundary?
MAMMAL			
Townsend's big-eared bat *Corynorhinus townsendii*	SSC	Ranges throughout California except for high elevation portions of the Sierra Nevada Mountains. Generally, prefers mesic habitats but known to occur in all non-alpine habitats of California. Roosting occurs in caves, tunnels, mines, buildings, or other structures and this species may use different roosting sites for day and night (CDFW 2020).	Yes. Suitable habitat for this species is present.
spotted bat *Euderma maculatum*	SSC	Ranges across the eastern half of California from the low foothills and over the Cascade and Sierra Nevada crests to Nevada, as well as all of Southern California except for the lowlands of Orange and Los Angeles Counties. Generally, occurs in desert, mixed coniferous forests, and grassland habitats. Prefers to roost in rock crevices on cliffs, but will sometimes use caves and buildings (CDFW 2020).	Yes. Suitable habitat for this species is present.
western mastiff bat *Eumops perotis californicus*	SSC	Ranges throughout all of Southern California, the central coast, and the Sierra Nevada Mountains. Generally, occurs in open, arid, or semi-arid habitats. Roosts in rock crevices and buildings. (CDFW 2020).	Yes. Suitable habitat for this species is present.
fisher – Southern Sierra Nevada ESU *Pekania pennanti* pop. 2	FE, ST & SSC	Large areas of mature, dense forest stands with snags and greater than 50% canopy closure. Uncommon permanent resident of the Sierra Nevada, Cascades, and Klamath Mountains; also found in a few areas in the North Coast Ranges (USFWS 2014).	No. Mature, dense forest habitat absent.
San Joaquin kit fox *Vulpes macrotis mutica*	FE & ST	The subspecies historically ranged in alkali scrub/shrub and arid grasslands throughout the level terrain of the San Joaquin Valley floor from southern Kern County north to Tracy in San Joaquin County, and up into more gradual slopes of the surrounding foothills and adjoining valleys of the interior Coast Range. Occurs in desert-like habitats characterized by sparse or absent shrub cover, sparse ground cover, and short vegetative structure. Prefers areas with open, level, sandy ground (USFWS 2010).	Yes. Suitable habitat for this species is present.
Total	**13 Special-Status Wildlife Species**		**4 = No Habitat** **9 = Habitat**

[1] Species names and status follow CDFW 2021

[2] Special status:
FE = listed under the Endangered Species Act as endangered
FT = listed under the Endangered Species Act as threatened
FCT = candidate for listing under Endangered Species Act
BGEPA = protected under the Bald and Golden Protection Act
SE = listed on the California Endangered Species Act as endangered
ST = listed on the California Endangered Species Act as threatened
FCT = candidate for listing under Endangered Species Act
FP = fully protected under California law
SCE = considered a Species of Concern by CDFW

Of the 14 special-status wildlife species with the potential to occur within the FERC Project Boundary, suitable habitat is present for nine of the species: 1) Crotch bumble bee (*Bombus crotchii*); 2) golden eagle (*Aquila chrysaetos*); 3) Swainson's hawk (*Buteo swainsoni*); 4) white-tailed kite (*Elanus leucurus*); 5) bald eagle (*Haliaeetus leucocephalus*); 6) Townsend's big-eared bat (*Corynorhinus townsendii*); 7) spotted bat (*Euderma maculatum*); 8) western mastiff bat (*Eumops perotis californicus*); and 9) San Joaquin kit fox (*Vulpes macrotis mutica).*

2.2.4.2 Botanical Resources

KRCD mapped vegetation Alliances within and adjacent to the FERC Project Boundary following A Manual of California Vegetation (Sawyer et al. 2009). A total of eleven habitats were identified, each of which is described below.

California Buckeye Grove Alliance

This alliance is co-dominated between California buckeye and interior live oak (*Quercus wislizeni*) with lesser cover of edible fig (*Ficus carica*) and western poison oak (*Toxicodendron diversilobum*). Although interior live oak is listed in the Manual as an association with California buckeye groves, the occurrences in this area were not integrated enough to warrant a joint association. An understory occurs mostly at the margins of this habitat and is comprised of various species such as American deervetch (*Vicia americana*), soft chess (*Bromus hordeaceus*), diverse hairy vetch (*Vicia villosa*), and common fiddleneck (*Amsinckia menziesii*) (Sawyer et al. 2009). This habitat occurs on the slopes south of the Kings River.

California Sycamore Woodland/Grassland Association Alliance

This alliance is dominated by western sycamore (*Platanus racemosa*) in the tree layer with some valley oak (*Quercus lobata*) around that habitat margins. The understory is comprised of the species found in the wild oat (*Avena* spp.) and annual brome (*Bromus* spp.) grassland (Sawyer et al. 2009). This habitat occurs near the Kings River's bank in the western FERC Project Boundary.

Interior Live Oak Forest Alliance

This alliance is dominated by interior live oak in the tree layer with occasional occurrences of edible fig, western poison oak, camphor tree (*Cinnamomum camphora*), and ornamental pines. The understory of this habitat is comprised of the species found in the wild oat and annual brome grassland along with miniature lupine (*Lupinus bicolor*) and club-fruited cylindrical clarkia (*Clarkia cylindrica*) (Sawyer et al. 2009). This habitat occurs on the slopes away from the Kings River and is the dominant habitat type in the immediate vicinity of the FERC Project Boundary.

This habitat has a riparian variant that is defined by the absence of camphor trees and ornamental pines, and cover of Hind's willow (*Salix exigua* var. *hindsian*a) and Goodding's black willow (*Salix gooddingii*), but at levels generally below that of interior live oak (Sawyer et al. 2009). This habitat occurs along the banks of the Kings River in the eastern FERC Project Boundary.

Red Willow – Goodding's Black Willow Riparian Woodland Alliance

This alliance is dominated by red willow (*Salix laevigata*) with lesser cover of Goodding's black willow, Himalayan blackberry (*Rubus armeniacus*), and California button willow (*Cephalanthus occidentalis*) of which Goodding's black willow is marginally more prevalent (Sawyer et al. 2009). Occasional patches of edible fig also occur in this habitat, and the herb layer is generally poorly developed. This habitat occurs on the in-stream island of the eastern FERC Project Boundary and a small piece of the southern bank of the Kings River.

Sandbar Willow Thicket Alliance

This alliance is dominated by Hinds' willow with very high cover. Some herbaceous cover is present around the margins of this habitat that is comprised of the species found in the wild oat and annual

brome grassland habitat (Sawyer et al. 2009). This habitat occurs at a small depression in the western FERC Project Boundary.

Valley Oak Forest/Grassland Association Alliance

This alliance is comprised of valley oak in the tree layer and white-leaf bush lupine (*Lupinus albifrons*) in the shrub layer. The canopy of these species is fairly open, and the herb layer is comprised of species found in the wild oat and annual brome grassland habitat (Sawyer et al. 2009). This habitat occurs in the western FERC Project Boundary.

Wild Oat and Annual Brome Grassland Alliance

This alliance is comprised of a mixture of species in the herb layer with no one species being dominant in any particular area. Overall soft chess, ripgut grass (*Bromus diandrus*), red brome (*Bromus rubens*), and rose clover (*Trifolium hirtum*) are most prevalent with additional cover of American deervetch, smooth cat's-ear (*Hypochaeris glabra*), silver hair grass (*Aira caryophyllea*), wild oat, diverse hairy vetch, Carolina geranium (*Geranium carolinianum*), and Heerman's tarplant (*Holocarpha heermannii*) (Sawyer et al. 2009). This habitat occurs throughout the FERC Project Boundary.

Developed Alliance

This alliance is comprised of all built structures of the Pine Flat Dam and does not have vegetation cover.

Marginally Vegetated Gravel Field Alliance

This alliance is primarily comprised of a gravel field adjacent to the Kings' River with some cover of riparian and upland species such as willow weed *(Persicaria lapathifolia*), red-dotted monkeyflower, wand mullein (*Verbascum virgatum*), soft chess, and small-flowered spring beauty (*Claytonia* sp.) (Sawyer et al. 2009). However, total vegetation cover in this habitat does not exceed 10 percent and is usually approximately 5 percent. This habitat occurs on the south bank of the Kings' River in the eastern FERC Project Boundary.

Open Water Alliance

This alliance is composed of water with no vascular vegetation cover and minimal observations of algae growth. This is defined as the Kings' River which occurs in the eastern FERC Project Boundary.

2.2.4.3 Wildlife Resources

A variety of wildlife utilize the available habitat within the FERC Project Boundary. Reptiles recorded in the area include the western fence lizard (*Sceloporus occidentalis*), sagebrush lizard (*Sceloporus graciosus*), rubber boa (*Charina bottae*), common kingsnake (*Lampropeltis getula*), Sierra gartersnake (*Thamnophis couchii*) and western rattlesnake (*Crotalus viridis*). California newt (*Taricha torosa*), American bullfrog (*Lithobates catesbeianus*), and Sierran treefrog (*Pseudacris regilla*) are all common

amphibian species that have been observed in the area, as well (California Watchable Wildlife 2021, eBird 2021, iNaturalist 2021, USACE 2001).

Over 60 bird species have been recorded in or around the FERC Project Boundary, including a variety of water species, such as common merganser (*Mergus merganser*), American coot (*Fulica americana*), killdeer (*Charadrius vociferus*), California gull (*Larus californicus*), eared grebe (*Podiceps nigricollis*), great blue heron (*Ardea herodias*), western grebe (*Aechmophorus occidentalis*), and ruddy duck (*Oxyura jamaicensis*). Other bird species known from the area include red-tailed hawk (*Buteo jamaicensis*), tree swallow (*Tachycineta bicolor*), white-crowned sparrow (*Zonotrichia leucophrys),* California quail (*Callipepla californica*), Anna's hummingbird (*Calypte anna*) and mourning dove (*Zenaida macroura*) (California Watchable Wildlife 2021, eBird 2021, iNaturalist 2021, USACE 2001).

The most common large mammal in the vicinity of the Project is mule deer, members of the North Kings herd. Smaller mammals include coyotes (*Canis latrans*), California ground squirrel (*Otospermophilus beecheyi*), bobcat (*Lynx rufus*), raccoon (*Procyon lotor*), and gray fox (*Urocyon cinereoargenteus*) (California Watchable Wildlife 2021, eBird 2021, iNaturalist 2021, USACE 2001).

Surveys conducted on May 6 and 29, 2020 recorded 14 species of common wildlife, including western fence lizard, mallard (*Anas platyrhynchos*), red-tailed hawk, California quail, turkey vulture (*Cathartes aura***)**, common raven (*Corvus corax*), house finch (*Haemorhous mexicanus*), acorn woodpecker (*Melanerpes formicivorus*), cliff swallow (*Petrochelidon pyrrhonota*), Nuttall's woodpecker (*Picoides nuttallii*), bushtit (*Psaltriparus minimus*), black phoebe (*Sayornis nigricans*), tree swallow and California ground squirrel.

2.2.5 Recreational Resources

The Project's FERC license includes seven articles (i.e., 17, 18, 22, 23, 24, 25 and 33) and Exhibit R related to recreation and land use. In particular, in response to Article 33, KRCD constructed a parking lot and trails and provided a platform that created wheel-chair accessibility to a fishing access area located on USACE lands on the south bank of the Kings River immediately below the Pine Flat Dam. In fall 2001 following the attacks on the World Trade Center on September 11, 2001, the Department of Homeland Security excluded public access to the 0.6-mile-long section of the Kings River from Pine Flat Dam to the Pine Flat Road Bridge. In December 2005, the USACE advised KRCD that the closure of the area would be permanent. After consulting with USACE and Fresno County and entering into an agreement with the County, KRCD filed with FERC a Revised Exhibit R that showed an alternative fishing access area downstream of the USACE Pine Flat Dam Bridge. The area, known as the North Riverside Access Park, would is within the FERC Project Boundary and includes: 1) an approximately 1,050-foot-long access road from North Piedra Road; 2) a 0.5-acre parking area for 11 vehicles; 3) five day-use sites each with a picnic tables and a barbecue grill; 4) a two-stall ADA-compliant restroom; 5) two interpretive kiosks; and 6) visitor feedback stations. A non-Project 1.5-mile-long multi-purpose trail, of which 0.5 mile is ADA compliant, originates in the North Riverside Access Park and provides access to the Kings River. In an order dated August 21, 2007, the Commission, after opportunity for comment by stakeholders, approved the alternative fishing area in lieu of the closed fishing access area and KRCD constructed and maintains the area.[13] In addition, on November 25, 2014, KRCD filed with

[13] To view the Commission's order, refer to FERC's ELibrary at Accession Number 20080107-0172.

the Commission a Public Safety Plan.[14] In March 2021, the California Fish and Game Commission closed all fishing year-round between USACE's Pine Flat Dam and Pine Flat Road Bridge.

Based on KRCD's last FERC Form 80 Recreation Report that was filed on February 27, 2015,[15] totals of 13,120 and 2,008 recreationists visited the recreation facility during the daytime and nighttime periods, respectively, from March 7 to December 31, 2014. The data were collected by use of electronic counters: a vehicle counter counted each vehicle that entered the North Riverside Access Park off Piedra Road and a pedestrian counter counted each person that entered the non-Project access trail from the park. More recent recreation use data are not available.

2.2.5.1 Recreational Resources Condition

Non-Project public recreation sites in the vicinity of the Project include the Winton and Choinumni parks along the Kings River, Avocado Lake Park, and a number of recreational facilities on Pine Flat Lake. The parks are owned and operated by local and state agencies, and the Pine Flat Lake recreation facilities are operated jointly by USACE and the United States Department of Agriculture, Forest Service.

Angling is a popular recreation activity along the river where public access is available (refer to Section 2.2.3.2 for the California Fish and Game Commission's fishing regulations for this area). CDFW conducted angler creel surveys on the Kings River from the USACE's Pine Flat Road Bridge to the Greenbelt County Park in 2020. Surveys were conducted in January (3 weekdays, 4 weekend days), February (4 weekdays, 4 weekend days) and March (2 weekdays, 2 weekend days). The angler survey was terminated in mid-March due to the Covid pandemic. A total of 1,293 anglers, 181 using rods and 1,211 using spin/casting rods, were counted. On average, 33 anglers were counted per pass on weekend days and 18 anglers were counted per pass on weekdays. Some 90 percent of the anglers were observed in Put-and-Take reaches and 10 percent in Catch-and-Release reaches. Anglers traveled an average of 35 miles, with most (80.3%) anglers from Fresno County. Anglers averaged 5.2 hours per visit and the overall catch-per-unit effort was calculated to be 0.51 trout/hour for the three-month survey period catch. A total of 673 trout was reported caught by anglers with 334 reported as kept and 339 reported as released. Supplemental size trout accounted for 37 percent of the total catch, catchable size trout comprised 57 percent of the total catch, and trout 14-inch or larger comprised 6 percent of the total catch. Angler satisfaction with the fishery was high, averaging 4.5 on a scale of 1 to 5. (CDFW 2020.)

According to American Whitewater (AW), the section of Kings River from Pine Flat Dam to the State Highway 180 Bridge is a Class I-II paddling run for beginner and intermediate use and largely for canoes and floats with some kayakers. AW states the run has some rapids, some weirs that require portaging, and the boatable flow range is 500 cfs to 10,000 cfs.[16]

[14] To view the Public Safety Plan, refer to FERC's ELibrary at Accession Number 20150121-0197.
[15] To view KRCD's February 27, 2015, Form 80 filing, refer to FERC's ELibrary at Accession Number 20150306-0032.
[16] American Whitewater homepage at https://www.americanwhitewater.org/content/River/view/river-detail/226/main accessed on August 2, 2021.

2.2.5.2 Specific Recreation Issue Raised by CDFW

In its July 1, 2021, reply to KRCD's request for waiver of the 3-stage consultation process, CDFW raised a specific concern related to recreation stating:

> Second, KRCD had a responsibility, under the original FERC license requirements, to maintain the fishing access area eliminated from the FERC Boundary. This area served as mitigation for lost fishing access under this project. However, now KRCD does not have a clear obligation to mitigate as it was initially established as part of the FERC license agreement. Anglers lost out on recreation opportunities with the elimination of this fishing access area. The current fishing access area is inadequate. KRCD should be able to provide equivalent services (e.g., safe wheelchair access) in their new fishing access area. CDFW thinks that there should continue to be mitigation for the loss of angler access to the Kings River at this location and subsequent reduction of recreational fishing opportunities.

First and foremost, construction and operation of KRCD's proposed Unit 4 would have no nexus or effect on recreation because flows and existing recreation facilities would not be affected in any manner. Notwithstanding, KRCD is willing to discuss with CDFW, outside the scope of this Application for Amendment, CDFW's concerns regarding the adequacy of the existing Project fishing access recreation area that was approved by FERC in August 2007 and included in the license. KRCD looks forward to those discussions.

2.2.6 Land Use

As described above, the FERC Project Boundary encompasses 11.87 acres, with 4.94 acres of federal lands administered by the USACE, 4.55 acres of State of California lands submerged by the Kings River, and 2.38 acres of Fresno County lands. The area within the boundary is zoned as agricultural (AE160) and resource conservation (RC40), and no special designated lands occur within or adjacent to the boundary. In addition, the lands near the powerhouse are closed to public access. No designated federal or State of California Wildernesses, Wild and Scenic Rivers, wetlands, or environmentally sensitive areas occur within or adjacent to the FERC Project Boundary. The only affected federal lands occur near the powerhouse and these are managed by the USACE and are closed to the public.

2.2.7 Visual Resources

The Project powerhouse and switchyard facilities are not visible from any public access point. The Project recreation facilities, which are on Fresno County land, are visible to those using the facilities. The 2000 Fresno County General Plan goals and policies applicable to the protection of scenic resources on county and private lands include (Fresno County 2000):

> Goal OS-K. To conserve, protect, and maintain the scenic quality of Fresno County and discourage development that degrades areas of scenic quality.
>
> Policy OS-K.1. The County shall encourage the preservation of outstanding scenic views, panoramas, and vistas wherever possible. Methods to achieve

this may include encouraging private property owners to enter into open space easements for designated scenic areas.

Policy OS-K.2. The County shall identify and map significant scenic resources within the County and shall develop a program to manage these resources.

Policy OS-K.3. The County should preserve areas of natural scenic beauty and provide for public access to scenic vistas by purchasing sites for park use.

Policy OS-K.4. The County should require development adjacent to scenic areas, vistas, and roadways to incorporate natural features of the site and be developed to minimize impacts to the scenic qualities of the site.

None of the Project facilities that may be viewed by the public are designated by Fresno County as significant scenic resources.

2.2.8 Socioeconomics

The population of the Fresno County, in which the Project is located, was estimated at 1,023,358 people in January 2020 (CDOF 2020). Between 2010 and 2020, Fresno County's population increased by 9.9 percent from 930,450 to 1,023,358, slightly more than the state's approximate growth of 7 percent over the same decade (CDOF 2020). Fresno County's population has increased every year for the last decade, with the most significant increase coming from 2014 to 2015 when the population increased by an estimated 1.06 percent (CDOF 2020).

With a population of 1,023,358 residents, 1,005,703 housing units, Fresno County has an estimated 3.20 persons per household and a vacancy rate of 6.7 percent (CDOF 2020). The 2019 population density of Fresno County is an estimated 167.7 persons per square mile (U.S. Census Bureau 2020). From 1990 to 2000, 2000 to 2010, and 2010 to 2020, the population of Fresno County increased by 19.7 percent, 16.39 percent, and 9.98 percent, respectively. During those same periods, the number of housing units increased at a rate of 19.35 percent, 16.78 percent, and 10.16 percent, respectively. For comparison, the population of the State of California increased by 11.87 percent, 10.48, percent, and 6.79 percent and the number of housing units increased by 7.53 percent, 12.18, percent, and 4.8 percent, respectively (Table 2-15).

Table 2-15. Summary of Fresno County and State of California population and housing units in 1990, 2000, 2010, 2015, 2019, and 2020.

Area		2020	2019	2015	2010	2000	1990
Fresno County	Population	1,023,358	1,015,195	975,169	930,450	799,407	667,490
	Housing Units	1,005,703	997,567	957,277	912,927	781,740	654,970
State of California	Population	39,782,870	39,695,376	38,870,150	37,253,956	33,721,583	30,143,555
	Housing Units	14,329,863	14,235,201	13,914,933	13,670,304	12,186,125	11,332,713

SOURCE: CDOF 2020, 2007

Table 2-16 shows that the majority (591,467 or 59.2%) of the Fresno County population falls between ages of 18 and 65. The state of California has a higher percent of the population between the ages of 18 and 65 (62.7%) (U.S. Census Bureau 2020).

Table 2-16. Summary in Fresno County and California by age group in 2019.

Population: Age	Fresno County	California
Population under 5 years old	75,931	2,370,733
Persons under 5 years old, percent	7.6%	6.0%
Persons under 18 years old	281,746	8,890,250
Persons under 18 years old, percent	28.2%	22.5%
Persons 65 years old and over	125,886	5,847,809
Persons 65 years old and over, percent	12.6%	14.8%

SOURCE: U.S. Census Bureau 2020

* Estimates provided with data from the U.S. Census Bureau are not comparable to other geographic levels due to methodology and differences that exist between different data sources.

Fresno County has 15 incorporated areas including: Clovis, Coalinga, Firebaugh, Fowler, Fresno, Huron, Kerman, Kingsburg, Mendota, Orange Cove, Parlier, Reedley, Sanger, San Joaquin, and Selma. In 2019, the estimated population of Fresno, the largest city in Fresno County, was 542,012. In 2020, it grew to 545,769, increasing by 0.69 percent (CDOF 2020). The second largest city in Fresno County is Clovis, which had an estimated population of 119,175 in 2020, a 2.2 percent population growth from the year before (CDOF 2020). Major population centers around Fresno County are Sacramento, 169 miles north of Fresno, and Bakersfield, 109 miles to the South.

Table 2-17 summarizes household units (i.e., number of units, net change for a given period, and percent change for a given period), homeownership rate, median home value, income, and poverty for Fresno County. Median value of owner-occupied housing and median household income in Fresno County are significantly lower than that of the State of California. Also, the percent of people in poverty in Fresno County (21.3%) is almost double that of the State of California (11.8%).

Table 2-17. Summary of household units, homeownership, home value, and income in Fresno County and the State of California.

Household Information	Fresno County	California
Housing units, 2019	997,567[1]	14,366,336
Homeownership rate, 2014-2018, percent	52.8%	54.6%
Median value of owner-occupied housing units, 2014- 2018	$237,500	$475,900
Households, 2014-2018	304,624	12,965,435
Persons per household, 2014-2018	3.16	2.96
Median household income, 2014-2018	$51.261	$71,228
Per capita income in the past 12 months, 2014-2018	$23,284	$35,021
Persons in poverty, 2019	21.3%	11.8%

SOURCE: U.S. Census Bureau 2020, CDOF 2020

[1] Estimates provided with data from the U.S. Census Bureau are not comparable to other geographic levels due to methodology and differences that exist between different data sources

Fresno County is like the State of California in respect to ethnic diversity. The county is predominantly made up of persons of Hispanic or Latino origin, with the second largest group being White. Table 2-18 provides a summary of population estimates by race for Fresno County and the State of California for the year 2019.

Table 2-18. Summary of population estimates by gender and race in Fresno County and the State of California in 2019.

Population: Gender/Race	Fresno County	California
POPULATION		
White persons[1]	765,311	28,409,288
White alone, not Hispanic o Latino	285,742	14,421,961
Black or African American persons[1]	57,948	2,568,294
American Indian and Alaska Native persons[1]	29,973	632,196
Asian persons[1]	110,900	6,124,394
Native Hawaiian and Other Pacific Islander persons[1]	2,997	197,561
Persons reporting two or more races	31,971	1,580,489
Persons of Hispanic or Latino origin[2]	537,516	15,567,816
PERCENT OF POPULATION		
Female persons, percent	50.1%	50.3%
White persons, percent[1]	76.6%	71.9%
White alone, not Hispanic or Latino	28.6%	36.5%
Black or African American persons, percent[1]	5.8%	6.5%
American Indian and Alaska Native persons, percent[1]	3.0%	1.6%
Asian persons, percent[1]	11.1%	15.5%
Native Hawaiian and Other Pacific Islander, percent[1]	0.3%	0.5%
Persons reporting two or more races, percent	3.2%	4.0%
Persons of Hispanic or Latino origin, percent[2]	53.8%	39.4%
Language other than English spoken at home, age 5+, percent	44.8%	44.1%

SOURCE: U.S. Census Bureau 2020
[1] Includes persons reporting only one race.
[2] Hispanics may be of any race; therefore, Hispanics are also included in applicable race categories.

The Census Bureau estimates that 75.3 percent of Fresno County's population is educated through high school with 20.7 percent of the population having obtained a Bachelor's degree or higher. An estimated 82.9 percent of California's population is estimated to have a high school education or higher. In California the percentage of the population who has obtained a Bachelor's degree or higher is 33.3 percent. When compared to the State of California, Fresno County has a lower percentage of both high school graduates and individuals with a Bachelor's degree or higher (U.S. Census Bureau 2020).

According to the California Employment Development Department (EDD), in 2019 the annual average unemployment rate was 7.2 percent for Fresno County. Comparatively, the average unemployment rates for 2010 and 2015 were, respectively, 16.7 percent and 10.2 percent (EDD 2020a). These rates are higher compared to those for the State of California, which had an unemployment rate of approximately 12.2 percent, 6.2 percent, and 4 percent in 2010, 2015, and 2019 (EDD 2020a).

The EDD uses the North American Industry Classification System (NAICS) as a basis for industry classification (BLS 2020). Based on data from November 2020, local government (12.9%), farming (9.9%), and retail (9.6%) are the three largest industry types in Fresno County. Leisure and hospitality, which includes recreation, accounts for 7.0 percent of employment in Fresno County. Utilities, which includes PG&E, makes up 4.6 percent of the employees in the county (Table 2-19). These percentages are similar to the State of California except for farming that accounts for only 2.0 percent of total employment in the state (EDD 2020b).

Table 2-19. Summary of industry statistics for Fresno County and State of California for 2020.

Industry Type	Fresno County		State of California	
	Employees	Percent Total	Employees	Percent Total
Local Government	49,800	12.9%	1,694,900	10.2%
Farming	38,200	9.9%	340,000	2.0%
Retail Trade	36,900	9.6%	1,604,300	9.6%
Leisure & Hospitality	26,900	7.0%	1,543,400	9.2%
Social Assistance	26,100	6.8%	814,200	4.9%
Ambulatory Health Care Services	22,200	5.8%	874,800	5.2%
Administrative & Support & Waste Services	19,900	5.2%	1,085,500	6.5%
Construction	18,300	4.8%	869,700	5.2%
Transportation, Warehousing & Utilities	17,900	4.6%	726,500	4.4%
Nondurable Goods (including food)	16,500	4.3%	421,200	2.5%
Financial Activities	14,600	3.8%	853,000	5.1%
Hospitals	14,200	3.7%	401,600	2.4%
Wholesale Trade	13,400	3.5%	658,000	3.9%
State Government	12,300	3.2%	519,100	3.1%
Professional, Scientific, and Technical Services	11,300	2.9%	1,334,700	8.0%
Federal Government	11,100	2.9%	257,900	1.5%
Other Services	10,000	2.6%	476,200	2.9%
Nursing & Residential Care Facilities	8,300	2.2%	287,100	1.7%
Durable Goods	8,100	2.1%	800,800	4.8%
Educational Services	3,500	0.9%	347,000	2.1%
Information	3,000	0.8%	525,000	3.1%
Management of Companies & Enterprises	2,200	0.6%	241,100	1.4%
Mining and Logging	300	0.1%	21,700	0.1%
Total	**385,000**	**100%**	**16,697,700**	**100%**

SOURCE: EDD 2020b

2.2.9 Cultural Resources

The Project's FERC license includes one article (i.e., 43) related to cultural resources.

2.2.9.1 Cultural Resources Condition

KRCD retained HDR Engineering, Inc. (HDR) to conduct an archaeological and historic built environment survey and evaluation within the FERC Project Boundary. HDR's study was conducted between May 2019 and January 2020 by Jay Lloyd (M.A.), a Registered Professional Archaeologist (RPA) who meets the Secretary of Interior's Professional Qualification Standards (PQS) for prehistoric and historic archaeology (per 36 Code of Federal Regulations Part 61) and Leesa Gratreak (M.S.) who meets the PQS for history and architectural history. The study included:

- background and archival research;
- a records search from the Southern San Joaquin Valley Information Center of the California Historical Records Information System;
- a Sacred Lands File search with the Native American Heritage Commission;
- preliminary outreach via certified mail on July 16, 2019 with the local Native American tribes and representatives listed below:
  - Chairperson Robert Ledger Sr. of the Dumna Wo-Wah Tribal Government
  - Stan Alec of the Kings River Choinumni Farm Tribe
  - Chairperson Rueben Barrios Sr. of the Santa Rosa Rancheria Tachi Yokut Tribe

  - Chairperson Leanne Walker-Grant of Table Mountain Rancheria
  - Cultural Resources Director Bob Pennell of Table Mountain Rancheria
  - Chairperson Kenneth Woodrow of the Wuksache Indian Tribe/Eshom Valley Band
- National Register of Historic Places (NRHP) significance recommendations for both the Jeff L. Taylor Powerhouse Intake Structure and the Jeff L. Taylor Powerhouse.

In addition, the study included a pedestrian archaeological and historic built environment survey of the area on June 19, 2019. HDR's research and field study did not identify any tribal resources, archaeological sites (prehistoric or historic), or historic built environment resources within or adjacent to FERC Project Boundary.

2.3 Impact Assessment

2.3.1 Impacts Resulting from Construction of Unit 4

Construction of KRCD's proposed Unit 4, as described in this IIP, would have no impacts on geology or soils. The area that would be disturbed is very small (i.e., likely less than 2 acres), flat, entirely within the existing FERC Boundary, and has been previously disturbed by construction of the Pine Flat Dam, Jeff L. Taylor Powerhouse and Bypass System. It is expected that the available space within the fenced plant area will be sufficient for laydown and staging of materials and equipment: all work would be confined to the Jeff L. Taylor Powerhouse and powerhouse yard. No undisturbed areas are anticipated to be disturbed as a result of the work. Construction would not include any disturbance to lake or streambeds, riparian, or wetland areas. No borrow or spoils areas are needed. All waste material, including soils, if any, would be disposed of offsite in appropriate disposal areas. All areas would be stabilized, including establishing any necessary drainage. KRCD would obtain and adhere to all necessary permits and approvals, including a Stormwater Pollution Prevention Plan, that would control surface erosion.

Construction would have no effect on water resources. During construction, KRCD would meet all flow requirements and continue to provide water for downstream consumptive uses. Construction would have no effect on flow through the powerhouse or the Bypass System for Units 1 and 2, and only a very brief interruption of the Unit 3 Bypass System. For the same reasons, the efficacy of the Bypass System as a means to provide cool, well-oxygenated water when needed would not be affected. As required by the FERC license, KRCD would continue to comply with and monitor flow and DO concentrations and TDG; and, as required by the Framework Agreement, KRWA would continue to manage and monitor water temperature. If appropriate, KRCD would prepare a hazardous materials and management plan to assure the proper containment and control of hazardous materials used during construction.

Construction would have no effect on fish and aquatic resources, including the five special-status aquatic species that may occur in the reach downstream of Pine Flat Dam. No ESA-listed aquatic species, critical habitat, designated EFH, anadromous fishes, or sensitive environmental areas occur. As described above, flow, water temperature, DO, TDG, and general water quality would not be affected during construction, and no work would occur in Pine Flat Lake or the Kings River streambed.

KRWA would continue to monitor fishes in the Kings River as required by the Framework Agreement.

Construction would have no effect on botanical resources. Construction would occur in an area devoid of vegetation. No special-status species, including ESA-listed plants, occur in the construction area. KRCD's surveys for the two special-status plants that have potential to occur did not find those plants (Table 2-11). In addition, no critical habitat or sensitive environmental areas occur within or adjacent to the FERC Project Boundary. All disturbed areas would be stabilized. The introduction, transfer, and spread of invasive species, including plants, animals, and microbes (e.g., algae, fungi, parasites, mussels, and bacteria), from one work site and/or waterbody to another would be controlled during construction. Prior to entering the work area, KRCD will inspect the equipment to be used for invasive species and, if any signs of invasive species are found, the equipment shall be sent offsite to be cleaned to remove those species. All visible soil/mud, plant materials, and animal remnants on equipment will be removed prior to entering and exiting the work site.

Construction would have no effect on wildlife resources. No ESA-listed wildlife species, critical habitat or sensitive natural community areas occur. Potential effects on the nine special-status wildlife species that may occur in the area Table 2-13 are described below.

- The Crotch bumble bee utilizes open grassland and scrub for nesting, which is present in the FERC Project Boundary, but not in the area of the proposed new Unit 4, which will be built on an already developed site. This will include all laydown areas. Therefore, the Crotch bumble bee would not be impacted by construction of Unit 4.
- Golden eagle and bald eagle have both been observed on or near the Project, and there is appropriate habitat for white-tailed kite and Swainson's hawk. There would be no direct impacts to habitat by the construction of the proposed Unit 4. However, if construction of Unit 4 takes place during the nesting bird season, noise and other construction activities could disturb nesting birds. Therefore, if construction occurs during the nesting bird season (between January 1 and September 1), KRCD will conduct nesting bird surveys in the work area within 2 weeks of beginning construction. If nesting birds are located, buffers will be developed around nests to prevent disturbance of the nesting birds during the term of construction. Therefore, nesting birds, including golden eagle, bald eagle, white-tailed kite and Swainson's hawk, would not be impacted by construction of the proposed Unit 4.
- Townsend's big-eared bat, spotted bat, and western mastiff bat may utilize structures in the area of the proposed new Unit 4. Although no bat habitat is anticipated to be directly impacted by the construction of Unit 4, bats roosting in the area may be disturbed by construction activity. Within 2 weeks of beginning construction, KRCD will survey the work area for evidence of bat use. If any bat roost evidence is located within 500 ft of the work area, Best Management Practices will be developed and implemented to prevent impacts to roosting bats during the term of construction. This would prevent any adverse impacts to any bat species, including Townsend's big-eared bat, spotted bat, and western mastiff bat, during the construction of Unit 4.
- Potential habitat for San Joaquin kit fox occurs within the FERC Project Boundary, but none within the work area of proposed Unit 4, which will be built on already disturbed area. Additionally, KRCD did not observe any denning habitat around the work area for San Joaquin

kit fox. Therefore, the construction of the proposed Unit 4 would not affect San Joaquin kit fox.

Construction would have no effect on recreational resources. The area near the Jeff L. Taylor Powerhouse is closed to public access, including fishing. As described above, flow, water temperature, DO and general water quality would not be affected during construction, and no work is proposed to occur at the Project's downstream fishing access recreation area. KRWA would continue to supplement fish stocking as required by the Framework Agreement.

Construction would have no effect on land use. No designated federal or State of California Wildernesses, Wild and Scenic Rivers, wetlands, or environmentally sensitive areas occur within or adjacent to the FERC Project Boundary. A small labor force would access the area during construction. Local roads are fully adequate to accommodate the labor force and construction vehicles, and no additional access roads would be required. No change in transportation patterns or road closures are anticipated. No changes in road conditions are anticipated as a result of the work.

Construction would have no effect on visual resources. The area of disturbance is not viewable by the public.

Construction would have no effect on socioeconomics in Fresno County. Most of the small labor force would originate in the county, which would have no effect on overall socioeconomics.

Construction would have no effect on cultural resources. As described above, no cultural or tribal resources occur within the area that would be disturbed.

KRCD would obtain and adhere to all necessary permits and approvals for construction of Unit 4.

2.3.2 Impacts Resulting from Operation of Unit 4

Operation of KRCD's proposed Unit 4, as described in this IIP, would have no impacts on geology or soils. The new Unit 4 powerhouse building (Figure 1-3) would cover much of the area disturbed by construction and the remaining area would be stabilized and likely retuned to a fenced in parking area. No additional erosion would occur in the river due to Unit 4 operations since powerhouse releases would be the same – the only difference would be that some water that previously passed through the Bypass System would pass thought Unit 4 and be discharged into the air next to Bypass System discharge point (Figure 1-3).

Operation of the proposed Unit 4 would have no effect on water resources. No change would occur in the magnitude or timing of flow releases. The only difference would be that some water that previously passed through the Bypass System would pass thought Unit 4. No change would occur in water temperature for DO concentrations. Unit 4 would draw water off the Bypass System, so the cool water supplied by the Bypass System would also be discharged by Unit 4. Like the Bypass System that discharges well-oxygenated water due to an aerial discharge, Unit 4 would also have an aerial discharge that would assure the Unit 4 discharge is well-oxygenated. As required by the FERC license, KRCD would continue to comply with and monitor flow and DO concentrations; and, as specified by the Framework Agreement, KRWA would continue to manage and monitor water temperature.

Operation of Unit 4 would have no effect on fish and aquatic resources. The magnitude and timing of flow releases, water temperature and DO concentrations would be the same as it would without Unit 4. KRWA would continue to monitor fishes in the Kings River as required by the Framework Agreement.

Operation of Unit 4 would have no effect on terrestrial resources, recreational resources, land use, visual resources, socioeconomics, and cultural resources. The Project would operate as it would if Unit 4 was not in place and operating.

KRCD would continue to adhere to the terms and conditions in the Project's FERC license and all related permits, approvals, and agreements.

Section 3.0
REFERENCES CITED

California Central Valley Regional Water Quality Control Board (CVRWQB). 2018. Water Quality Control Plan for the Tulare Lake Basin. State of California Regional Water Quality Control Board, Central Valley Region.

California Department of Conservation (CDC). 2019. CGS Regional Geologic Maps. Available online: <https://www.conservation.ca.gov/cgs/maps-data/rgm#atlasseries>. Accessed August 22, 2021. Last updated 2019.

California Department of Fish and Wildlife (CDFW). 2021. California Natural Diversity Database (CNDDB) QuickView Tool in BIOS 5. Available online: <https://wildlife.ca.gov/Data/CNDDB/Maps-and-Data#43018408-cnddb-in-bios>. Accessed August 18, 2021. Last updated August 18, 2021. CDFW, Natural Heritage Division, Sacramento, CA.

____. 2020. 2020 Lower Kings River Angler Survey Downstream Pine Flat Dam to Greenbelt Parking Lot, Fresno County, California. Kenneth D. Johnson, Environmental Scientist, CDFW. Dated October 2020.

____. 2018. Protocols for Surveying and Evaluating Impacts to Special Status Native Plant Populations and Sensitive Natural Communities. CDFW, Natural Heritage Division, Sacramento, CA.

California Watchable Wildlife. 2021. Pine Flat Lake. Available online: https://www.cawatchablewildlife.org/viewsite.php?site=310&display=q. Accessed on August 13, 2021. Last updated 2021.

Cech, J.J., S.J. Mitchell, D.T. Castleberry, and M. McEnroe. 1990. Distribution of California stream fishes: influence of environmental temperature and hypoxia. Env. Biol. Fish. 29:95-105.

Cramer Fish Sciences. 2019. Lower Kings River Fishery Habitat Characteristic and Identification of Habitat Enhancement Opportunities 2019. Issued September 27, 2019.

eBird. 2021. Pine Flat Lake. Available online: https://ebird.org/hotspot/L8098038?yr=all&m=&rank=mrec&hs_sortBy=count&hs_o=desc. Accessed August 13, 2021. Last updated August 13, 2021.

Elliott, T. C., Chen, K., and Swanekamp, R. C. 1997. Standard Handbook of Powerplant Engineering, Second Edition. McGraw-Hill October 1, 1997.

FISHBIO. 2020. Lower Kings River 2019 Fish Population Snorkel Survey. Issued May 2020.

Fresno County. 2000. Fresno County General Plan. Adopted October 3, 2000. Available online: https://www.co.fresno.ca.us/home/showdocument?id=18117. Accessed October 22, 2020.

Hanson Environmental, Inc. 2005. Analysis of the Condition of Rainbow Trout Collected from the Kings River Downstream of Pine Flat Dam 1983-2005. Issued October 2005.

iNaturalist. 2021. Pine Flat Lake. Available online: https://www.inaturalist.org/. Accessed August 13, 2021. Last updated August 13, 2021.

Kings River Water Association (KRWA), State of California, and Kings River Conservation District (KRCD). 1999. Kings River Fisheries Management Program Framework Agreement.

____ and State of California. 1964. Agreement.

Knight, N.J. 1985. Microhabitats and temperature requirements of hardhead (*Mylopharadon conocephalus*) and Sacramento squawfish (*Ptychocheilus grandis*), with notes for some other native California stream fishes. Ph.D. Dissertation. University of California. Davis, California.

Moyle, P.B. 2002. Inland Fishes of California. University of California Press, Berkeley and Los Angeles, California.

____ and D.M. Baltz. 1985. Microhabitat use by an assemblage of California stream fishes: developing criteria for instream flow recommendations. Transactions of the American Fisheries Society 114:695-704.

____ and R.A. Daniels. 1982. Fishes of the Pit River system, and Surprise Valley region. University of California Publ. Zool. 115:1-82.

____ and R.D. Nichols. 1973. Ecology of some native and introduced fishes of the Sierra Nevada foothills in Central California. *Copeia*. 1973:473-490.

____, R.M. Yoshiyama, J. E. Williams, and E.D. Wikramanayake. 1995. Fish Species of Special Concern in California. Ed. 2. Department of Wildlife and Fisheries Biology. U.C. Davis, CA. Prepared for the State of California The Resources Agency, Department of Fish and Game, Inland Fisheries Division.

Natural Resources Conservation Service (NRCS). 2019. United States Department of Agriculture Web Soil Survey 2.3 (online edition). Available online: https://websoilsurvey.nrcs.usda.gov/app/HomePage.htm. Accessed August 22, 2021. Last updated July 31, 2019.

Nafis, G. 2020. California Herps: A Guide to Reptiles and Amphibians of California. Available online: http://www.californiaherps.com/.

Reeves, J.G. 1964. Age and growth of the hardhead minnow *Mylopharodon conocephalus* in the American River basin of California, with notes on its ecology. M.S. Thesis. University of California, Berkeley. 90 pp.

Sawyer, J.O., T. Keeler-Wolf, and J.M. Evans. 2009. A Manual of California Vegetation (Second Edition). Sacramento, CA: CNPS.

State of California, Department of Finance (CDOF). 2020. E-5 Population and Housing Estimates for Cities, Counties, and the State 2011-2020 with 2010 Census Benchmark. Sacramento, California. Available online: http://www.dof.ca.gov/Forecasting/Demographics/Estimates/E-5/.

____. 2007. E-8 Historical Population and Housing Estimates for Cities, Counties, and the State, 1990-2000. Sacramento, California. August 2007. Available online: http://www.dof.ca.gov/Forecasting/Demographics/Estimates/E-8/.

State of California, Employment Development Department (EDD). 2020a. Local Area Unemployment Statistics, Annual Average. Updated September 18, 2020. Available online: https://data.edd.ca.gov/Labor-Force-and-Unemployment-Rates/Local-Area-Unemployment-Statistics-LAUS-Annual-Ave/7jbb-3rb8.

____. 2020b. Employment by Industry Data. Available online: https://www.labormarketinfo.edd.ca.gov/data/employment-by-industry.html.

Technical Steering Committee (TSC), Kings River Fisheries Management Program. 2006. Kings River Fisheries Management Program Water Quality Monitoring Report 2004-2005. Issued February 2006.

____. 2009. Results of Macroinvertebrate Sampling on the Kings River below Pine Flat Dam. Issued February 2009.

____. 2011. Habitat Selection Report: The effects of flow and size-class on habitat use by rainbow trout within the Kings River downstream of the Pine Flat Dam 2012. Issued September 2011.

____. 2012a. Movement of Resident Rainbow Trout: Movement in Response to Temperature, Flow, Management Zone and Weirs in the Kings River Below Pine Flat Dam 2012. Issued April 2012.

____. 2012b. Harvest of Rainbow Trout: The Effects of Time, Flow, Size Class, Planting Location and Management Zone on Trout Harvest in the Kings River Below Pine Flat Dam 2012. Issued May 2012.

____. 2012c. Habitat Selection, Behavioral Movement, and Fate of Adult Rainbow Trout within the Kings River Downstream of Pine Flat Dam 2012, Summary Report. Issued June 2012.

____. Undated. Kings River Genetics Study Program Year, Program Year 2011-15.

TopoZone. 2021. Pine Flat Lake Topo Map in Fresno County CA. Available online: https://www.topozone.com/california/fresno-ca/reservoir/pine-flat-lake/. Accessed August 22, 2021. Last updated 2021.

United States Census Bureau (U.S. Census Bureau). 2020. Quick Facts, California, Fresno County, Madera County, California. Last updated July 1, 2019. Available online: https://www.census.gov/quickfacts/fact/table/maderacountycalifornia,fresnocountycalifornia,CA/PST045219.

United States Department of Defense, Army Corps of Engineers (USACE). 2001. Final Environmental Impact Statement/Environmental Impact Report: Pine Flat Dam Fish and Wildlife Habitat Restoration, Fresno, California. Available online: https://apps.dtic.mil/sti/pdfs/ADA406366.pdf. Accessed August 10, 2021.

United States Department of the Interior, Fish and Wildlife Service (USFWS). 2021. Information Planning and Conservation System (iPaC). Available online: https://ecos.fws.gov/ipac/. Accessed August 10, 2021.

United States Geologic Survey (USGS). 2021. United States Quaternary Faults. Available online: https://usgs.maps.arcgis.com/apps/webappviewer/index.html?id=5a6038b3a1684561a9b0aadf88412fcf. Accessed August 22, 2021. Last updated 2021.

Van Deventer, J.S. 2014. User's Guide for Microfish 3.0 Demonstration version. Available online: www.MircoFish.org.

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APPENDIX 1

KRCD's DRAFT APPLICATION FOR A NON-CAPACITY AMENDMENT OF LICENSE DATED MAY 25, 2021

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Jeff L. Taylor - Pine Flat Hydroelectric Project FERC Project No. 2741

Application for a Non-Capacity Amendment of License

Security Level: Public

Prepared by:
Kings River Conservation District
4886 E. Jensen Avenue
Fresno, California 93725
https://krcd.org/

Draft – 5/25/21

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INITIAL STATEMENT

Before The Federal Energy Regulatory Commission

Application for Non-Capacity Amendment of License

1.0 Introduction

The Kings River Conservation District (KRCD, Licensee or Applicant) has prepared this Initial Statement as part of its Non-Capacity License Amendment Application (Application for Amendment) for the Jeff L. Taylor - Pine Flat Hydroelectric Project, Federal Energy Regulatory Commission (FERC or Commission) Project Number 2741 (Project), as described below and in the enclosed exhibits. This Application for Amendment is prepared in substantial conformance with the regulations stated in Title 18 Code of Federal Regulations (C.F.R.) Section (§) 4.201, which specifies the requirements for applications for amendment of license. The original license for the Project expires on August 1, 2029.

KRCD proposes to add a new turbine-generating unit to the Project. This constitutes a non-capacity amendment to the existing license, as defined in 18 C.F.R. Section 4.201(b). Addition of the new unit would increase the installed name-plate capacity of the Project and has not been previously authorized by the Commission. The increase would be greater than 2 megawatts (MW) but would not increase the Project's maximum hydraulic capacity of 8,000 cubic feet per second (cfs).[1]

KRCD seeks to add the new unit as an investment related to "new construction, new capacity, efficiency, modernization, rehabilitation or replacement of major equipment," consistent with Section 36 of the Federal Power Act (FPA), 16 U.S.C. Section 823(g).

2.0 Applicant's Name, Business Address, and Telephone Number

The exact name, business address, and telephone number of the Applicant are:

Kings River Conservation District
4886 E. Jensen Avenue
Fresno, California 93725
Tel: (559) 237-5567

[1] Original Application, Exhibit H Statement of the Proposed Operation of the Pine Flat Power Plant, January 31, 1977.

The exact name and business address of each person authorized to act as an agent for the Applicant in this application are:

David M. Merritt
Interim General Manager
Kings River Conservation District
4886 E. Jensen Avenue
Fresno, California 93725
Tel: (559) 237-5567
dmerritt@krcd.org

Michael A. Swiger
Van Ness Feldman
1050 Thomas Jefferson Street
Washington, D.C., 20007
Tel: (202) 298-1891
mas@vnf.com

3.0 Applicant's Organizational Status

KRCD is a municipality of the State of California, licensee for the waterpower project, designated as the Project in the records of the Commission, issued on September 25, 1979. Established in 1951, by the Kings River Conservation District Act (Assembly Bill No. 340, Chapter 931, the "KRCD Act") and headquartered in Fresno, California, KRCD is a public agency governed by a seven-member Board of Directors, one from each division within KRCD's service area. The KRCD Act provided for KRCD's organization, operation, maintenance and governance, for the inclusion of lands therein and the exclusion of lands therefrom; providing for the acquisition, construction, maintenance and operation of works and property for the purposes of the district, including the storage, conservation, distribution and sale of water, the development, distribution and sale of electric power, the drainage, reclamation and protection of land and prescribing and defining the powers, duties and responsibilities of said district. KRCD's mission is to provide flood protection, cooperate with other agencies to achieve a balanced and high-quality water supply, provide on-farm support in efficient water conservation practices, and develop power resources for the public good.

4.0 Non-Capacity Amendment Application Description

4.1 Existing Project

The existing Project is located in Fresno County, California, 30 miles outside the City of Fresno, on the north bank of the Kings River, approximately 200 feet downstream of the United States Department of Defense, Army Corps of Engineers' (USACE) Pine Flat Dam.[2] Existing Project facilities include: 1) six fixed-wheel emergency gates (two per intake), each approximately 9 feet wide by 15 feet high located on USACE's intake and associated gate hoists controlled by equipment in USACE's hoist room located near the top of Pine Flat Dam;[3] 2) three penstock extensions, one each from the three USACE 13.5-foot-diameter underground penstocks that were

[2] Pine Flat Dam is a 455-foot-high concrete gravity dam that impounds USACE's Pine Flat Lake, which at its normal operations elevation of 955 feet has a maximum storage capacity of 1,000,000 acre-feet. The dam's spillway consists of six bays each controlled by a 36 by 42 foot tainter gates, and has a capacity of 391,000 cfs. The dam also includes an intake and three 13.5-foot-diameter penstocks, each of which has a maximum capacity of 3,000 cfs. The drainage area upstream of the dam is 1,545 square miles. From 1954 through 2020, the average daily flow in the Kings River below Pine Flat Dam was 2,287 cfs.

[3] The gages and hoist are redundant to the gates and hoist owned and operated by the USACE.

installed by the USACE in the Pine Flat Dam when it was constructed in 1954;[4] 3) the outdoor Jeff L. Taylor Powerhouse, which contains three Francis turbines and associated generating units each with an installed name-plate capacity of 55 MW; 4) three generator leads and a step-up transformer bank at the powerhouse, consisting of three 70 megavolt amperes (mva) single-phase units; 5) a downstream recreation area; and 6) appurtenant equipment. The maximum hydraulic capacity of the existing Project is 8,000 cfs. The 11.87-acre existing FERC Project Boundary includes 4.94 acres of federal lands administered by the USACE, 4.55 acres of State of California lands submerged by the Kings River, and 2.38 acres of Fresno County lands. The Project is an energy recovery (run-of-river) facility that generates electricity from water releases from Pine Flat Reservoir by USACE during mandatory flood control operations and as requested by the Kings River Water Association through its Water Master for irrigation demand, except when releases are less than approximately 500 cfs, which is below the flow level needed to generate electricity with existing units in the Jeff L. Taylor Powerhouse. Figure 1 shows monthly average flow through the Project from Water Year (WY) 2003 through WY 2020.

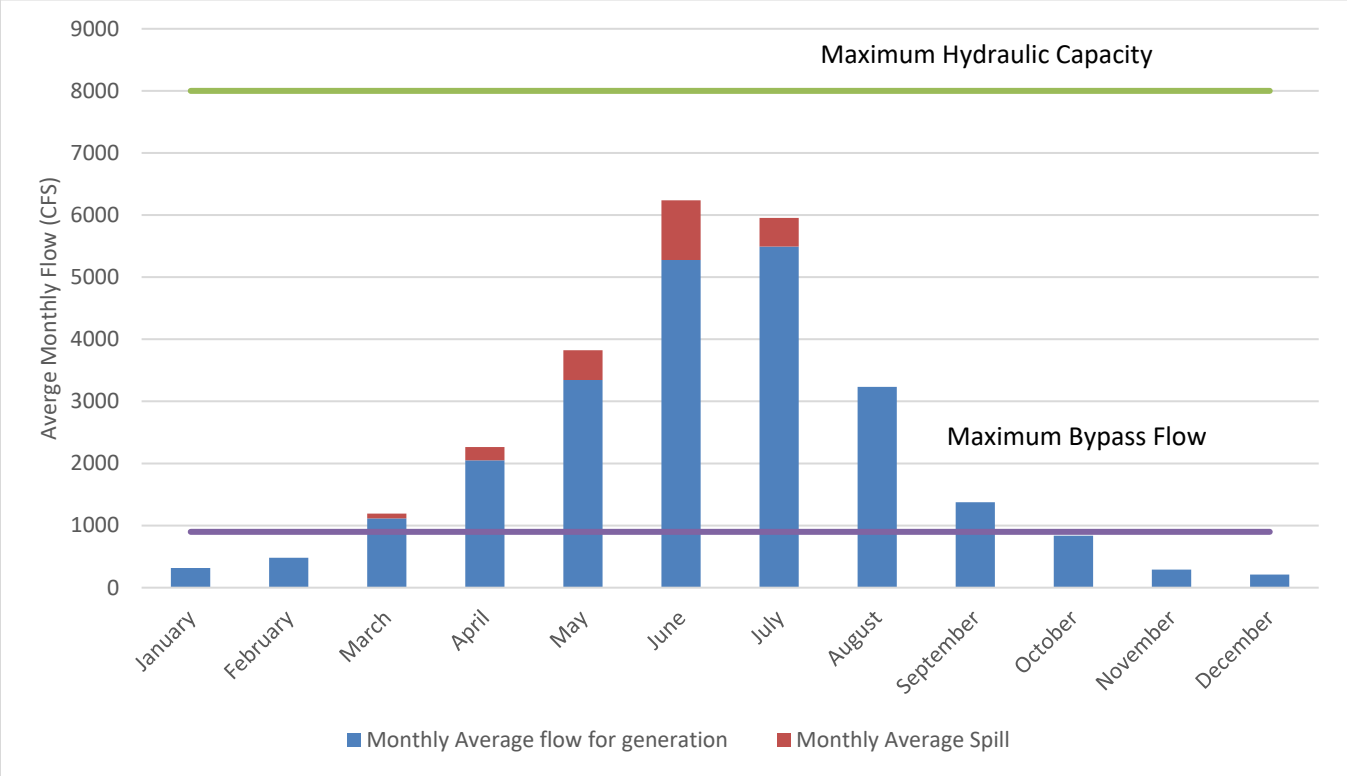

Figure 1. Monthly average flow through the Project from WY 2003 through WY 2020. Source: Kings River Gage at U.S. Army Corps of Engineers Bridge.

[4] As described at page 13 of the Commission's September 25, 1979, Order Issuing License, Article 41 of the license required KRCD to reimburse the United States (U.S.) for the cost of the three existing USACE penstocks. However, the USACE penstocks are not part of the Project's licensed facilities.

The Project does not include any dams, reservoirs or impoundments, transmission lines, or open water conduits. Pine Flat Dam and Reservoir were constructed by the USACE in 1954 to provide local and regional flood protection. Project power is provided from the Pine Flat Switchyard to the grid via California Department of Water Resources' (DWR) existing Pine Flat Transmission Line, FERC Project No. 2876, which interconnects with Pacific Gas and Electric Company's 230-kilovolt (kV) Balch #2-McCall Transmission Line. The only Project water conduits are the three penstock extensions described above. Of note, USACE through a Cooperative Agreement with KRCD as the local cost share provider (KRCD contributed 25% of the overall cost), constructed a Bypass System to improve water temperature and dissolved oxygen downstream of Pine Flat Dam. The Bypass System draws water from the deeper, cooler portions of Pine Flat Reservoir as compared to the warmer water released through USACE's Pine Flat Dam sluice gates. USACE was authorized to make the improvements by Section 1135 of the Water Resource Development Act of 1986, PL 99-662, and the Bypass System commenced operations in 2003. The non-Project Bypass System facilities consist of a 48-inch-diameter bypass line from each of the three Project penstock extensions. The 48-inch-diamter pipes from Units No.1 and No. 2 penstock extensions combine into a single 66-inch-diameter line that discharges flow through a 66-inch Monovar[5] energy dissipation valve into the air above the Kings River. The bypass line from the Unit No.3 penstock extension discharges flow through a 48-inch Monovar energy dissipation valve into the air above the Kings River. Responsibility for the Bypass System operations, repair, and maintenance is delegated to KRCD under the Cooperative Agreement with the USACE.

Figure 2 shows the Project area and Project and non-Project facilities.

[5] A Monovar valve consists of a fixed and sliding plate with a pattern of orifices in each plate. As the sliding plate is adjusted the orifices line up controlling flow through the valve. When the valve is fully open, the orifices in the fixed and siding plate are fully aligned to allow full flow through the valve.

Figure 2. Project and non-Project facilities.

4.2 Proposed Unit 4

As stated above, KRCD proposes to add a fourth generating unit to the Project that will primarily utilize flows of 375 cfs that cannot be used to generate power in the existing powerhouse and are currently discharged through the Bypass System. Unit 4 may also operate concurrently with the existing powerhouse to provide additional generation and capacity during times when the Bypass System would not normally be in operation. The new unit will increase the generating capacity of the Project by approximately 6.3 MW from 165 MW to 171.3 MW, an increase in name-plate generation capacity of 3.8 percent. The new unit will not increase the existing 8,000 cfs maximum hydraulic capacity of the Project.

The proposed Unit 4 would include: 1) a 66-inch-diameter extension from the existing Bypass System's Units 1 and 2 66-inch-diameter pipe; 2) an outdoor Unit 4 Powerhouse that would contain a 6.3 MW Francis turbine and associated generator; 3) a generator lead and a step-up transformer consisting of one 6.6 mva, three-phase unit at the new powerhouse; and 4) appurtenant equipment. The new powerhouse would be located between the dam and the existing switchyard in the paved driveway above the Bypass System piping walkways, and would be approximately 20 feet in

height, allowing for ample clearance for a crane boom to access any valves or piping for the Bypass System that will be located behind the new structure. The new unit would discharge at a maximum rate of 375 cfs into the Kings River via a draft tube outlet pipe penetrating the existing spray wall above the Kings River surface elevation (i.e., an aerial discharge). (Figure 2.) Unit 4 would connect to the existing switchyard and would operate in coordination with operations of Units 1, 2 and 3 and the existing Bypass System to provide the required water discharge below Pine Flat Dam that is currently released through the Bypass System. Figure 2 is a schematic that shows flow through the Project that would occur with the new Unit 4.

No modifications are required to USACE's Pine Flat Dam, spillway, intake or penstocks; Units 1, 2 or 3; or the non-Project Bypass System connected to Unit 3. No changes to flood control operations, Pine Flat Lake elevations, delivery of irrigation water flow, or instream flow would result from the addition of Unit 4.

The anticipated total duration of construction, and commissioning is approximately 12 months, commencing after FERC amends KRCD's license to include the fourth unit, and detailed design, approval of detailed construction plans, acquisition of any additional required permits or approvals, and purchase of equipment are complete. KRCD anticipates at this time that the initial work to install the penstock for Unit 4 into the existing Bypass System will occur during the scheduled annual outage of Units 1 and 2 – a separate outage will not be needed. Unit 4 construction will not affect the Bypass System for Unit 3 and it will continue to operate to meet flow requirements in the existing license and other downstream water requirements. There will not be any interruption to flows below Pine Flat Dam as a result of construction.

Key construction activities would include the following:

- site preparation to excavate and install the turbine generator foundation;
- modification of existing Bypass System for Units 1 and 2 to add penstock extension piping and new gate valves for the addition of Unit 4;
- installation of the discharge piping through the spray wall and installation of seals;
- installation of the water-to-wire equipment package including the turbine generator unit, turbine shutoff valve, hydraulic power unit (HPU), generator breaker and main lead termination box, electrical distribution panels, and other miscellaneous equipment and structures associated with the water-to-wire package;
- excavation and installation of the generator step-up (GSU) foundation and transformer;
- trenching and installation of wiring from the Unit 4 generator to the GSU;
- relocation of the backup diesel generator and fuel tank;
- installation of the control cabinets in the existing control room;
- installation of conduits and wiring for control and instrumentation;
- start-up and commissioning of Unit 4; and
- site clean-up.

All work would occur within the proposed FERC Project Boundary adjacent to the existing Jeff L. Taylor Powerhouse in areas previously disturbed for initial construction of the Project and the Bypass System. No work would be required in the streambed because Unit 4 would discharge into the air above the surface of Kings River.

The construction labor force is estimated to average about 25 persons over the total construction period. Equipment would be transported to the Jeff L. Taylor Powerhouse via California Highway 180 East from Fresno to N. Piedra Road and then to a secure entry gate to Pine Flat Dam and the Jeff L. Taylor Powerhouse. All access roads are suitable for the anticipated loads. No additional access roads would be required for the addition of Unit 4. It is anticipated that not more than 20 trailer ("low boy") truck roundtrips would be required to transport the turbine generator equipment, GSU and Unit 4 Powerhouse prefabricated building, piping and valves, and other heavy materials and equipment. Approximately 17 truckloads of ready-mixed concrete may be needed for equipment pads, foundations, and curbs. No changes in road conditions are anticipated as a result of the work.

At the site, typical heavy construction equipment that would be needed includes an excavator (backhoe), an air compressor, one or two dump and flatbed trucks for material and equipment handling, two truck-mounted cranes, pickup trucks, a construction office trailer, and miscellaneous equipment. Smaller equipment would include hoists and platforms, concrete placing and drilling equipment, a welding machine, pipe fitting equipment, light plant, and other miscellaneous equipment customary to the electrical, mechanical, and structural crafts.

No borrow areas are anticipated to be required because the work does not entail significant earthwork. It is expected that the available space within the fenced plant area will be sufficient for laydown and staging of materials and equipment. All work would be confined to the Jeff L. Taylor Powerhouse and powerhouse yard. No undisturbed areas are anticipated to be disturbed as a result of the work.

5.0 Pertinent Statutory and Regulatory Requirements of the State of California

KRCD possesses all necessary property and rights, including water rights, to operate the Project with the new Unit 4. KRCD does not propose any changes to the terms and conditions in the existing license or related agreements. At this time, KRCD anticipates consulting with the following agencies regarding the need for permits related to the new unit:

- California Department of Transportation regarding need for a Transportation Permit if some construction vehicles would be overweight or would carry oversize loads.
- State Water Resources Control Board (Water Board) regarding need for an Industrial General Permit Storm Water Pollution Prevention Plan.
- San Joaquin Valley Air Pollution Control District regarding the need for an air quality permit during construction.

- Fresno County regarding the need for a general construction permit and any other county and local construction permits.

Attachment 1 to this Application for Amendment contains a copy of a letter from KRCD to the Water Board requesting water quality certification (WQC) under Section 401 of the Clean Water Act for Unit 4, as described in this Initial Statement.[6]

[6] On February 22, 1979, the Water Board issued to KRCD a WQC for the Project (Certificate No. 78-11).

SUBSCRIPTION AND VERIFICATION

This application for a non-capacity license amendment is executed in the State of California, City of Fresno, and County of Fresno by David M. Merritt, Interim General Manager of the Kings River Conservation District, being first duly sworn, deposes and says that the contents of this application are true to the best of his knowledge or belief, and signs the application this ____ day of _____, 2021.

KINGS RIVER CONSERVATION DISTRICT

By: _____
David M. Merritt, Interim General Manager

Subscribed and sworn to (or affirmed) before me on this _____date of _____, 2021 by _____ proved to me on the basis of satisfactory evidence to be the person(s) who appeared before me.

_____
_____ Notary Public
In and for the County of Fresno,
State of California

My commission expires _____

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REVISED EXHIBITS

Applications for non-capacity license amendments require that only those exhibits applicable to the proposed amendment be provided in accordance with application requirements at 18 C.F.R. Section 4.201(c). KRCD has determined that revisions of four exhibits in the existing license are needed. The first revised exhibit is Exhibit K-1, *Site Map*. KRCD has updated the existing Exhibit K-1 map, which was recently approved by the Commission, to add the location of the proposed new Unit 4 powerhouse and related facilities. Attachment 2 to this Application for Amendment contains the revised Exhibit K-1 map.

The second and third revised exhibit are Exhibits L-1, *Pine Flat Power Plant Cross Sections and Profiles,* and Exhibit L-2, *Pine Flat Power Plant Plan and Longitudinal Sections*. KRCD has updated the existing Exhibit L-1 and L-2 drawings to show the plan, profiles, and sections of the proposed new unit and associated powerhouse. Attachment 3 to this Application for Amendment contains the revised Exhibits L-1 and L-2 drawings, which are considered Critical Energy Infrastructure Information (CEII).

The fourth revised exhibit is Exhibit M, *General Description of Existing Mechanical, Electrical and Transmission Equipment*. KRCD has revised the existing Exhibit M to show the mechanical and electrical equipment that would be added to the Project as part of the new unit. Attachment 4 to this Application for Amendment contains a redline of the existing Exhibit M showing the changes related to Unit 4 and a clean version of the revised Exhibit M.

KRCD has not included in this Application for Amendment revised versions of other exhibits in the existing license for the following reasons:

- Exhibit J, *Location Map*. Addition of a fourth unit as proposed by KRCD does not modify the general location of the Project or any information shown in Exhibit J of the existing license;
- Exhibit R, *Recreation Facilities*. Addition of a fourth unit as proposed by KRCD does not add, remove, or otherwise affect any of the recreation facilities shown in Exhibit R of the existing license; and
- Exhibit S, *Protection of Fisheries and Wildlife Resources*. Addition of a fourth unit as proposed by KRCD does not affect any components in Exhibit S in the existing license.

The existing license does not include an Exhibit E, *Environmental Report*, and KRCD has not included one in this Application for Amendment for the following reasons:

- construction of the new unit would have a very minor footprint, and have no effect on the Project's ability to meet flow requirements in the existing license or meet downstream flow requirements;

- operation of the new unit would not result in lower dissolved oxygen concentrations in the Kings River since the discharge from the unit will be aerial or changes in the temperature of the discharge water;
- operation of the new unit would have no effect on the temperature of discharged water since the source of the water discharge by the new Unit 4 would be the same as the source of the water discharged by the existing Bypass System for Units 1 and 2;
- all of the area that would be disturbed by the construction of Unit 4 has been previously disturbed and would be in developed areas (i.e., existing parking areas);
- KRCD's recent surveys of the FERC Project Boundary, in which the construction and new Unit 4 would occur, found no wildlife or botanical resources protected under the Endangered Species Act, California Endangered Species Act, or California Fully Protected Species; no special-status species or sensitive environmental areas; and no cultural resources protected under the National Historic Preservation Act;[7]
- upstream migration of anadromous fishes is physically blocked many miles downstream of Pine Flat Dam, and anadromous fishes, critical habitat, and Essential Fish Habitat designated under the Magnuson-Stevens Fishery Conservation and Management Act do not occur in the Project vicinity;
- designated federal or State of California Wildernesses, Wild and Scenic Rivers, wetlands, or environmentally sensitive areas occur in the Project vicinity;
- addition of the new unit will have no effect on the streambed, USACE's Pine Flat Reservoir or USACE flood control operations;
- addition of the new unit will not require any changes to the terms and conditions in the existing license; and
- If construction occurs during the nesting bird season (between January 1 and September 1), nesting bird surveys will be conducted in the work area within 2 weeks of beginning construction. If nesting birds are located, buffers will be developed around nests to prevent disturbance of the nesting birds during the term of construction.
- Within 2 weeks of beginning construction, KRCD will survey the work area for evidence of bat use. If any bat roost evidence is located within 500 feet of the work area, Best Management Practices will be developed and implemented to prevent impacts to roosting bats during the term of construction.

KRCD does not propose to conduct any studies related to this Application for Amendment, nor does KRCD propose any specific environmental measures other than adherence to those that agencies include in any necessary permits for construction and operation of the new Unit 4.

[7] KRCD's wildlife, botanical and cultural resources survey reports are on file with FERC as part of KRCD's August 31, 2020, non-capacity amendment application regarding modification of the FERC Project Boundary. The reports are included by reference here, but not refiled with FERC.

CONSULTATION

Section 4.38(a)(6)(v)(C) requires that if a licensee plans to file an application to amend an existing license that involves the addition of new water power turbine, the licensee must conduct 3-stage consultation as defined in 18 C.F.R Section 4.38(b), (c), and (d), with agencies, Native American tribes and the public prior to filing its application.

6.0 Request for Waiver of 3-Stage Consultation Process

Given the very minor environmental effects that would occur due to the construction and operations of Unit 4 as proposed in this Application for Amendment, On May 25, 2021, KRCD requested that the agencies and Native American tribes listed below waive the requirements for FERC's 3-stage consultation process as described in 18 C.F.R. Section 4.38(b), (c) and (d) (e.g., distribution of an initial consultation package, joint agency and public meeting, etc.).

- USACE;
- United States Depart of Commerce, National Oceanic and Atmospheric Administration, National Marine Fisheries Service (NMFS);
- United States Department of the Interior, Fish and Wildlife Service (USFWS);
- United States Department of the Interior, National Parks Service (NPS);
- United States Environmental Protection Agency (EPA);
- California Department of Fish and Wildlife (CDFW);
- Water Board;
- California State Historic Preservation Officer (SHPO);
- Santa Rosa Rancheria Tachi Yokut Tribe (federally recognized);
- Table Mountain Rancheria (federally recognized);
- Dumna Wo-Wah Tribal Government;
- Kings River Choinumni Farm Tribe; and
- Wuksache Indian Tribe/Eshom Valley Band.

All correspondences related to the 3-stage consultation process are included in Attachment 5 to this Application for Amendment.

[Stakeholders – This section will be expanded in the final application to report on the above consultation and requested waiver after KRCD receives responses from agencies and tribes. KRCD]

7.0 Request for Comments on Draft Application

On May 25, 2021, KRCD distributed a draft of the Public portion of this Application for Amendment to the agencies and tribes listed in Section 6.0 for a 60-day-long review and comment period.

All correspondences related to the draft Application for Amendment are included in Attachment 5 to this Application for Amendment.

[Stakeholders – This section will be expanded in the final application to report on the consultation. The final application will summarize the consultation and includes a copy of all correspondences between KRCD, agencies and Native American tribes. Further, if KRCD does not adopt a written recommendation proposed by an agency or Native American tribe during this review period, the final application will include the reason KRCD did not adopt the recommendation. If there may be any such recommendations, KRCD would reach out to the agency or tribe prior to finalizing the application to try to resolve the difference. KRCD]

ATTACHMENT 1

LETTER FROM KRCD TO WATER BOARD REQUESTING CLEAN WATER ACT, SECTION 401, WATER QUALITY CERTIFICATION

[Stakeholders – This letter will be developed and filed with the Water Board and Commission in KRCD's final application to FERC. KRCD plans to request a meeting with the Water Board at least 30 days in advance of filing the WQC request letter. As the State lead agency, KRCD will prepare the necessary documents, etc. to comply with CEQA. KRCD]

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ATTACHMENT 2

REVISED EXHIBIT K-1

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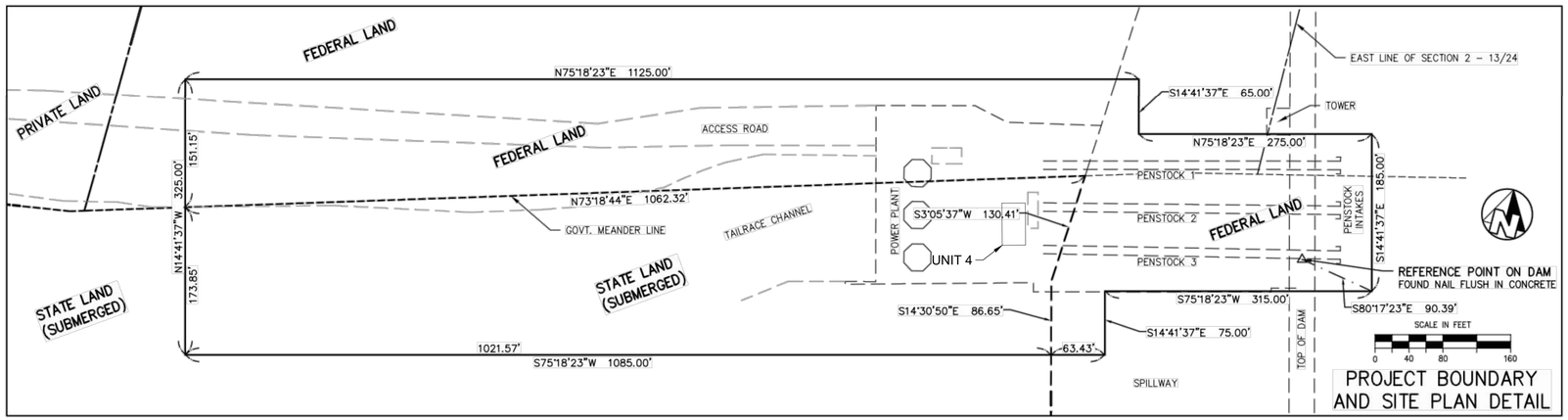

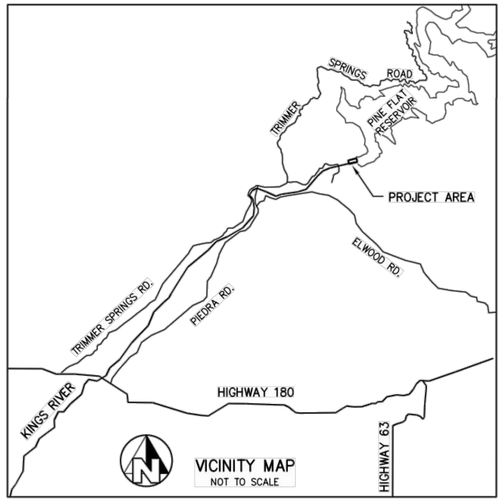

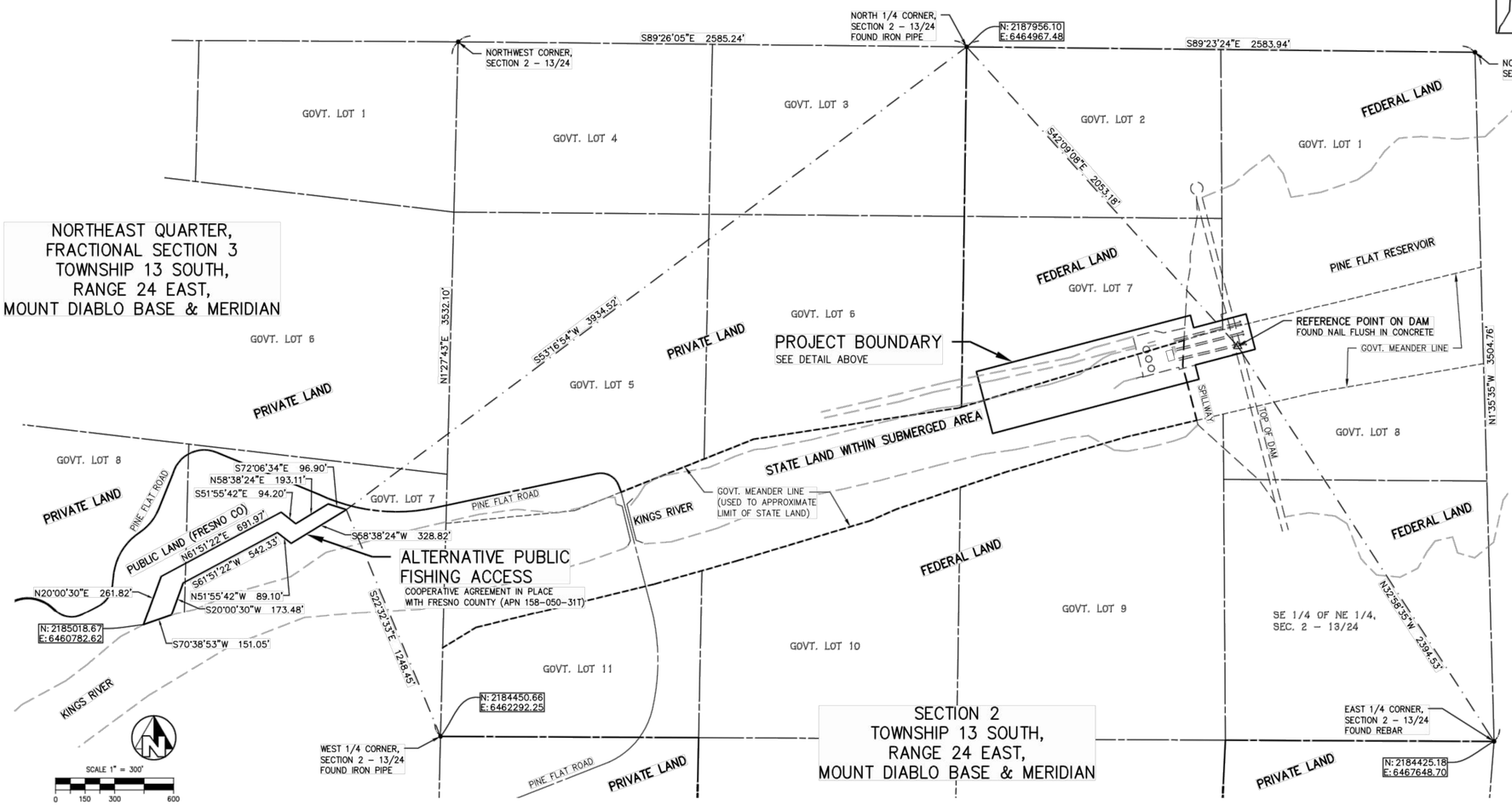

SURVEYOR'S STATEMENT

I HEREBY STATE THAT THE PROJECT BOUNDARIES FOR THE SUBJECT PROJECT AS SHOWN ON THIS "REVISED EXHIBIT K–1" ARE DEVELOPED WITHIN REASONABLE ACCURACIES AS REQUIRED IN 18CFR4.41 TO THE GEOGRAPHIC LOCATION BASED ON A FIELD SURVEY UTILIZING REAL–TIME KINEMATIC GPS OBSERVATIONS REFERENCING CONTROL STATIONS WITH PUBLISHED COORDINATES IN THE STATED COORDINATE SYSTEM, AND CONVENTIONAL SURVEYING TECHNIQUES.

BY: _____ 8/13/20

TIMOTHY M. ODOM, PLS 8468 DATE

PROFESSIONAL LAND SURVEYOR TIMOTHY M. ODOM No. 8468 STATE OF CALIFORNIA

NOTES:
ALL COORDINATES SHOWN ON THIS MAP ARE REFERENCED TO NORTH AMERICAN DATUM 1983, CALIFORNIA STATE PLANE, ZONE IV, US FOOT.
MAGNETIC DECLINATION: 12°35' E, AS OF 8/13/2020, CHANGING BY 0°05' W PER YEAR, COMPUTED WITH NOAA'S MAGNETIC DECLINATION CALCULATOR.

REVISED EXHIBIT K–1

PINE FLAT POWER PLANT PROJECT NO. 2741
PROJECT BOUNDARY MAP

KINGS RIVER CONSERVATION DISTRICT
CALIFORNIA

DATE: AUGUST 13, 2020 SCALE: 1" = 300' (24" X 36" SHEET)

FERC NO. 2741

ATTACHMENT 3

REVISED EXHIBITS L-1 and L-2

In accordance with Sections 5.30 and 4.32(k) of FERC's regulations and in light of heightened national security concerns, FERC and KRCD treat Exhibit L drawings as Critical Energy Infrastructure Information (CEII) under Section 388.112 of FERC's regulations because they contain detailed design information about existing critical infrastructure that relates details about the generation of electrical energy, and could be useful to a person planning an attack on critical infrastructure. Therefore, KRCD is not filing the drawings as Public information. Procedures for agencies, Native American tribes and the public to obtain access to CEII may be found at 18 C.F.R. Section 388.113. Requests for access should be made to FERC's CEII Coordinator.

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ATTACHMENT 4

REVISED EXHIBIT M

(Redline and Clean Versions)

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EXHIBIT M
GENERAL DESCRIPTION OF MECHANICAL, ELECTRICAL AND TRANSMISSION EQUIPMENT

M.1 GENERAL

The Jeff L. Taylor - Pine Flat Project includes: 1) six~~6~~ fixed-wheel emergency gates (two per intake) located on USACE's intake and associated gate hoists controlled by equipment in USACE's hoist room located near the top of Pine Flat Dam; 2) three penstock extensions, one each extending from the three USACE 13.5-foot-diameter underground penstocks to the Project's Jeff L. Taylor Powerhouse; 3) one penstock extension extending from the non-Project Units 1 and 2 Bypass System to the Unit 4 Powerhouse; 4) the outdoor Jeff L. Taylor Powerhouse that contains three Francis turbines and associated generating units each with an installed name-plate capacity of 55 megawatts (MW); 5) an outdoor Unit 4 Powerhouse that contains one Francis turbine and associated generating unit with an installed name-plate capacity of 6.3 MW; 6) three generator leads and a step-up transformer bank at the Jeff L. Taylor Powerhouse, consisting of three 70 megavolt amperes (mva), single-phase units, and one generator lead and a step-up transformer at the Unit 4 Powerhouse consisting of one 6.6 mva, three-phase unit; 7) a downstream recreation area; and 8) appurtenant equipment. The Project's total name-plate installed capacity is 171.3 MW.~~Power Plant will comprise three units of equal size providing a total installed capacity of 165 megawatts. The units will be connected to three 13.5 foot diameter penstocks presently existing in the Pine Flat Dam.~~

M.2 EQUIPMENT DESCRIPTION

The following tabulations present data on major Project equipment~~ to be installed~~:

1. Pine Flat Dam

Power Intake Gates	Six fixed wheel emergency gates (two per intake), each approximately 9 feet wide by 15 feet high.

Gate Hoists	Gate hoists ~~will be installed~~ in USACE's ~~the~~ hoist room located at El. 951.5 near the top of Pine Flat ~~the~~ D~~d~~am.

2. Power Plants

No. of units	Four~~Three~~
Turbines	Units 1, 2 and 3 in Jeff L. Taylor Powerhouse: Three Francis turbines, each 76,000 horsepower (h.p.) at 225 revolutions pe minute (rpm)~~rpm~~ under a rated head of 345 feet. A high-head and a low-head runner ~~are~~ provide~~d for~~ each unit to ~~permit~~ operat~~ion~~ under a net effective head range of 125 to 384 feet. Unit 4 in Unit 4 Powerhouse: One horizontal Francis turbine, 8,060 h.p. at 450 rpm under a rated head of 208 ft. The runner permits the unit to operate under a net effective head range of 124 feet to 281 feet.
Generators	Units 1, 2 and 3 in Jeff L. Taylor Powerhouse: Three 61.6 megavolt amperes (mva)~~MVA~~, outdoor type, rated output 55 MW at 13.8 kV, 90% power factor, with static exciters. Each generator is provided with a 13.8 kilovolt (kV) circuit breaker and the three generators connect~~ed~~ to a common 13.8 kV bus. Unit 4 in Unit 4 Powerhouse: One 7.0 mva, indoor type, rated output 6.3 MW at 6.9 kV, 90% power factor with rotating brushless exciter. The

	generator is provided with a 6.9 kV circuit breaker and connects to a 6.9 kV bus.
Buses	Jeff L. Taylor Powerhouse: 13.8 kV isolated phase bus duct for electrical power connections between generator Uunits 1, 2 and 3, general circuit breakers and step-up power transformers bank. Unit 4 Powerhouse: 6.9 kV isolated phase bus duct for electrical connection between generator Unit 4 and generator circuit breaker and step-up transformer.
Transformers	Jeff L. Taylor Powerhouse: One 13.8 kV – 230 kV step-up transformer bank, consisting of three 70 mvaMVA single phase units. An aAdditional 70 mvaMVA single phase unit is provided as a spare. Unit 4 Powerhouse: One 6.6 kV – 230 kV step-up transformer for Unit 4.
Pine Flat Switchyardboard	One 230 kV outdoor type, including two power ceircuit breakers and associated switches that connect Project power to the California Department of Water Resources' Pine Flat Transmission Line, FERC Project No. 2876for connection to two 230 kV overhead transmission lines.

~~Transmission~~	~~One double circuit 230 kV transmission line, steel towers, approximately one mile long (for connection to existing P.G. and E. transmission system).~~

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EXHIBIT M
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M.1 GENERAL

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The following tabulations present data on major Project equipment:

1. Pine Flat Dam

Power Intake Gates	Six fixed wheel emergency gates (two per intake), each approximately 9 feet wide by 15 feet high.
Gate Hoists	Gate hoists in USACE's hoist room located at El. 951.5 near the top of Pine Flat Dam.

2. Power Plants

No. of units	Four
Turbines	Units 1, 2 and 3 in Jeff L. Taylor Powerhouse: Three Francis turbines, each 76,000 horsepower (h.p.) at 225 revolutions pe minute (rpm) under a rated head of 345 feet. A high-head and a low-head runner provide each unit to operate under a net effective head range of 125 to 384 feet. Unit 4 in Unit 4 Powerhouse: One horizontal Francis turbine, 8,060 h.p. at 450 rpm under a rated head of 208 ft. The runner permits the unit to operate under a net effective head range of 124 feet to 281 feet.
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Buses	Jeff L. Taylor Powerhouse: 13.8 kV isolated phase bus duct for electrical power connections between generator Units 1, 2 and 3, general circuit breakers and step-up power transformers bank. Unit 4 Powerhouse: 6.9 kV isolated phase bus duct for electrical connection between generator Unit 4 and generator circuit breaker and step-up transformer.
Transformers	Jeff L. Taylor Powerhouse: One 13.8 kV – 230 kV step-up transformer bank, consisting of three 70 mva single phase units. An additional 70 mva single phase unit is provided as a spare. Unit 4 Powerhouse: One 6.6 kV – 230 kV step-up transformer for Unit 4.
Pine Flat Switchyard	One 230 kV outdoor type, including two power circuit breakers and associated switches that connect Project power to the California Department of Water Resources' Pine Flat Transmission Line, FERC Project No. 2876.

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ATTACHMENT 5

CONSULTATION DOCUMENTATION

[Stakeholders – We'll include all written consultation correspondences here in the final application. KRCD]

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APPENDIX 2

PRELIMINARY DETAILED DESIGN DRAWINGS FOR UNIT 4

In accordance with Sections 5.30 and 4.32(k) of FERC's regulations and in light of heightened national security concerns, KRCD considers these preliminary design drawings Critical Energy Infrastructure Information (CEII) under Section 388.112 of the Commission's regulations because the drawings contain detailed design information about critical infrastructure that relates details about the generation of electrical energy, and could be useful to a person planning an attack on critical infrastructure. Therefore, KRCD does not release the drawings to the public. Moreover, such information is exempt from disclosure under the Freedom of Information Act 5 at United States Code Section 552 and does not simply give the general location of the critical infrastructure. Procedures for the public to obtain access to CEII may be found at 18 C.F.R. Section 388.113. Requests for access should be made to the Commission's CEII Coordinator.

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APPENDIX 3

PERTINENT HYDROLOGY DATA

These data are in a Microsoft™ Excel file that is approximately 52 megabytes in size. If you would like a copy of this file, contact Pawan Niroula, Plant Manager, Kings River Conservation District at pniroula@krcd.org or (559) 237-5567.

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APPENDIX 4

PERTINENT WATER TEMPERATURE, DISSOLVED OXYGEN CONCENTRATION AND TOTAL DISSOLVED GAS PERCENT SATURATION DATA

These data are in a Microsoft™ Excel file that is approximately 24 megabytes in size. If you would like a copy of this file, contact Pawan Niroula, Plant Manager, Kings River Conservation District at pniroula@krcd.org or (559) 237-5567.

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APPENDIX 5

RESULTS OF KRCD'S QUERY OF USFWS'S INFORMATION FOR PLANNING AND CONSULTATION WEBSITE ON AUGUST 10, 2021

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IPaC resource list

This report is an automatically generated list of species and other resources such as critical habitat (collectively referred to as *trust resources*) under the U.S. Fish and Wildlife Service's (USFWS) jurisdiction that are known or expected to be on or near the project area referenced below. The list may also include trust resources that occur outside of the project area, but that could potentially be directly or indirectly affected by activities in the project area. However, determining the likelihood and extent of effects a project may have on trust resources typically requires gathering additional site-specific (e.g., vegetation/species surveys) and project-specific (e.g., magnitude and timing of proposed activities) information.

Below is a summary of the project information you provided and contact information for the USFWS office(s) with jurisdiction in the defined project area. Please read the introduction to each section that follows (Endangered Species, Migratory Birds, USFWS Facilities, and NWI Wetlands) for additional information applicable to the trust resources addressed in that section.

Location

Fresno County, California

Local office

Sacramento Fish And Wildlife Office

(916) 414-6600
(916) 414-6713

Federal Building
2800 Cottage Way, Room W-2605
Sacramento, CA 95825-1846

Endangered species

This resource list is for informational purposes only and does not constitute an analysis of project level impacts.

The primary information used to generate this list is the known or expected range of each species. Additional areas of influence (AOI) for species are also considered. An AOI includes areas outside of the species range if the species could be indirectly affected by activities in that area (e.g., placing a dam upstream of a fish population even if that fish does not occur at the dam site, may indirectly impact the species by reducing or eliminating water flow downstream). Because species can move, and site conditions can change, the species on this list are not guaranteed to be found on or near the project area. To fully determine any potential effects to species, additional site-specific and project-specific information is often required.

Section 7 of the Endangered Species Act **requires** Federal agencies to "request of the Secretary information whether any species which is listed or proposed to be listed may be present in the area of such proposed action" for any project that is conducted, permitted, funded, or licensed by any Federal agency. A letter from the local office and a species list which fulfills this requirement can **only** be obtained by requesting an official species list from either the Regulatory Review section in IPaC (see directions below) or from the local field office directly.

For project evaluations that require USFWS concurrence/review, please return to the IPaC website and request an official species list by doing the following:

1. Draw the project location and click CONTINUE.
2. Click DEFINE PROJECT.
3. Log in (if directed to do so).
4. Provide a name and description for your project.
5. Click REQUEST SPECIES LIST.

Listed species[1] and their critical habitats are managed by the Ecological Services Program of the U.S. Fish and Wildlife Service (USFWS) and the fisheries division of the National Oceanic and Atmospheric Administration (NOAA Fisheries[2]).

Species and critical habitats under the sole responsibility of NOAA Fisheries are **not** shown on this list. Please contact NOAA Fisheries for species under their jurisdiction.

---

1. Species listed under the Endangered Species Act are threatened or endangered; IPaC also shows species that are candidates, or proposed, for listing. See the listing status page for more information. IPaC only shows species that are regulated by USFWS (see FAQ).
2. NOAA Fisheries, also known as the National Marine Fisheries Service (NMFS), is an office of the National Oceanic and Atmospheric Administration within the Department of Commerce.

The following species are potentially affected by activities in this location:

Mammals

NAME	STATUS

Fisher Pekania pennanti — Endangered

No critical habitat has been designated for this species.
https://ecos.fws.gov/ecp/species/3651

San Joaquin Kit Fox Vulpes macrotis mutica — Endangered

Wherever found

No critical habitat has been designated for this species.
https://ecos.fws.gov/ecp/species/2873

Reptiles

NAME	STATUS

Giant Garter Snake Thamnophis gigas — Threatened

Wherever found

No critical habitat has been designated for this species.
https://ecos.fws.gov/ecp/species/4482

Amphibians

NAME	STATUS

California Red-legged Frog Rana draytonii — Threatened

Wherever found

There is **final** critical habitat for this species. The location of the critical habitat is not available.
https://ecos.fws.gov/ecp/species/2891

California Tiger Salamander Ambystoma californiense — Threatened

There is **final** critical habitat for this species. The location of the critical habitat is not available.
https://ecos.fws.gov/ecp/species/2076

Fishes

NAME	STATUS

Delta Smelt Hypomesus transpacificus — Threatened

Wherever found

There is **final** critical habitat for this species. The location of the critical habitat is not available.
https://ecos.fws.gov/ecp/species/321

Flowering Plants

NAME	STATUS

Keck's Checker-mallow Sidalcea keckii — Endangered

Wherever found

There is **final** critical habitat for this species. The location of the critical habitat is not available.
https://ecos.fws.gov/ecp/species/5704

Critical habitats

Potential effects to critical habitat(s) in this location must be analyzed along with the endangered species themselves.

THERE ARE NO CRITICAL HABITATS AT THIS LOCATION.

Migratory birds

Certain birds are protected under the Migratory Bird Treaty Act[1] and the Bald and Golden Eagle Protection Act[2].

Any person or organization who plans or conducts activities that may result in impacts to migratory birds, eagles, and their habitats should follow appropriate regulations and consider implementing appropriate conservation measures, as described below.

1. The Migratory Birds Treaty Act of 1918.
2. The Bald and Golden Eagle Protection Act of 1940.

Additional information can be found using the following links:

- Birds of Conservation Concern http://www.fws.gov/birds/management/managed-species/birds-of-conservation-concern.php
- Measures for avoiding and minimizing impacts to birds http://www.fws.gov/birds/management/project-assessment-tools-and-guidance/conservation-measures.php
- Nationwide conservation measures for birds http://www.fws.gov/migratorybirds/pdf/management/nationwidestandardconservationmeasures.pdf

The birds listed below are birds of particular concern either because they occur on the USFWS Birds of Conservation Concern (BCC) list or warrant special attention in your project location. To learn more about the levels of concern for birds on your list and how this list is generated, see the FAQ below. This is not a list of every bird you may find in this location, nor a guarantee that every bird on this list will be found in your project area. To see exact locations of where birders and the general public have sighted birds in and around your project area, visit the E-bird data mapping tool (Tip: enter your location, desired date range and a species on your list). For projects that occur off the Atlantic Coast, additional maps and models detailing the relative occurrence and abundance of bird

species on your list are available. Links to additional information about Atlantic Coast birds, and other important information about your migratory bird list, including how to properly interpret and use your migratory bird report, can be found below.

For guidance on when to schedule activities or implement avoidance and minimization measures to reduce impacts to migratory birds on your list, click on the PROBABILITY OF PRESENCE SUMMARY at the top of your list to see when these birds are most likely to be present and breeding in your project area.

NAME	BREEDING SEASON (IF A BREEDING SEASON IS INDICATED FOR A BIRD ON YOUR LIST, THE BIRD MAY BREED IN YOUR PROJECT AREA SOMETIME WITHIN THE TIMEFRAME SPECIFIED, WHICH IS A VERY LIBERAL ESTIMATE OF THE DATES INSIDE WHICH THE BIRD BREEDS ACROSS ITS ENTIRE RANGE. "BREEDS ELSEWHERE" INDICATES THAT THE BIRD DOES NOT LIKELY BREED IN YOUR PROJECT AREA.)
Bald Eagle *Haliaeetus leucocephalus* This is not a Bird of Conservation Concern (BCC) in this area, but warrants attention because of the Eagle Act or for potential susceptibilities in offshore areas from certain types of development or activities. https://ecos.fws.gov/ecp/species/1626	Breeds Jan 1 to Aug 31
Nuttall's Woodpecker *Picoides nuttallii* This is a Bird of Conservation Concern (BCC) only in particular Bird Conservation Regions (BCRs) in the continental USA https://ecos.fws.gov/ecp/species/9410	Breeds Apr 1 to Jul 20
Oak Titmouse *Baeolophus inornatus* This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska. https://ecos.fws.gov/ecp/species/9656	Breeds Mar 15 to Jul 15

Probability of Presence Summary

The graphs below provide our best understanding of when birds of concern are most likely to be present in your project area. This information can be used to tailor and schedule your project activities to avoid or minimize impacts to birds. Please make sure you read and understand the FAQ "Proper Interpretation and Use of Your Migratory Bird Report" before using or attempting to interpret this report.

Probability of Presence (■)

Each green bar represents the bird's relative probability of presence in the 10km grid cell(s) your project overlaps during a particular week of the year. (A year is represented as 12 4-week months.) A taller bar indicates a higher probability of species presence. The survey effort (see below) can be used to establish a level of confidence in the presence score. One can have higher confidence in the presence score if the corresponding survey effort is also high.

How is the probability of presence score calculated? The calculation is done in three steps:

1. The probability of presence for each week is calculated as the number of survey events in the week where the species was detected divided by the total number of survey events for that week. For example, if in week 12 there were 20 survey events and the Spotted Towhee was found in 5 of them, the probability of presence of the Spotted Towhee in week 12 is 0.25.
2. To properly present the pattern of presence across the year, the relative probability of presence is calculated. This is the probability of presence divided by the maximum probability of presence across all weeks. For example, imagine the probability of presence in week 20 for the Spotted Towhee is 0.05, and that the probability of presence at week 12 (0.25) is the maximum of any week of the year. The relative probability of presence on week 12 is 0.25/0.25 = 1; at week 20 it is 0.05/0.25 = 0.2.
3. The relative probability of presence calculated in the previous step undergoes a statistical conversion so that all possible values fall between 0 and 10, inclusive. This is the probability of presence score.

To see a bar's probability of presence score, simply hover your mouse cursor over the bar.

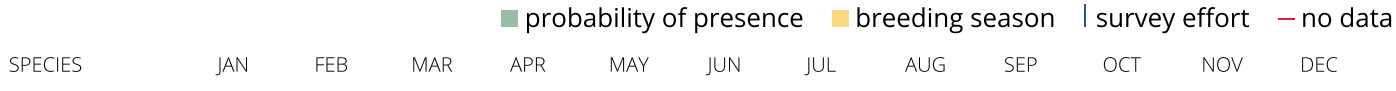
Breeding Season (■)
Yellow bars denote a very liberal estimate of the time-frame inside which the bird breeds across its entire range. If there are no yellow bars shown for a bird, it does not breed in your project area.

Survey Effort (|)
Vertical black lines superimposed on probability of presence bars indicate the number of surveys performed for that species in the 10km grid cell(s) your project area overlaps. The number of surveys is expressed as a range, for example, 33 to 64 surveys.

To see a bar's survey effort range, simply hover your mouse cursor over the bar.

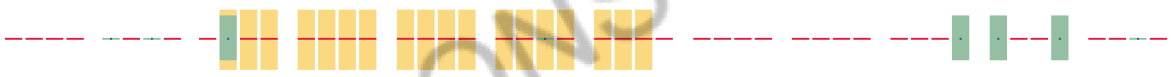
No Data (–)
A week is marked as having no data if there were no survey events for that week.

Survey Timeframe
Surveys from only the last 10 years are used in order to ensure delivery of currently relevant information. The exception to this is areas off the Atlantic coast, where bird returns are based on all years of available data, since data in these areas is currently much more sparse.



Bald Eagle Non-BCC Vulnerable (This is not a Bird of Conservation Concern (BCC) in this area, but warrants attention because of the Eagle Act or for potential susceptibilities in offshore areas from certain types of development or activities.)

Nuttall's Woodpecker BCC - BCR (This is a Bird of Conservation Concern (BCC) only in particular Bird Conservation Regions (BCRs) in the continental USA)



Oak Titmouse BCC Rangewide (CON) (This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska.)

Tell me more about conservation measures I can implement to avoid or minimize impacts to migratory birds.

Nationwide Conservation Measures describes measures that can help avoid and minimize impacts to all birds at any location year round. Implementation of these measures is particularly important when birds are most likely to occur in the project area. When birds may be breeding in the area, identifying the locations of any active nests and avoiding their destruction is a very helpful impact minimization measure. To see when birds are most likely to occur and be breeding in your project area, view the Probability of Presence Summary. Additional measures or permits may be advisable depending on the type of activity you are conducting and the type of infrastructure or bird species present on your project site.

What does IPaC use to generate the migratory birds potentially occurring in my specified location?

The Migratory Bird Resource List is comprised of USFWS Birds of Conservation Concern (BCC) and other species that may warrant special attention in your project location.

The migratory bird list generated for your project is derived from data provided by the Avian Knowledge Network (AKN). The AKN data is based on a growing collection of survey, banding, and citizen science datasets and is queried and filtered to return a list of those birds reported as occurring in the 10km grid cell(s) which your project

intersects, and that have been identified as warranting special attention because they are a BCC species in that area, an eagle (Eagle Act requirements may apply), or a species that has a particular vulnerability to offshore activities or development.

Again, the Migratory Bird Resource list includes only a subset of birds that may occur in your project area. It is not representative of all birds that may occur in your project area. To get a list of all birds potentially present in your project area, please visit the AKN Phenology Tool.

What does IPaC use to generate the probability of presence graphs for the migratory birds potentially occurring in my specified location?

The probability of presence graphs associated with your migratory bird list are based on data provided by the Avian Knowledge Network (AKN). This data is derived from a growing collection of survey, banding, and citizen science datasets .

Probability of presence data is continuously being updated as new and better information becomes available. To learn more about how the probability of presence graphs are produced and how to interpret them, go the Probability of Presence Summary and then click on the "Tell me about these graphs" link.

How do I know if a bird is breeding, wintering, migrating or present year-round in my project area?

To see what part of a particular bird's range your project area falls within (i.e. breeding, wintering, migrating or year-round), you may refer to the following resources: The Cornell Lab of Ornithology All About Birds Bird Guide, or (if you are unsuccessful in locating the bird of interest there), the Cornell Lab of Ornithology Neotropical Birds guide. If a bird on your migratory bird species list has a breeding season associated with it, if that bird does occur in your project area, there may be nests present at some point within the timeframe specified. If "Breeds elsewhere" is indicated, then the bird likely does not breed in your project area.

What are the levels of concern for migratory birds?

Migratory birds delivered through IPaC fall into the following distinct categories of concern:

1. "BCC Rangewide" birds are Birds of Conservation Concern (BCC) that are of concern throughout their range anywhere within the USA (including Hawaii, the Pacific Islands, Puerto Rico, and the Virgin Islands);
2. "BCC - BCR" birds are BCCs that are of concern only in particular Bird Conservation Regions (BCRs) in the continental USA; and
3. "Non-BCC - Vulnerable" birds are not BCC species in your project area, but appear on your list either because of the Eagle Act requirements (for eagles) or (for non-eagles) potential susceptibilities in offshore areas from certain types of development or activities (e.g. offshore energy development or longline fishing).

Although it is important to try to avoid and minimize impacts to all birds, efforts should be made, in particular, to avoid and minimize impacts to the birds on this list, especially eagles and BCC species of rangewide concern. For more information on conservation measures you can implement to help avoid and minimize migratory bird impacts and requirements for eagles, please see the FAQs for these topics.

Details about birds that are potentially affected by offshore projects

For additional details about the relative occurrence and abundance of both individual bird species and groups of bird species within your project area off the Atlantic Coast, please visit the Northeast Ocean Data Portal. The Portal also offers data and information about other taxa besides birds that may be helpful to you in your project review. Alternately, you may download the bird model results files underlying the portal maps through the NOAA NCCOS Integrative Statistical Modeling and Predictive Mapping of Marine Bird Distributions and Abundance on the Atlantic Outer Continental Shelf project webpage.

Bird tracking data can also provide additional details about occurrence and habitat use throughout the year, including migration. Models relying on survey data may not include this information. For additional information on marine bird tracking data, see the Diving Bird Study and the nanotag studies or contact Caleb Spiegel or Pam Loring.

What if I have eagles on my list?

If your project has the potential to disturb or kill eagles, you may need to obtain a permit to avoid violating the Eagle Act should such impacts occur.

Proper Interpretation and Use of Your Migratory Bird Report

The migratory bird list generated is not a list of all birds in your project area, only a subset of birds of priority concern. To learn more about how your list is generated, and see options for identifying what other birds may be in your project area, please see the FAQ "What does IPaC use to generate the migratory birds potentially occurring in my specified location". Please be aware this report provides the "probability of presence" of birds within the 10 km grid cell(s) that overlap your project; not your exact project footprint. On the graphs provided, please also look carefully at the survey effort (indicated by the black vertical bar) and for the existence of the "no data" indicator (a red horizontal bar). A high survey effort is the key component. If the survey effort is high, then the probability of presence score can be viewed as more dependable. In contrast, a low survey effort bar or no data bar means a lack of data and, therefore, a lack of certainty about presence of the species. This list is not perfect; it is simply a starting point for identifying what birds of concern have the potential to be in your project area, when they might be there, and if they might be breeding (which means nests might be present). The list helps you know what to look for to confirm presence, and helps guide you in knowing when to implement conservation measures to avoid or minimize potential impacts from your project activities, should presence be confirmed. To learn more about conservation measures, visit the FAQ "Tell me about conservation measures I can implement to avoid or minimize impacts to migratory birds" at the bottom of your migratory bird trust resources page.

Facilities

National Wildlife Refuge lands

Any activity proposed on lands managed by the National Wildlife Refuge system must undergo a 'Compatibility Determination' conducted by the Refuge. Please contact the individual Refuges to discuss any questions or concerns.

THERE ARE NO REFUGE LANDS AT THIS LOCATION.

Fish hatcheries

THERE ARE NO FISH HATCHERIES AT THIS LOCATION.

Wetlands in the National Wetlands Inventory

Impacts to NWI wetlands and other aquatic habitats may be subject to regulation under Section 404 of the Clean Water Act, or other State/Federal statutes.

For more information please contact the Regulatory Program of the local U.S. Army Corps of Engineers District.

Please note that the NWI data being shown may be out of date. We are currently working to update our NWI data set. We recommend you verify these results with a site visit to determine the actual extent of wetlands on site.

This location overlaps the following wetlands:

LAKE

- L1UBHh

RIVERINE

- R3UBH
- R4SBC
- R5UBF

A full description for each wetland code can be found at the National Wetlands Inventory website

Data limitations

The Service's objective of mapping wetlands and deepwater habitats is to produce reconnaissance level information on the location, type and size of these resources. The maps are prepared from the analysis of high altitude imagery. Wetlands are identified based on vegetation, visible hydrology and geography. A margin of error is inherent in the use of imagery; thus, detailed on-the-ground inspection of any particular site may result in revision of the wetland boundaries or classification established through image analysis.

The accuracy of image interpretation depends on the quality of the imagery, the experience of the image analysts, the amount and quality of the collateral data and the amount of ground truth verification work conducted. Metadata should be consulted to determine the date of the source imagery used and any mapping problems.

Wetlands or other mapped features may have changed since the date of the imagery or field work. There may be occasional differences in polygon boundaries or classifications between the information depicted on the map and the actual conditions on site.

Data exclusions

Certain wetland habitats are excluded from the National mapping program because of the limitations of aerial imagery as the primary data source used to detect wetlands. These habitats include seagrasses or submerged aquatic vegetation that are found in the intertidal and subtidal zones of estuaries and nearshore coastal waters. Some deepwater reef communities (coral or tuberficid worm reefs) have also been excluded from the inventory. These habitats, because of their depth, go undetected by aerial imagery.

Data precautions

Federal, state, and local regulatory agencies with jurisdiction over wetlands may define and describe wetlands in a different manner than that used in this inventory. There is no attempt, in either the design or products of this inventory, to define the limits of proprietary jurisdiction of any Federal, state, or local government or to establish the geographical scope of the regulatory programs of government agencies. Persons intending to engage in activities involving modifications within or adjacent to wetland areas should seek the advice of appropriate federal, state, or local agencies concerning specified agency regulatory programs and proprietary jurisdictions that may affect such activities.