SOUTHERN CALIFORNIA EDISON

Kern River No. 1 Hydroelectric Project (FERC Project No. 1930)

DRAFT LICENSE APPLICATION

VOLUME 2 (PART 1)
EXHIBIT E: ENVIRONMENTAL EXHIBIT

SOUTHERN CALIFORNIA EDISON®
Energy for What's Ahead℠

December 2025

SOUTHERN CALIFORNIA EDISON

Kern River No. 1 Hydroelectric Project
FERC Project No. 1930

Draft License Application

Volume 2 (Part 1)
Exhibit E: Environmental Exhibit

Southern California Edison
2244 Walnut Grove Avenue
Rosemead, CA 91770

December 2025

Support from:

Stantec

LIST OF EXHIBITS

Exhibit E: Environmental Exhibit

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LIST OF ACRONYMS

CFR	Code of Federal Regulations
DLA	Draft License Application
Exhibit E	Environmental Exhibit
FERC	Federal Energy Regulatory Commission
FLA	Final License Application
ILP	Integrated Licensing Process
PAD	Pre-Application Document
Project	Kern River No. 1 Hydroelectric Project
SCE	Southern California Edison
USR	Updated Study Report

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1.0 INTRODUCTION

Southern California Edison (SCE) is filing this Environmental Exhibit (Exhibit E) with the Federal Energy Regulatory Commission (FERC) as part of the Application for New License for the Kern River No. 1 Hydroelectric Project (Project), FERC Project No. 1930. Pursuant to FERC regulations in the Code of Federal Regulations (CFR), Title 18, Section 5.16 (18 CFR § 5.16), SCE is required to file a preliminary licensing proposal no later than 150 days prior to the deadline for filing a License Application. As allowed under § 5.16(c), SCE elected to file a Draft License Application (DLA), which includes the contents of a License Application required by 18 CFR § 5.18 instead of the preliminary licensing proposal. The regulation at 18 CFR § 5.16(c) states that if an applicant elects to file a DLA, a notice of its intent should be included in the Updated Study Report (USR).

The deadline to file a DLA for the Project is January 2, 2026. The deadline to file the USR is March 16, 2026. Due to this disparity in the relicensing process schedule and to satisfy the notification requirement under 18 CFR § 5.16(c), SCE filed a Notice of Intent to prepare a DLA with FERC on March 13, 2025,[1] as part of the Initial Study Report and concurrently notified Stakeholders on the Project's distribution list.

Pursuant to FERC regulations at 18 CFR § 5.16 and § 5.18, Exhibit E describes the existing Project and provides the necessary technical information and analyses to identify and evaluate potential effects of Project operation and maintenance under the Proposed Action compared with the No-Action Alternative. In addition, Exhibit E proposes new environmental measures under the Proposed Action to protect, mitigate, and enhance environmental and cultural resources.

This Exhibit E was developed from information summarized in SCE's Pre-Application Document (PAD) along with additional information collected during implementation of 14 FERC-approved Technical Study Plans. Exhibit E includes a summary of relevant information and study results for each resource to provide background for the analysis.

In addition to this Introduction, Exhibit E includes the following content:

- Section 2.0, *Application*, explains the type of license that SCE is seeking and pertinent Project information.
- Section 3.0, *Purpose of Action and Need for Power*, presents the purpose of the action and the need for the power generated by the Project.
- Section 4.0, *Statutory and Regulatory Requirements and Applicable Laws*, provides a discussion of compliance with major applicable laws.

[1] Initial Study Report, Project No. 1930-090, Accession No. 20250313-5015 (filed March 13, 2025).

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- Section 5.0, *Proposed Action and Alternatives*, provides a summary of the existing Project facilities and operations (No-Action Alternative) and describes the Proposed Action, including any changes to Project facilities, how SCE would operate the Project, and introduces environmental measures, management, and monitoring plans associated with the Proposed Action.

- Section 6.0, *Other Alternatives*, describes alternatives considered but eliminated from detailed study.

- Section 7.0, *Environmental Analysis*, includes a description of the general setting of the Project; describes the affected environment, which is the existing condition and the baseline against which to measure the effects of the Proposed Action; and a discussion of potential Project-related effects (beneficial or adverse) associated with implementation of the Proposed Action—including proposed environmental measures—on environmental and cultural resources.

- Section 8.0, *Cumulative Effects*, presents information about cumulatively affected resources, including the geographic and temporal scope of analysis.

- Section 9.0, *Developmental Analysis*, describes the electric power benefits of the Project; summarizes the cost, power value, and net benefit of the Proposed Action; and provides an economic analysis of Project operation and maintenance. This section is included as a placeholder in the DLA and will be updated as part of the Final License Application (FLA).

- Section 10.0, *Conclusions and Recommendations*, compares the effects of the Proposed Action and the No-Action Alternative for the Project; identifies the recommended alternative; summarizes unavoidable adverse effects; discusses the recommendations of fish and wildlife agencies; describes the Project's consistency with comprehensive plans; and presents a summary of findings and level of significance.

References are provided in each section.

Exhibit E also includes the following four appendices that support information and discussion presented in the sections described above.

- Appendix E.1, *Proposed Environmental Measures, Management, and Monitoring Plans*, includes measures proposed by SCE to protect and maintain environmental and cultural resources affected by the Proposed Action and to mitigate any potential adverse effects on those resources. Collectively, these are referred to as environmental measures.

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- Appendix E.2, *Resource Technical Memorandum*, includes data and information collected during the Integrated Licensing Process (ILP) associated with the 14 FERC-approved Study Plans.[2] Technical memorandum filed with FERC are included as part of this comprehensive appendix to support findings and information summarized in Section 7 of Exhibit E. If an interim technical memorandum was updated with new information since SCE's Initial Study Report filing, only the most recent version of the technical memorandum is included. Certain technical memorandum contain information regarding sensitive biological or cultural resources and are therefore filed as Privileged information (CUI//PRIV) in Volume 4 and 5 of this License Application.

- Appendix E.3, *Draft Biological Assessment*, documents potential impacts of the continued operation and maintenance of the Project to Endangered Species Act listed species.

- Appendix E.4, *Consultation Documentation*, includes a description of SCE's consultation history and documentation of outreach pertaining to the ILP relicensing proceeding with state and federal resource agencies, Tribes, non-governmental organizations, and members of the public.

[2] Study Plan Determination, Project No. 1930-090, Accession No. 20240314-3013 (issued March 14, 2024).

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LIST OF ACRONYMS

CFR	Code of Federal Regulations
FERC	Federal Energy Regulatory Commission
Forest Service	United States Forest Service
FPA	Federal Power Act
MW	megawatt
MWh	megawatt hours
Project	Kern River No. 1 Hydroelectric Project
SCE	Southern California Edison
USC	United States Code

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2.0 APPLICATION

Southern California Edison (SCE) is applying to the Federal Energy Regulatory Commission (FERC) for a new license for the existing Kern River No. 1 Hydroelectric Project (Project) using the Integrated Licensing Process. This Application for New License was prepared pursuant to FERC regulations in the Code of Federal Regulations (CFR), Title 18, Section 5.16 (18 CFR § 5.16) and Section 5.18 (18 CFR § 5.18)—Application for New License for Major Project—Existing Dam (License Application). This Exhibit E was prepared by SCE in support of this License Application. In accordance with Section 15(c)(1) of the Federal Power Act (FPA) and FERC's implementing regulations, SCE is filing a Final License Application for the Project with FERC prior to June 1, 2026, to continue operation and maintenance of the Project under a new license (United States Code [USC], Title 16, Section 808(c)(1) [16 USC § 808(c)(1)]).

The Project is designated as FERC Project No. 1930 pursuant to the license issued on June 16, 1998. The existing Project license was issued for a period of 30 years, expiring on May 31, 2028. SCE is seeking a license renewal for the continued operation and maintenance of the Project.

This License Application presents proposed environmental measures as part of the new license to be issued by FERC. At this time, SCE proposes to operate the Project in a manner consistent with the current license while incorporating ongoing, updated, and new environmental measures.

The Project is located on the lower Kern River on the western slope of the Sierra Nevada, approximately 15 miles east of the City of Bakersfield in Kern County, California (Map 2-1). The Project occupies federal lands within the Sequoia National Forest, administered by the United States Forest Service (Forest Service). The installed capacity of the Project is 26.3-megawatts (MW). The Project operates in a run-of-river mode and includes the following features:

- Diversion dam (Democrat Dam) and impoundment;
- An approximately 8.5-mile-long water conveyance system, consisting of a sandbox, flowline, forebay, and penstock;
- Powerhouse and associated equipment;
- Access roads and trails;
- Communications and power lines;
- Gaging stations; and
- Ancillary features.

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The Project's annual average generation over the term of the current FERC license (1999–2024) is 132,068 megawatt hours (MWh) and the most recent 5-year average annual production (2020–2024) is 151,564 MWh. As the Project operates in a run-of-river mode and essentially has no storage, the estimated dependable generating capacity of the Project is 79,277 MWh, which represents a year with the lowest annual inflow (2015). Under the existing Project license, the current FERC Project boundary encompasses 121.27 acres of land, of which 116.79 acres are on federal land and the remaining 4.48 acres are SCE owned. SCE does not propose any enhancements to increase Project capacity or any new construction.

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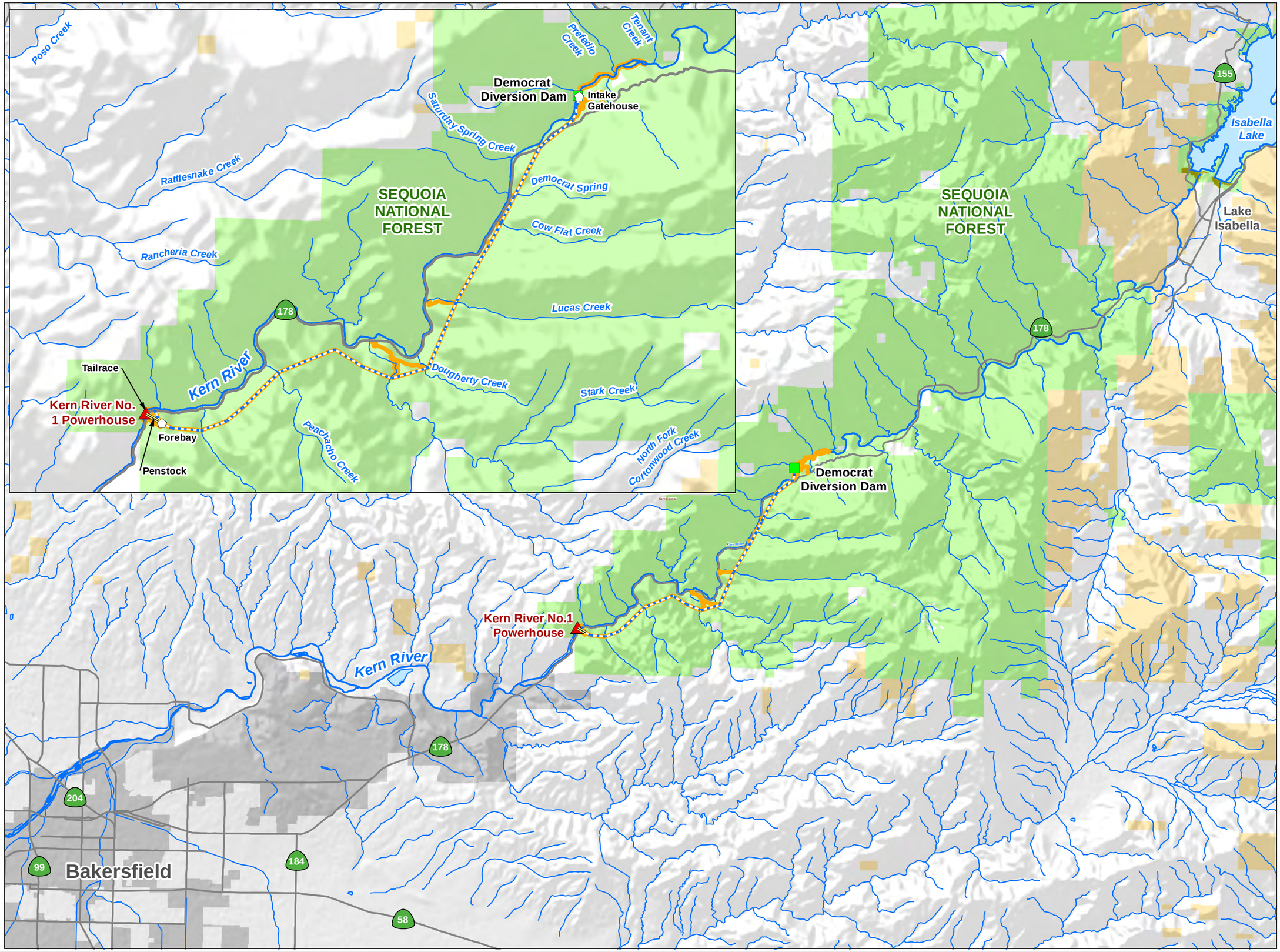
MAPS



Facilities

- Dam
- Powerhouse
- Water Conveyence Feature
- Flowline
- Penstock
- FERC Boundary

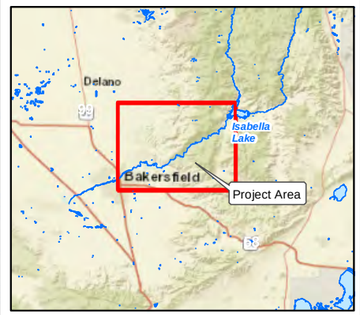
Other Features

- Highway
- Watercourse
- Water Body

Land Jurisdiction*

- U.S. Forest Service
- U.S. Bureau of Land Management
- U.S. Army Corps of Engineers
- Private (Blank)

*SOURCE: BLM 2021



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Kern River No. 1 Hydroelectric Project
FERC Project No. 1930

Map 2-1

Project Vicinity and Land Jurisdiction

0 0.5 1 2 Miles

Projection: UTM Zone 11
Datum: NAD 83

Date: 10/9/2025

Southern California Edison (SCE) has no reason to believe that there are any inaccuracies or defects with information incorporated in this work and make no representations of any kind, including, but not limited to, the warranties of merchantability or fitness for a particular use, nor are any such warranties tobe implied, with respect to the information or data, furnished herein. No part of this map may be reproduced ortransmitted in any form or by any means, electronic or mechanical, including photocopying and recording system, except as expressly permitted in writing by SCE.

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LIST OF ACRONYMS

AB	Assembly Bill
CARB	California Air Resources Board
CEC	California Energy Commission
CPUC	California Public Utilities Commission
Exhibit E	Environmental Exhibit
FERC	Federal Energy Regulatory Commission
FPA	Federal Power Act
GHG	greenhouse gas
MW	megawatt
MWh	megawatt per hour
NEPA	National Environmental Policy Act
NERC	North American Electric Reliability Corporation
Project	Kern River No. 1 Hydroelectric Project
RPS	Renewables Portfolio Standard
SB	Senate Bill
SCE	Southern California Edison
WECC	Western Electricity Coordinating Council

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3.0 PURPOSE OF ACTION AND NEED FOR POWER

3.1 PURPOSE OF ACTION

The federal action to be considered by the Federal Energy Regulatory Commission (FERC) is the issuance of a new license to Southern California Edison (SCE), under the Federal Power Act (FPA), for continued operation and maintenance of the Kern River No. 1 Hydroelectric Project (Project). In deciding whether to issue a license, FERC must determine that the Project would be best adapted to a comprehensive plan for improving or developing the waterway. In addition, FERC must give equal consideration to the purposes of energy conservation, fish and wildlife resources, cultural resources, recreational resources, water quality, and other environmental resources.

FERC's issuance of a new license for the continued operation of the Project will allow SCE to continue producing electric power from a renewable resource for the term of the new license, while addressing the affected environmental, land use, public recreation, and cultural resources in accordance with the Commission's public interest and equal consideration mandates under the FPA.

This Environmental Exhibit (Exhibit E) was prepared consistent with FERC's Integrated Licensing Process requirements as set forth in the Code of Federal Regulations, Title 18, Section 5.18(b) (18 CFR § 5.18(b)) and was designed to support FERC's required analysis under the National Environmental Policy Act (NEPA). In this Exhibit E, SCE assesses the effects associated with the Project, evaluates alternatives to the proposed Project, makes recommendations to FERC on whether to issue a new license, and (if so) makes recommended terms and conditions to become a part of any license issued. This Exhibit E presents a description and analysis of environmental and economic effects of the No-Action Alternative and Proposed Action, including proposed environmental measures, where appropriate, to avoid, mitigate, or reduce those effects. Several other alternatives were considered in Exhibit E but were eliminated from detailed analysis because they were not considered reasonable, including federal government takeover, issuance of a non-power license, and retirement of the Project (refer to Section 6.0, *Other Alternatives*).

3.2 NEED FOR POWER

SCE is a public utility that supplies electricity to approximately 15 million people in a 50,000-square-mile service area that covers portions of coastal, central, and southern California. SCE serves all customers through a diverse transmission system that includes a generation mix of gas, nuclear, wind, solar, geothermal, biomass, energy storage, and hydroelectric resources. SCE also purchases power from other utilities or non-utility power producers.

The Project provides hydroelectric generation to meet part of SCE's power requirements, resource diversity, and capacity needs. The Project has a total installed capacity of 26.3 megawatts (MW). The estimated annual dependable generating capacity is 79,277 megawatts per hour (MWh), which represents a year with the lowest annual inflow (2015)

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(see Exhibit B, Table B-1). Natural inflows dictate the Project's dependable capacity. Over the term of the current license (1999 to 2024), annual generation ranged from 44,254 MWh in 2008, when the Project was taken off-line for maintenance to a maximum of 203,243 MWh (2011), a high flow water year. The Project's annual average generation over the term of the current license is 132,068 MWh, with a 5-year average (2020 to 2024) of 151,564 MWh..

3.2.1 Power Demand

The North American Electric Reliability Corporation (NERC) is a regulatory authority whose mission is to ensure the reliability and security of the power grid. NERC develops and enforces reliability standards; annually assesses seasonal and long-term reliability; monitors the bulk power system through system awareness; and educates, trains, and certifies industry personnel (NERC 2024).

NERC monitors and enforces compliance with its reliability standards through six regional entities. Of those entities, the Western Electricity Coordinating Council (WECC) is responsible for coordinating and promoting Bulk Electric System reliability within the Western Interconnection. The Western Interconnection includes all or portions of 14 western states, two Canadian provinces, and a portion of Baja California in Mexico. SCE's service area is within the California/Mexico sub-region of the Western Interconnection.

According to WECC forecasts for the Western Interconnection, demand is projected to increase by approximately 20.4 percent from 2025 to 2034. The summer peak demand is expected to increase by 17.2 percent during that same period (WECC 2024). The region has a need for power over the near term, and power from the Project would continue to help meet that need in the future. If the Project were to shut down or significantly change operations, SCE would need to build new, incremental resources to fill the energy, capacity, and clean-attribute gaps. This would likely involve the development of new renewable projects and associated infrastructure, which would be time-consuming, costly, and require significant resources. As the electric sector nears a low-emissions future, SCE's latest analysis called "Reaching Net Zero" (SCE n.d.) found that replicating the greenhouse gas (GHG) emissions reductions of 1 MW of clean firm resources (such as the Project) would necessitate between 7 MW and 11 MW of paired solar plus storage and require additional retention of natural gas resources to maintain reliability.

3.2.2 California Legislation

GHG emissions are regulated in California, and California continues to pursue extensive climate change policies. Assembly Bill (AB) 32, *The California Global Warming Solutions Act*, passed in 2006, required that GHGs emitted in California be reduced to 1990 levels by the year 2020. In 2016, former Governor Jerry Brown signed Senate Bill (SB) 32, which is an amendment to AB 32, codified the goal of reducing statewide emissions to 40 percent below 1990 levels by 2030. Most recently, AB 1279, *The California Climate Crisis Act*, was signed into law in 2022 and establishes the policy of the state to achieve carbon neutrality as soon as possible, but no later than 2045, and maintain net negative GHG emissions thereafter. The state plan for achieving the carbon neutrality goal set forth

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in AB 1279 is outlined in the California Air Resources Board's (California Air Resources Board) *2022 Scoping Plan* and includes measures related to clean technologies, energy deployment, natural and working lands, and other sectors (CARB 2022).

In addition, SB 350, *Clean Energy and Pollution Reduction Act of 2015*, increases California's renewable electricity procurement goal from 33 percent by 2020 to 50 percent by 2030. In 2019, SB 100, *The 100 Percent Clean Energy Act of 2018*, set the California Renewables Portfolio Standard (RPS) requirement to 60 percent by 2030 and requires all electricity to come from carbon-free sources by 2045 (CPUC [California Public Utilities Commission] 2024). Achieving this goal will increase the use of RPS-eligible resources, including solar, wind, biomass, geothermal, and others. To help ensure these goals are met and GHG emission reductions are realized, large utilities were required to develop and submit integrated resource plans; these plans detail how each utility will meet their customers' resource needs, reduce GHG emissions, and ramp up the deployment of clean energy resources (CEC [California Energy Commission] 2025). In 2019, SCE developed a plan called *Pathway 2045* that outlined how SCE will meet carbon neutrality by 2045, which includes the continued operation of SCE's existing hydroelectric fleet (SCE 2019). An updated plan, *Countdown to 2045*, was prepared in 2023 to build upon *Pathway 2045* and address new regulatory requirements established under AB 1279 (SCE 2023).

Energy generated by the Project reduces GHG emissions in California by displacing energy and other services that would otherwise be provided by gas-fired units. If the Project is not relicensed, SCE would need to obtain replacement from zero-emitting, firm (i.e., able to generate power 24 hours per day/7 days per week, when needed), RPS-eligible energy sources, which would require new facilities (see Exhibit H, *Project Need and Key Information*). The environmental benefits of the Project, therefore, go beyond just its energy output: they play a critical role in California's broader decarbonization strategy.

3.2.3 Ensuring Grid Reliability and Flexibility

One of the Project's most important attributes is its ability to provide firm, reliable power. As a run-of-river hydroelectric plant, the Project generates electricity based on water availability, which fluctuates with seasonal and hydrological conditions. However, unlike wind and solar, the Project output is not dependent on momentary weather patterns, giving it a level of predictability and stability that makes it a key resource for grid reliability.

The role of generation resources, such as the Project, is often underappreciated in the context of overall grid management. The Project's firm, carbon-free capacity is critical during periods when solar and wind resources are either unavailable or underperforming, such as on cloudy or windless days or during evening peak hours when solar power generation drops off. By providing clean power during these critical periods, the Project helps prevent the need for ramping up fossil fuel peaker plants (i.e., power plants that only run when there is high demand), which would increase carbon emissions and run counter to the state's climate goals.

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To summarize, energy produced from the Project is used by SCE to (1) meet current demand for energy in its service area; (2) meet renewable energy goals; (3) provide a low-cost source of energy with low-GHG emissions; and (4) help meet a need for power within WECC's Western Interconnection in both the short and long term; and (5) contribute to California resource adequacy and provide grid reliability and flexibility.

3.3 REFERENCES

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LIST OF ACRONYMS

APE	Area of Potential Effects
CFR	Code of Federal Regulations
CWA	Clean Water Act
CZMA	Coastal Zone Management Act
EFH	Essential Fish Habitat
ESA	Endangered Species Act
FERC	Federal Energy Regulatory Commission
FLA	Final License Application
Forest Service	United States Forest Service
FPA	Federal Power Act
NHPA	National Historic Preservation Act
NMFS	National Marine Fisheries Service
Project	Kern River No. 1 Hydroelectric Project
SCE	Southern California Edison

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SHPO	State Historic Preservation Officer
State Water Board	California State Water Resources Control Board
USC	United States Code
USFWS	United States Fish and Wildlife Service

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4.0 STATUTORY AND REGULATORY REQUIREMENTS AND APPLICABLE LAWS

The Federal Energy Regulatory Commission (FERC) license for the Kern River No. 1 Hydroelectric Project (Project) is subject to requirements under the Federal Power Act (FPA) and other applicable statutes. Pursuant to FERC regulations in the Code of Federal Regulations (CFR), Title 18, Section 5.18(b)(3) (18 CFR § 5.18(b)(3)), this section briefly describes the statutory and regulatory requirements that must be addressed as part of the relicensing process.

4.1 FEDERAL POWER ACT

FERC is the lead federal agency for regulating the licensing of the Project and evaluating the Proposed Action as outlined in this License Application. Consistent with the FPA, FERC will consider the following sections of the FPA.

4.1.1 Section 4(e) Conditions

Section 4(e) of the FPA, United States Code (USC), Title 16, Section 797(e) (16 USC § 797(e)), provides that any license issued by FERC for a project within a federal reservation shall be subject to and contain conditions as the Secretary of the responsible federal land management agency deems necessary for the adequate protection and use of the reservation. The Project occupies 116.79 acres of federal lands within the Sequoia National Forest, which are administered by the United States Forest Service (Forest Service). Therefore, FERC will solicit FPA Section 4(e) conditions from the Forest Service after the Final License Application (FLA) is filed.

4.1.2 Section 10(j) Recommendations

Under Section 10(j) of the FPA, 16 USC § 803(j), each license issued by FERC shall include conditions based on recommendations provided by federal and state fish and wildlife agencies for the protection, mitigation, or enhancement of fish and wildlife resources affected by the Project. FERC is required to include these conditions unless it determines that they are inconsistent with the purposes and requirements of the FPA or other applicable laws. Before rejecting or modifying an agency recommendation, FERC is required to attempt to resolve any such inconsistency with the agency, giving due weight to the recommendations, expertise, and statutory responsibilities of such agency. FERC will solicit FPA Section 10(j) recommendations after the FLA is filed.

4.1.3 Section 18 Fishway Prescriptions

Section 18 of the FPA, 16 USC § 811, states that FERC is to require the construction, operation, and maintenance by a licensee of fishways as may be prescribed by the Secretaries of Commerce or the Interior. FERC will solicit FPA Section 18 fishway prescriptions after the FLA is filed.

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4.2 CLEAN WATER ACT

Section 401 of the Clean Water Act (CWA), 33 USC § 1341, states that a license applicant must obtain certification from the appropriate state water pollution control agency verifying compliance with the applicable provisions of the CWA, unless the certification is waived.

As required by 18 CFR § 5.23(b), Southern California Edison (SCE) will request a water quality certification from the California State Water Resources Control Board (State Water Board), including proof of the date on which the certifying agency received the request, no later than 60 days following the date of FERC's issuance of its Notice of Acceptance and Ready for Environmental Analysis.

4.3 ENDANGERED SPECIES ACT

Section 7 of the Endangered Species Act (ESA), 16 USC § 1536, requires federal agencies to ensure that their actions are not likely to jeopardize the continued existence of threatened or endangered species or result in the destruction or adverse modification of the critical habitat of such species.

Consultation is required under Section 7 of the ESA as part of the FERC process. Federal agencies must consult with the U.S. Fish and Wildlife Service (USFWS) and the National Marine Fisheries Service (NMFS) to ensure that any action they authorize, fund, or carry out is not likely to jeopardize the continued existence of any threatened or endangered species or result in the destruction or adverse modification of critical habitat for these listed species.

FERC initiated informal consultation with USFWS and NMFS under Section 7 of the ESA on June 29, 2023, and on that same date designated SCE as the non-federal representative for informal consultation under Section 7. Refer to Appendix E.4, *Consultation Documentation* for a description of ESA Section 7 consultation completed for the Project. If required, a Draft Biological Assessment will be included in the FLA.

4.4 MAGNUSON-STEVENS FISHERY CONSERVATION AND MANAGEMENT ACT

Section 305(b)(2) of the Magnuson-Stevens Fishery Conservation and Management Act, 6 USC § 1855(b)(2), requires federal agencies to consult with NMFS on all actions that may adversely affect essential fish habitat (EFH).

The Magnuson-Stevens Fishery Conservation and Management Act governs fisheries management in the United States, including the designation of EFH. EFH is only applicable to federally managed commercial fish species, which live at least one component of their lifecycle in marine waters. All fish in the Kern River are freshwater species; therefore, no designated EFH is located in the vicinity of the Project.

4.5 COASTAL ZONE MANAGEMENT ACT

Under Section 307 (c)(3)(A) of the Coastal Zone Management Act (CZMA), 16 USC § 1456(c)(3)(A), FERC cannot issue a license for a project within or affecting a states'

coastal zone unless the state CZMA agency concurs with the license applicant's certification of consistency with the state's CZMA program, or the agency's concurrence is conclusively presumed by its failure to act within 180 days of its receipt of the applicant's certification. The California Coastal Commission is the agency responsible for implementing California's coastal management program.

On June 17, 2025, SCE requested concurrence from the California Coastal Commission that the Project is not included within and does not affect California's coastal zone or resources. Concurrence from the California Coastal Commission Energy, Ocean Resources & Federal Consistency Unit was received on June 17, 2025, which confirmed that the California Coastal Commission staff agrees that the Project is not located within the California coastal zone and that its operation does not affect coastal resources. Refer to Appendix E.4, *Consultation Documentation,* for additional information regarding outreach to the California Coastal Commission.

4.6 NATIONAL HISTORIC PRESERVATION ACT

Section 106 of the National Historic Preservation Act (NHPA), 54 USC § 30610, and its implementing regulations in 36 CFR Part 800 require that federal agencies consider the effects of their undertakings on historic properties. Historic properties are districts, sites, buildings, structures, or objects significant in American history, architecture, engineering, and culture that are eligible for inclusion in the National Register of Historic Places.

FERC initiated informal consultation with the California State Historic Preservation Officer (SHPO) under Section 106 on June 29, 2023, and on that same date designated SCE as FERC's non-federal representative for informal consultation under Section 106. SCE, as FERC's non-federal representative for Section 106 consultation, submitted the proposed Area of Potential Effects (APE) and study areas to SHPO on July 16, 2024. In a letter dated August 30, 2024, the SHPO agreed with the delineation of the APE and study areas, but reserved the right to consult on its expansion should planned studies or consultation identify cultural resources that extend beyond the FERC Project boundary or otherwise are found to be affected by the Project.

Refer to Appendix E.4, *Consultation Documentation* for a description of Section 106 consultation completed for the Project.

4.7 WILD AND SCENIC RIVERS ACT

Section 7(a) of the Wild and Scenic Rivers Act, 16 USC § 1278(a), requires federal agencies to make a determination as to whether the operation of a project under a new license would invade the area or unreasonably diminish the scenic, recreational, and fish and wildlife values present in the designated river corridor. The segment of the Kern River within the FERC Project boundary is not Congressionally designated as a Wild and Scenic River.

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4.8 WILDERNESS ACT OF 1964

Section 4(c) of the Wilderness Act of 1964, 16 USC § 1133(c), establishes strict limitations and prohibitions on specific activities to preserve the natural conditions of designated wilderness areas. Section 4(c) generally prohibits any commercial enterprise, permanent roads, motorized equipment and vehicles, and structures unless needed for the administration of the area, specifically identified in the Act or subject to existing private property rights. There are no areas Congressionally designated under the Wilderness Act within the FERC Project boundary.

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LIST OF ACRONYMS

ac-ft	acre-feet
amp	ampere
CDFW	California Department of Fish and Wildlife
CFR	Code of Federal Regulations
cfs	cubic feet per second
CRMP	Cultural Resources Management Plan
EAP	Emergency Action Plan
FERC or Commission	Federal Energy Regulatory Commission
FLA	Final License Application
Forest Service	United States Forest Service
HP	horsepower
Hz	hertz
kV	kilovolt
kW	kilowatts
mi^2	square miles
MW	megawatts
MWh	megawatt hour

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NOE	Notice of Categorical Exemption
PG&E	Pacific Gas and Electric Company
Project	Kern River No. 1 Hydroelectric Project
RPM	revolutions per minute
SCE	Southern California Edison
SCH	State Clearinghouse
SHPO	State Historic Preservation Officer
SR	State Route
State Water Board	State Water Resources Control Board
USACE	United States Army Corps of Engineers
USGS	United States Geological Survey

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5.0 PROPOSED ACTION AND ALTERNATIVES

5.1 NO-ACTION ALTERNATIVE

Under the No-Action Alternative, Southern California Edison's (SCE) Kern River No. 1 Hydroelectric Project (Project) would continue to operate under the terms and conditions of the current license. Thus, this description of the No-Action Alternative includes a description of the existing facilities and current authorized Project operations. This section was developed to meet the requirements for the description of the existing Project as specified in Title 18 of the Code of Federal Regulations (CFR) § 5.18(b)(4). The description of the No-Action Alternative is organized into the following major subsections:

- Section 5.1.1, *Project Overview*
- Section 5.1.2, *Existing Project Facilities*
- Section 5.1.3, *FERC Project Boundary*
- Section 5.1.4, *Project Operations*
- Section 5.1.5, *Project Maintenance*
- Section 5.1.6, *Project Generation and Outflow Records*
- Section 5.1.7, *Existing Environmental Measures*
- Section 5.1.8, *Project Compliance History*

5.1.1 Project Overview

The Project is located on the lower Kern River on the western slope of the Sierra Nevada, approximately 15 miles east of the City of Bakersfield in Kern County, California. The Project occupies federal lands within the Sequoia National Forest, administered by the United States Forest Service (Forest Service). Map 5-1 displays the Project vicinity and associated land jurisdiction.

The Project, completed in 1906, is operated in a run-of-river mode and has no water storage. Water from the Kern River is diverted at Democrat Dam and directed through a concrete sandbox, where sediment settles out of the water before entering the Project's conveyance system, which is comprised of approximately 8.5 miles of tunnels, flumes, and conduits (collectively, the flowline) that run along the eastern side of the Kern River canyon. Water within the conveyance system is directed to a small concrete forebay, through a buried penstock, and into the Project powerhouse. Water exiting the powerhouse enters a short tailrace and is returned to the Kern River upstream of the Kern Canyon Project (FERC Project No. 178) owned by Kern and Tule Hydro LLC. The total installed capacity of the powerhouse is 26.3 megawatts (MW).

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5.1.2 Existing Project Facilities

This section describes existing Project facilities (from upstream to downstream) including the dam, water conveyance system, powerhouse, and other appurtenant facilities. A list of these Project facilities is provided in Table 5-1. A summary of the physical characteristics / specifications of the primary Project facilities is provided in Table 5-2. Refer to the following maps for geographic depictions of the Project vicinity and land jurisdictions (Map 5-1); public land survey system (township, range, and section) (Map 5-2); and Project facility locations (Maps 5-3a–g). Also refer to Exhibit A, *Project Description* of this License Application for a detailed description of Project facilities and Exhibit F, *General Design Drawings and Supporting Information* for detailed facility drawings and descriptions (filed as CUI//CEII in Volume 3 of this License Application).

5.1.2.1 Diversion Dam and Impoundment

Democrat Dam is located on the Kern River approximately 10.2 miles upstream of the powerhouse. The dam is a 58-foot high cyclopean-concrete overflow gravity dam. The crest of the dam is at an elevation of 1,913 feet and approximately 29 feet is exposed above the stream bed. The dam crest is approximately 204-feet long and 7-feet wide. The crest of the dam also serves as a spillway and is designed to spill river flows that are not diverted for power production. A crane with claw attachment is mounted on the top of the dam and is used to remove large woody debris and maintain the intake racks. Democrat Dam is not a high hazard dam under the criteria defined in 18 CFR Part 12.

The Democrat Dam Impoundment (also referred to as the "pond") covers approximately 27 acres and has a gross storage capacity of 247 acre-feet (ac-ft) at an elevation of 1,913 feet. However, there is no usable storage at the diversion dam. Since Democrat Dam is a run-of-river dam and its whole crest is a spillway, the dam regularly spills and the impoundment and tailwater levels are governed by flows in the Kern River, as released from the upstream Isabella Dam.[1] A 329-foot-long drainage tunnel with a 72-inch electric motor operated sluice gate is located at the base of Democrat Dam. The gate is provided for draining the pond behind the diversion dam.

5.1.2.2 Intake Structure

Water is diverted just upstream of the dam into the intake structure which includes two bar rack screens (trash racks). One screen is located immediately adjacent to the diversion dam and the other screen is located approximately 40 feet upstream. The screens are constructed of steel plates on two-inch centers with overall widths of 36 feet and 30 feet, respectively. They are designed to produce relatively low approach velocities. The two intake gates to the water conduit are hydraulically operated and are automatically controlled by pond and flume water controllers.

[1] Lake Isabella is located approximately 20 miles upstream of the Project and is owned and operated by the U.S. Army Corps of Engineers. Water released from Isabella Dam enters the lower Kern River and is undiverted until reaching the Project diversion at Democrat Dam. Project inflow is almost entirely regulated by upstream operations at Isabella Dam, save for accretion flow from a few small tributaries between Isabella and Democrat dams.

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5.1.2.3 Water Conveyance System

The diverted water is conveyed through an approximately 8.5-mile-long water conveyance system consisting of a sandbox, flowline, forebay, and penstock which connects the intake structure at Democrat Dam with the powerhouse. The water conveyance system runs along the eastern hillslope above the Kern River. Two intake gates to the water conveyance system are hydraulically operated and are automatically controlled by impoundment and flume water controllers. The diverted water flows under gravity from an elevation of approximately 1,913 feet at the diversion dam to the top of the penstock at an elevation of approximately 1,830 feet.

Sandbox

A sandbox is located approximately 700 feet downstream of the diversion dam at the head of the flowline. The sandbox is 104 feet long and has a maximum width of 20 feet. The sandbox acts as a sediment trap, reducing the entrainment of sediment into the flowline and downstream powerhouse. Two slide gate valves with orifice plates are located on the bottom, downstream end of the sandbox. One of the valves is used to provide the continuous minimum instream flows required by FERC.[2]

Flowline

From the sandbox, water enters Flume No. 1 and is conveyed through the remaining series of tunnels, flumes, and conduits comprising the flowline. The water conveyance system is designed to carry a maximum of 412 cubic feet per second (cfs) under optimum conditions.

There are 19 below-ground tunnel segments totaling 42,884 feet, numbered sequentially north to south. Tunnel segments have concrete floors with a typical width of 8 feet and vertical walls with a typical height of 7 feet. Approximately 16,000 feet of tunnel has a concrete roof cap placed in areas judged during construction to have potentially unstable rock, while the remainder of the tunnel has a natural rock roof.

The above-ground sections of the conveyance system (i.e., flumes and conduits), are generally located where the flowline traverses topographical depressions, such as small canyons and drainages. Like the tunnel segments, they are also numbered sequentially from north to south. The flowline includes six flume structures, including 390 feet of rectangular flume and 904 feet of Lennon flume on steel structures. There is also a total of 612 feet of arched-concrete conduit along nine conduit segments.

Nine tunnel portal access points, or adits, are located at various tunnel or tunnel / flume junctions along the flowline and provide access for maintenance activities.

[2] FERC continuous minimum instream flow release requirements include release of 50 cfs or inflow, whichever is less, from June 1 through September 30 and 15 cfs from October 1 through May 31.

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Forebay

The forebay is a 45-foot-long, 33-foot-wide, and 11-foot-deep concrete gravity structure that impounds water (less than 1 ac-ft) to regulate flow to the powerhouse. Water enters the forebay via Tunnel No. 19 and flows into the primary of two reinforced concrete bays. The primary bay contains the penstock intake that is fitted with a trash rack. Inflow into the forebay is controlled by two butterfly valves at the tunnel outfall. Inflow into the penstock is controlled by two more butterfly valves located just downstream of the trash rack. All the butterfly valves can be remotely operated but normally are manually operated at the forebay. The secondary bay is immediately downstream of the primary bay and is partitioned from it by a wall that is several feet lower than the outer retaining wall that contains both bays. The secondary bay serves as a spillway by allowing water to overflow from the primary bay and exit the structure via a 1,362-foot spillway overflow pipe that discharges into the Kern River. The above-ground overflow spillway pipe is supported by concrete piers and varies in diameter from 65 inches at the forebay to 44 inches just prior to entering the river. The primary / secondary bay partition wall is also fitted with a slide gate that can be opened to drain the forebay.

Penstock

From the forebay, an approximately 1,693-foot-long buried steel penstock carries water to the powerhouse. To increase velocity and pressure, the inside diameter of the penstock decreases over the length of the pipe, with a diameter of approximately 108 inches at the forebay tapering down to approximately 71 inches at the powerhouse. The penstock conveys water to the turbines through a manifold system. The static head is 877 feet. An adit is located near the penstock to provide access for maintenance activities.

5.1.2.4 Powerhouse and Associated Equipment

The powerhouse is an approximately 71-foot by 170-foot concrete structure located on the east bank of the Kern River. Water to the powerhouse is supplied from the forebay through a single penstock. Water exiting the powerhouse enters a tailrace before being returned to the river. The switchyard is located directly adjacent to and south of the powerhouse. Other ancillary facilities located near the powerhouse include a machine shop, office / lunchroom, and restroom facilities.

Turbines and Generators

The powerhouse contains four Allis-Chalmers turbines (double overhung, single-jet, impulse type) rated at a total of 43,000 horsepower (HP). Individual turbine installed ratings are as follows:

- Unit 1: 10,750 HP, design head 865 feet and 300 revolutions per minute (RPM)
- Unit 2: 10,750 HP, design head 865 feet and 300 RPM

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- Unit 3: 10,750 HP, design head 865 feet and 300 RPM
- Unit 4: 10,750 HP, design head 865 feet and 300 RPM

The four main generators are horizontal shaft General Electric units with a total installed capacity of 26,280 kilowatts (kW) or 26.3 MW. The main generator installed ratings as follows:

- Unit 1: 6,570 kW, 0.9 power factor, 2.7 kilovolt (kV), three-phase, 60 hertz (Hz)
- Unit 2: 6,570 kW, 0.9 power factor, 2.7 kV, three-phase, 60 Hz
- Unit 3: 6,570 kW, 0.9 power factor, 2.7 kV, three-phase, 60 Hz
- Unit 4: 6,570 kW, 0.9 power factor, 2.7 kV, three-phase, 60 Hz

The powerhouse is normally unattended. Start-up and shut-down of the turbine / generator equipment is manually performed by the operators based at the Kern River No. 3 Powerhouse (FERC Project No. 2290).

Tailrace

Water is returned to the Kern River via the tailrace on the upstream side of the powerhouse. The tailrace is a large concrete pool with two bays (approximate surface area of 4,350 square feet) that slows the water exiting the powerhouse as it re-enters the river. Water from the tailrace is impounded behind the Kern Canyon Project (FERC Project No. 178; owned by Kern and Tule Hydro LLC) diversion structure immediately downstream.

Switchyard

The switchyard is located directly adjacent to and south of the powerhouse. The Project transformer banks are connected to two 66-kV busses (non-project) through four, 3-pole, 66-kV, 1,200 amperes (amp), oil circuit breakers together with the necessary disconnecting switches, potential devices, and related equipment.

Controls

Necessary devices are installed to make the operation of the powerhouse semi-automatic. These consist of electrically operated alarm circuits for low-water pressure, alarms for generator and bearing oil temperature, automatic-trip oil circuit breakers, switchboards, meters, relays, instrument transformers, station light and power transformers, and selsyn water-level load control. This equipment transmits status signals, telemetering, and alarms to Kern River No. 3 Powerhouse, FERC Project No. 2290, and the Bishop Control Center.

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The station load control equipment consists of a solid-state electronic controller which receives forebay level data via a transducer at the forebay and actuates motors to open or close the turbine power needles to regulate forebay level and unit loading.

5.1.2.5 Access Roads and Trails

The Project includes various access roads and trails, which are used for routine operation and maintenance of the Project (Maps 5-3a–g). Descriptive information on each access road and trail is provided in Table 5-3.

5.1.2.6 Communication and Power Lines

The Project includes the following communication and power lines:

- Erskine 12 kV Distribution Line: A 1,844-foot-long (0.35 mile) powerline that extends from the Democrat Dam Intake Gatehouse to an outlet box near the southern end of Flume No. 1 and provides power for appurtenances during tunnel outages.

- Camp 2.4 kV Distribution / Communication Line: A 1,665-foot-long (0.32 mile) communication line extends from the powerhouse to the forebay at the upper end of the penstock. The same poles which carry the communication line also carry a powerline which is used for the remote control of the gate at the upper end of the penstock.

There are no transmission lines included in the Project license. However, electricity produced by the Project powerhouse enters SCE's bulk electric grid on the 66-kV bus at the substation located outside the powerhouse. This includes the Gorman and Banducci 66-kV transmission lines (both are non-Project facilities).

5.1.2.7 Gaging Stations

The Project includes the following gaging stations that monitor and record water flow for compliance:

- United States Geological Survey [USGS] Gage No. 11192500; SCE Gage No. 409 (Kern River near Democrat Springs) – This gage is located about 0.4 mile downstream of the diversion dam. The streamflow is measured using a float and recorder. Data collected from this gage represents flow in the Kern River, below the diversion dam.

- USGS Gage No. 11192000; SCE Gage No. 410 (Kern River No. 1 Conduit near Democrat Springs) – This gage is located on the Kern River No. 1 Flowline near Cow Flat Creek. Streamflow is measured using a float and recorder. Data collected from this gage represents flow diverted for the Project.

The USGS also identifies USGS Gage No. 11192501 (Kern River near Democrat Springs) in its records. Data for this gage is computed by combining the data collected in the

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bypass reach[3] (USGS Gage No. 11192500) and the flowline (USGS Gage No. 11192000). For record keeping purposes, the USGS has numbered this gage 11192501 and compiles data as if it were an actual gage.

5.1.2.8 Ancillary and Support Facilities

Several detached ancillary buildings and features support the operation and maintenance of the Project. The location and function of each are described below by area.

Democrat Dam Area

- Buoy Line: Prevents debris from collecting in front of the intake grates and restricts recreationists from accessing the dam from the impoundment.
- Intake Gatehouse: Structure on the east side of the dam that contains the intake gates, valves, and control room.
- Drainage Tower, Tunnel, and Tunnel Outlet: Located on the east side of the dam, they facilitate draining of the impoundment during sediment management activities.
- Democrat Dam Access Walkway: Provides access from the southern end of Flume No. 1 to Democrat Dam. A portion of the walkway is built on top of the flume, the remaining is elevated steel walkway. A short spur segment of the walkway also extends from the end of Flume No. 1 Road to the flume.
- Sandbox Drainage Channel: Channel that extends from the two valves at the bottom of the sandbox and returns water to the Kern River. Continuous minimum instream flows are released back into the river from the sandbox via this channel.
- Gaging Cableway: A gaging cableway is located approximately 0.5 mile downstream of Democrat Dam and is used to take hydrological measurements during high flows to calibrate the stream gage (develop accurate stage-discharge relationship).

Water Conveyance

- Flume No. 6 Access Platform: Located at the end of Stark Creek Road, the platform provides access to Flume No. 6.

[3] A bypass reach is a segment of a river downstream of a diversion facility where Project operations divert a portion of the water from the river. For this Project, the bypass reach is a 10.2-mile reach of the lower Kern River from Democrat Dam downstream to the Kern River No. 1 Powerhouse Tailrace.

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Forebay Operations Area

- Operations Area Buildings: Several buildings located on the east side of State Route 178 (SR 178) support forebay operations activities, including the admin building, two garages, and the old Ice House.

- Water Tank: A 5,000-gallon water tank located above the Aerial Tram Lower Landing draws water from the penstock and provides domestic water for the powerhouse.

- Aerial Tram: An aerial tram is used to transport personnel and materials from the forebay operations area (lower landing on the east side of SR 178) up to the forebay (upper landing). The aerial tram hangs and travels on an approximately 1,050-foot-long aerial cable. The aerial tram cable is attached to a winch that is attached to the aerial tram cart and pulls the aerial tram up the hill.

- Aerial Tram Upper Landing to Forebay Walkway: A 230-foot-long steel walkway from the Aerial Tram Hoist Upper Landing provides access to the forebay.

- Communication Site: A communication site located southwest of the forebay allows communication between the forebay and the powerhouse.

- Perimeter Fencing: Perimeter fencing around the forebay operations area and the forebay provides public safety and secures Project facilities.

Powerhouse Area

- Powerhouse Area Buildings: Several buildings located on the west side of SR 178 support powerhouse operations activities, including a machine shop, office / lunchroom, and restroom.

- Perimeter Fencing: Perimeter fencing around the powerhouse and switchyard provide public safety and secure Project facilities.

5.1.3 FERC Project Boundary

The FERC Project boundary, as defined in the current FERC license, includes facilities and lands necessary for operation and maintenance of the Project and for other Project purposes, as described in Section 5.1.2, *Existing Project Facilities*, and summarized in Table 5-1. The boundary incorporates lands around the Project diversion dam and impoundment, water conveyance system, powerhouse and switchyard, access roads and trails, communication and power lines, gages, and other ancillary support facilities.

The current FERC Project boundary was established in the June 16, 1998 License Order (FERC 1998), and amended on March 30, 2000 to remove non-jurisdictional transmission and distribution lines (FERC 2000), and on March 20, 2013 to add a telecommunication site used for operation of Project (FERC 2013).

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Geographic depictions of the Project features, FERC Project boundary, and land ownership are provided in Map 5-1 and Maps 5-3a–g, and are further detailed in Exhibit G, *Project Maps*.

The current FERC Project boundary encompasses 121.27 acres of land, of which 116.79 acres are on federal land and the remaining 4.48 acres are SCE owned.

5.1.4 Project Operations

The Project is operated in compliance with existing regulatory requirements, agreements, and non-consumptive water rights to generate power. The following sections describe water management in the Kern River Watershed and regulatory requirements associated with the FERC license and water rights.

5.1.4.1 Water Management

Kern River Watershed Overview

The Kern River Watershed consists of two principal forks, the North Fork and South Fork, and a lower portion referred to as the lower Kern River. Both forks flow south and west, respectively, and converge at Lake Isabella. The Kern River exits Lake Isabella and flows southwest toward the San Joaquin Valley and terminates in Buena Vista Lake about 20 miles southwest of Bakersfield.

There are six FERC-licensed hydroelectric projects located on the Kern River. Above Lake Isabella, SCE owns and operates the 40.2-MW Kern River No. 3 Project (FERC Project No. 2290) located on the North Fork of the Kern River. At or below Lake Isabella, there are five FERC-licensed hydroelectric projects located on the Kern River (refer to Map 5-4). All of these hydroelectric projects are non-consumptive users of water. Listed from upstream to downstream, those projects are:

- Isabella Partners' 11.95-MW Isabella Hydroelectric Project (FERC No. 8377) is located on the downstream toe of the main United States Army Corps of Engineers (USACE)-owned dam at Lake Isabella and diverts its water at the dam outlet works. The total rate of diversion under existing permits is 1,632 cfs.

- SCE's 12.0-MW Borel Hydroelectric Project (FERC No. 382) is in the process of being decommissioned by SCE.[4]

- SCE's 26.3-MW Kern River No. 1 Hydroelectric Project (FERC No. 1930) is operated as a run-of-the-river power generation facility at Democrat Dam. The maximum diversion capacity for power generation is 412 cfs.

[4] SCE filed a Surrender Application with FERC on May 1, 2023 for the Borel Project; FERC's approval of license surrender and decommissioning is pending.

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- Kern and Tule Hydro LLC's 11.475-MW Kern Canyon Hydroelectric Project (FERC No. 178) was recently purchased from Pacific Gas and Electric Company (PG&E).

- Olcese Water District's 14.0-MW Rio Bravo Hydroelectric Project (FERC No. 4129) includes 5,100 acres of land and supplies irrigation water to agricultural lands and a golf course.

In addition, the USACE operates Lake Isabella, a major flood control and storage reservoir upstream of the Project.

Downstream of Lake Isabella

Lake Isabella, a 568,075 ac-ft reservoir constructed in 1953 by the USACE, is managed primarily for flood control, irrigation water storage, and delivery. The hydrology of the lower Kern River is regulated by reservoir operations. As a result of reservoir operations, flows are high in summer when agricultural releases are made, and low in winter when the dam retains water to refill the reservoir. There are no formal instream flow releases required from Lake Isabella. Current operations, as stated in the USACE's Reservoir Regulation Manual for Lake Isabella (USACE 1953, amended January 1978), are as follows: "It has been a practice to maintain a minimum release of approximately 5 cfs for fish enhancement. No official requirement has been established for the action."

Water impounded in Lake Isabella is directly released to the Isabella Partners Project and to the lower Kern River. The Isabella Partners Project is located at Isabella Dam and diverts water at the dam outlet works. The total diversion rate under existing permits is 1,632 cfs. Water from the Isabella Partners Project is released at the same location as releases from Isabella Dam. The Isabella Partners Project does not influence the operation of Lake Isabella for flood control or irrigation. Flows below Isabella Dam equal the sum of outflow from the Isabella Partners Project and Lake Isabella.

Water from Lake Isabella was historically diverted to SCE's Borel Project Powerhouse located 7 miles downstream of the dam; however, in 2017, the USACE implemented a safety modification to the Isabella Auxiliary Dam which resulted in an existing section of the Borel Conduit that passed through the Auxiliary Dam to be filled with concrete and abandoned in-place. This action rendered the Borel Project non-operational, and SCE is currently in the process of surrendering the Borel Project with FERC.

Absent diversions by the Borel Project, water released from Isabella Dam enters the lower Kern River and is undiverted until reaching the Kern River No. 1 Hydroelectric Project diversion at Democrat Dam, approximately 20 miles downstream. Thus, the Kern River No. 1 Hydroelectric Project inflow is almost entirely regulated by upstream operations at Isabella Dam, save for accretion flow from a few small tributaries between Isabella and Democrat dams.

Kern River No. 1 Hydroelectric Project

The Project is operated in a run-of-river mode. Water captured at the Democrat Dam diversion structure is transported through a connecting flowline and penstock to the

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powerhouse and then returned to the river through the powerhouse tailrace 10.2 miles downstream. SCE's Kern River No. 1 Hydroelectric Project has diversion rights of 412 cfs, which is the maximum capacity of the diversion. The Project license requires a minimum instream flow of 50 cfs to be released to the bypass reach from June 1 through September 30 and 15 cfs released from October 1 through May 31, or inflow if lower than the seasonal flow requirement. The amount and timing of flow diverted is a function of releases from Lake Isabella, flowline and powerhouse capacities, and minimum instream flow requirements.

Downstream of Kern River No. 1 Hydroelectric Project

Water exiting the Kern River No. 1 Tailrace is immediately impounded behind Kern and Tule LLC's diversion for the Kern Canyon Project. Diverted water from the Kern Canyon Project is released back into the Kern River 1.6 miles downstream at the Kern Canyon Powerhouse and then diverted again approximately 500 feet downstream by the Olcese Water District for its Rio Bravo Project. The Rio Bravo Project returns diverted water back to the Kern River 2 miles downstream at the Rio Bravo Powerhouse. From this point, the Kern River continues downstream into the City of Bakersfield and the California Central Valley where it is almost entirely utilized by consumptive uses. The Kern River terminates at Buena Vista Lake, a landlocked topographical depression located approximately 20 miles southwest of Bakersfield.

5.1.4.2 Regulatory Requirements

FERC License

FERC issued the current Project license to SCE on June 16, 1998 (FERC 1998). FERC has issued various administrative orders approving management and monitoring plans, and design drawings that were required as part of the current license. FERC has subsequently amended the license at various times with revisions to license articles and made determinations that SCE fulfilled the requirements of certain license articles. License conditions relevant to current Project operation and maintenance activities are summarized in Section 5.1.7, *Existing Environmental Measures*.

The Project is also subject to Articles 1–32 of the FERC's standard terms and conditions set forth in Form L-1 (October 1975), entitled *Terms and Conditions of License for Constructed Major Project Affecting the Lands of the United States, 54 FPC 1792, 1799*.

Water Rights

The rights to the use of the waters of the Kern River through the Project date back to Notices of Appropriation which were posted in 1900. The first use of water occurred in 1906 and Annual Statements of Water Diversion and Use have been filed with the State Water Resources Control Board (State Water Board) since enactment of the New Water Use Inventory Law of September 17, 1965. SCE's water rights for the Project are for hydroelectric generation and incidental domestic use and are based on pre-1914 appropriation for the use of 412 cfs. All of the 412 cfs, plus any instream flow requirements, must be made available by the USACE as releases from Lake Isabella as natural flow

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(inflow) from the North and South forks of the Kern River into Lake Isabella is equal to or above 462 cfs. These rights are referenced in § 40(b) of the USACE's Reservoir Regulation Manual for Lake Isabella (USACE 1953, amended January 1978). Since no changes to the existing Project facilities or operations are proposed, no additional/modification to water rights are proposed by SCE over the term of a new license.

5.1.5 Project Maintenance

Routine inspections are conducted at Project facilities to verify the structural and/or functional integrity of the facilities and to identify conditions that might disrupt operation or threaten public safety. Routine maintenance activities are conducted to maintain Project facilities in operational condition. A description of current Project maintenance activities is provided in the following subsections.

5.1.5.1 Powerhouse Inspection and Maintenance

SCE inspects powerhouse appurtenances daily to ensure they are operating properly. Minor maintenance and repairs to powerhouse appurtenances are made on an as-needed basis. In addition, repairs to other buildings and ancillary facilities located in the vicinity of the powerhouse are made as needed, including painting, building and fence maintenance, and access road repairs.

In the first quarter of each year, SCE conducts more extensive maintenance on the four generating units. Typically, one of the four units will be offline for maintenance while the remaining units continue generating. This process is repeated such that all four units receive maintenance over a 4- to 6-week period. During this maintenance period, SCE conducts mechanical and electrical inspections, testing, and maintenance of Project powerhouse appurtenances.

Full Project outages typically coincide with the need to conduct more extensive maintenance and are not a regular / routine activity.

5.1.5.2 Water Conveyance System

SCE conducts monthly physical inspections of the exterior portions of the water conveyance system, including the sandbox, tunnels, flumes, conduits, adits, forebay, forebay overflow spillway, and penstock. During these monthly inspections, SCE also tests valves along the water conveyance system to ensure they are operating properly and calibrates all gages. In addition to monthly inspections, the intake is inspected weekly. SCE also conducts physical inspections after large storm events, and FERC inspects the forebay annually.

Minor repairs, including patching leaks, removal of debris, and repair of support structures are made on an as-needed basis. Physical inspection of the interior of the water conveyance system is typically conducted every 1 to 5 years and coincides with a full Project outage.

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5.1.5.3 Dam Inspections, Testing, and Maintenance

SCE visually inspects Democrat Dam and appurtenances monthly, including concrete; trash racks; ancillary and support facilities; handrails, walkways, and gates; gatehouse; and gaging stations.

5.1.5.4 Sediment Management

Sediment management activities are conducted in the Democrat Dam Impoundment (also referred to as the "pond" or “impoundment”) and in the Kern River No. 1 Forebay. Each is described below.

Democrat Dam Impoundment

The goal of sediment management at Democrat Dam is to emulate the natural sediment regime of the lower Kern River (to the extent possible) by allowing naturally occurring sediment that is temporarily deposited in the impoundment to continue downstream, past Democrat Dam, and through the lower Kern River system without building up behind Democrat Dam. Sediment management activities that SCE has implemented over the term of the current license include operational flushing, full pond drain, and peak flow sediment bypass. Each are briefly described below.

- Operational Sluicing – Operational sluicing is a standard maintenance procedure and is performed as needed to bypass sediment that has accumulated directly in front of the drain gate. During operational sluicing only sediment directly in front of the drain gate is scoured, resulting in mobilization of a relatively insignificant amount of sediment. Operational sluicing is subject to seasonal flow constraints related to fish spawning and rearing. Flow criteria include (1) flow in the bypassed reach >600 cfs from July 1 to March 14, and (2) flow in the bypassed reach >1,200 cfs during the smallmouth bass spawning and rearing period from March 15 to June 30. Operational sluicing is implemented on an as-needed basis, whenever flow conditions allow.

- Full Pond Drain – Full pond drain involves draining the Democrat Impoundment by releasing full river flow through the lower drain gate, thereby creating conditions for increased scouring in the impoundment. A full pond drain can only feasibly occur when the lower drain gate is fully opened (releasing approximately 800 cfs) and the inflow into Democrat Impoundment is less than 800 cfs. This reduces the water level of the impoundment and allows the natural flow of the river and the impounded water to scour sediment accumulated in the impoundment. SCE only implements full pond drains between July 1 and March 14, to avoid the spawning and rearing period for hardhead minnow, which extends from March 15 to June 30. A full pond drain is implemented on an as-needed basis, whenever flow conditions allow.

- Peak Flow Sediment Bypass – The peak flow sediment bypass is a standard maintenance procedure that manages sediment-laden peak flows resulting from

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natural precipitation events, including winter storms and summer and fall thunderstorms. During storm events, tributary streams entering the Kern River below Isabella Dam can transport significant amounts of sediment into the Democrat Impoundment. Under these conditions, fine sediment suspended in the water column can be entrained into the flowline and delivered to the powerhouse where it can cause increased wear on the wetted portion of the hydraulic turbines. Therefore, during turbid flow conditions SCE may temporarily cease diversion to the powerhouse and allow the full river flow to pass over and through the lower drain gate directly into Kern River bypassed reach. In these situations, SCE closes the valve at the head of the flowline, and fully opens the lower drain gate to allow all inflow to flow into the bypassed reach. The sediment load is carried by the full river flow, thereby mimicking the natural sediment transport regime.

Reporting of sediment operations listed above is provided in annual reports that SCE prepares each year for the California Department of Fish and Wildlife (CDFW) and the State Water Board.

Forebay

During periodic maintenance outages, SCE removes accumulated sediment from the forebay by opening the drain gate that goes into the spillway pipe. Once the forebay is completely drained, if needed, SCE removes any remaining sediment by hand.

5.1.5.5 Vegetation Management

Vegetation management is implemented at Project facilities as necessary to control vegetation that may affect access, functionality of facilities, or worker / public health and safety. In addition, vegetation management is implemented to maintain compliance with fire prevention and fuels management requirements for defensible space. In general, vegetation management activities occur during the spring and early summer to avoid work during periods of high-fire danger. Vegetation management includes trimming by hand, removal of hazard trees, and herbicide application.

Hand Trimming

Hand trimming vegetation includes trimming grasses and forbs with a string trimmer and trimming and/or removing shrubs and trees with a chainsaw, other handheld saw, or pruners. These activities are implemented on an as-needed basis. Hand trimming generally occurs in the following areas:

- Within 10 feet around the perimeter of the dam
- Within 10 feet on either side of exposed water conveyance system features
- Within and up to 5 feet around the forebay perimeter fence
- Within and up to 100 feet around the powerhouse and switchyard and within and up to 30 feet around the forebay operations area

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- Within 15 feet on either side of communication and power lines
- Within 10 feet on either side of access roads
- Within 5 feet on either side of access trails

Hazard Tree Removal

Hazard trees, generally defined as trees with defects that may cause a failure resulting in property damage, personal injury, or death, are removed on an as-needed basis with permission from the Forest Service. Removal is conducted with a chainsaw, handheld saw, and/or other equipment.

Herbicide Application

Herbicides are used to control weeds and vegetation encroachment and are applied using a small truck-mounted sprayer or backpack sprayer. Herbicide use is conducted in accordance with Forest Service 4(e) Condition No. 27. Specifically, SCE must obtain written approval from the Forest Service for any planned uses of pesticides. In consultation with a Certified Pesticide Use Advisor, SCE prepares a Pesticide Use Proposal (Forest Service Form FS-2100-0002) and submits it to the Forest Service for approval. The Pesticide Use Proposal identifies the products to be used, application methods, treatment locations, and timing of application. Once approved, a licensed vendor applies approved herbicides in accordance with conditions in the Pesticide Use Proposal.

5.1.5.6 Woody Debris Removal

The buoy line upstream of Democrat Dam is used to prevent large woody debris from collecting in front of the intake grates. As needed, a boat or helicopter is used to lift the buoy line to allow accumulated large woody debris to effectively be transported during high-flow events over the dam and downstream.

5.1.5.7 Pest Management

Management of rodent populations at Project facilities includes a combination of physical control and rodenticide use. The purpose of rodent control is to prevent rodent infestations in building interiors, thereby protecting worker / public health and safety and maintaining system reliability. Rodent traps and over-the-counter rodenticides are used on an as-needed basis in the interior of buildings located in the vicinity of the powerhouse and at ancillary facilities located near Democrat Dam.

5.1.5.8 Road Maintenance

Project access roads are regularly inspected and maintained during normal Project activities on an annual basis. Minor repairs are conducted annually during the late summer / fall and major repairs are implemented on an as-needed basis. Minor road maintenance generally includes debris removal; mechanical brushing of road edges;

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basic repairs, including blading or grading of native roads within the existing road prism to ensure a smooth surface and adequate drainage; filling of potholes; maintenance of erosion control features such as culverts (including inlets/outlets and dissipators), drains, ditches, and water bars; sealing or resurfacing existing roads; repair, replacement, or installation of access control structures such as posts, cables, rails, gates, and barrier rock; and repair / replacement of signage. Major road maintenance generally includes placement or replacement of culverts and other drainage features; major grading, and/or road replacement. Vegetation management may also be conducted concurrently with road maintenance. These activities typically occur within previously disturbed areas, or in areas that are regulatory maintained and cleared of vegetation surrounding the Project facilities.

5.1.5.9 Trail Maintenance

Project access trails are regularly inspected during normal Project activities. Repairs and maintenance are conducted on an as-needed basis typically during late summer / fall. Trail maintenance generally includes debris and rock removal; basic repairs including minor brushing; maintenance of erosion control features such as water bars; repair, replacement, or installation of access control structures such as barrier rock; and repair / replacement of signage. Vegetation management may also be conducted concurrently with trail maintenance.

5.1.5.10 Power and Communication Line Maintenance

Power and communication line maintenance includes replacement of damaged poles on an as-needed basis. New poles are placed in, or immediately adjacent to, the existing holes using helicopters and/or line trucks. Vegetation management is also conducted along power and communication line corridors, as needed. Vegetation management may also be conducted concurrently with power and communication line maintenance.

5.1.6 Project Generation and Recent Outflow Records

The powerhouse is operated as a baseload facility.[5] All energy, minus that necessary to operate the plant auxiliaries, is transmitted to the SCE transmission system. The amount of energy necessary to operate the plant auxiliaries is normally 15 to 20 megawatt hours (MWh) per month.

Average annual net generation for the Project under the current FERC license (1999 to 2024) is 132,068 MWh, with a 5-year average (2020 to 2024) of 151,564 MWh. The Project has experienced periods (days, weeks, and months) of no or reduced generation, which were the result of: (1) planned routine maintenance and inspections; (2) non-routine infrastructure repairs/upgrades; (3) unscheduled (forced) outages due to equipment malfunction; (4) periods of low inflow when SCE was required to meet minimum instream flow requirements in the Kern River downstream of Democrat Dam, and there was insufficient water remaining for generation; and/or (5) pausing generation during increased sediment loads in the Kern River upstream of the Project to reduce undue wear

[5] Baseload facilities are those power plants that generate dependable power consistently to meet demand.

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on the water conveyance system and generating units. Refer to Exhibit B, Item 2, Capacity and Production, of this License Application for additional information on average annual energy production.

5.1.7 Existing Environmental Measures

The current and ongoing license articles related to Project operation and maintenance and environmental resources management included as part of the current FERC Order, including amendments, are briefly described below.

5.1.7.1 Project Operations

Minimum Streamflow Requirements

License Article 401 and Forest Service 4(e) Condition No. 4 require SCE to release from Democrat Dam the following minimum instream flow:

- **June 1 through September 30 of each year**: 50 cubic feet per second (cfs) or inflow, whichever is less.

- **October 1 through May 31 of each year**: 15 cfs or inflow, whichever is less.

These instream flow releases are to be continuously monitored by SCE at the existing USGS Gage No. 11192500 (SCE Gage No. 409). If monitoring identifies what the 4(e) condition defines as a “violation” of the minimum flow requirements, SCE must file a report with FERC within 30 days from the date that the data becomes available indicating the violation. The report must identify the cause, duration, and severity of the violation; any environmental impacts resulting from the violation; and the measures that were implemented to correct the violation. Based on this report, FERC reserves the right to require modifications to Project facilities and operations.

This flow may be temporarily modified if required by operation emergencies beyond the control of SCE, and for short periods upon agreement among SCE, the Forest Service, and the CDFW. If the flow is modified, SCE is required to notify FERC as soon as possible, but no later than 10 days after each incident.

5.1.7.2 Project Maintenance

Sediment Management

As required by License Article 402, on March 1, 1999, SCE filed sediment monitoring results as well as a Sediment Management Plan for implementing any necessary adjustments to the sediment releasing operations based on the monitoring results. FERC issued an order approving the sediment monitoring results and Sediment Management Plan on April 6, 1999. FERC’s order indicated that SCE fulfilled the requirements of Article 402 and no additional monitoring was required.

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Inspection of and Consultation for Project Flume Repairs

As required by License Article 405, SCE inspects Project flumes at least once each year to monitor the structural integrity of leaking flumes. Prior to making any repairs that would reduce an existing leakage, which is providing micro-riparian habitats important to vegetation and wildlife, SCE consults with the Forest Service and FERC to determine what measures may be possible to continue to sustain the micro-riparian habitats created by the leaking flumes and implements the agreed to measures upon FERC approval. This article allows SCE to take whatever measures are necessary in an emergency to prevent a catastrophic failure of the flowline. If such emergency measures become necessary, SCE is required to notify the Forest Service and FERC as soon as possible, but no later than 24 hours after each such incident.

Forest Service Consultation – Painting

In accordance with License Article 406, SCE consults with the Forest Service prior to painting Project facilities to determine colors that reduce the contrast of Project facilities with the surrounding environment.

5.1.7.3 Aquatic Resources

Adequacy of Flows for Smallmouth Bass Study Plan

As required by License Article 403, SCE developed and FERC approved (on June 21, 1999) a plan to study the adequacy of the minimum flows, required by Forest Service 4(e) Condition No. 4, for protecting and enhancing the smallmouth bass fishery in the Project bypass reach. The plan included five years of population monitoring studies at up to five locations within the Project bypass reach. The program was designed to study the population size, age, and growth of smallmouth bass and relate these population characteristics to flow and habitat conditions in the study reach. Implementation of the study occurred between 1999 and 2008. The study period is longer than five years due to sub-optimal field conditions, which resulted in SCE requesting, and FERC approving, extensions of time to complete the study (e.g., Project being offline during scheduled sampling period, abnormal amounts of sediment in the lower Kern River which influenced the quality of the data collected, and high river flows resulting in unsafe sampling conditions). SCE filed annual reports each monitoring year with a final report filed on May 27, 2009. On June 23, 2009, FERC issued a letter approving the final summary report. FERC's letter indicated that SCE fulfilled the requirements of Article 403 and no changes to the minimum instream flow regimes were recommended.

Water Temperature Study Plan

As required by License Article 404, SCE developed and FERC approved (on April 21, 1999) a schedule to implement the Water Temperature Study Plan that SCE filed on December 2, 1997. The five-year study was to confirm compliance with the FERC License and State Water Board 401 Water Quality Certification conditions. The plan included hourly water temperature monitoring in the bypass reach from May 1 through October 31. Implementation of the study occurred between 1999 and 2008. The study period is longer

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than five years due to sub-optimal field conditions, which resulted in SCE requesting, and FERC approving, extensions of time to complete the study (e.g., abnormal amounts of sediment in the Lower Kern River which influenced the quality of data collected). SCE filed annual reports each monitoring year with a final report filed on May 13, 2008. The final report indicated that water temperatures in the bypass reach met the objectives of the Basin Plan and that no additional measures were needed to protect habitat values in the bypass reach and that no additional temperature monitoring or modeling was required. On June 18, 2008, FERC issued a letter approving the Final Temperature Monitoring Report. FERC's letter indicated that SCE fulfilled the requirements of Article 404 of the license.

5.1.7.4 Cultural Resources

Cultural Resources Management Plan

As required by License Article 407, SCE implements the Cultural Resources Management Plan (CRMP) that was filed with FERC on May 2, 1994. The CRMP outlines procedures under which long-term operation and maintenance of the Project will be undertaken in compliance with applicable federal cultural resource statutes. Project effects on resources considered eligible for the National Register of Historic Places and measures identified to mitigate effects were determined in consultation with the State Historic Preservation Officer (SHPO), Forest Service, and Western Regional Office of the National Park Service.

Cultural Discovery

As required by License Article 408, if archeological or historic sites are discovered during Project construction or operation, SCE takes the following actions: consults with the SHPO and the Forest Service about the discovered sites; prepares a site-specific plan, including a schedule, to evaluate the significance of the sites and to avoid or mitigate any impacts to sites found eligible for inclusion in the National Register of Historic Places; bases the site-specific plan on recommendations of the SHPO and the Forest Service, and the Secretary of the Interior's Standards and Guidelines for Archeology and Historic Preservation; files the site-specific plan for FERC approval, together with the written comments of the SHPO and the Forest Service; and takes the necessary steps to protect the discovered archeological or historic sites from further impact until notified by FERC that all of requirements have been satisfied.

5.1.7.5 Land Management

Access Improvement Plan

As required by License Article 411, SCE filed an Access Improvement Plan with FERC on October 28, 1999. The plan, which proposes construction of a trail from the Lucas Creek Parking area to the river, was approved by FERC on May 2, 2000. Orders granting an extension of time were issued in 2002, 2003, and 2004 due to scheduling issues and delays in awarding the construction contract. The Lucas Creek Trail was completed in

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December 2004, and in September 2005, FERC issued a letter confirming that construction was complete, and the trail was accepted by Sequoia National Forest.

Erosion Control Plan

In accordance with Forest Service 4(e) Condition No. 6, before starting any activities that the Forest Service determines to be of a land-disturbing nature on National Forest System land, SCE files with the Director, Office of Hydropower Licensing, a plan approved by the Forest Service for the control of erosion, stream sedimentation, dust, and soil mass movement.

Solid Waste and Waste Water Plan

In accordance with Forest Service 4(e) Condition No. 7, before starting any activities that the Forest Service determines to be of a land-disturbing nature on National Forest System land, SCE files with the Director, Office of Hydropower Licensing, a plan approved by the Forest Service for the treatment and disposal of solid waste and waste water generated during construction and operation of the Project.

Hazardous Substances Plan

In accordance with Forest Service 4(e) Condition No. 8, SCE filed a Spill Prevention Control and Countermeasure Plan for the Kern River No. 1 Powerhouse on June 14, 1999. The plan was approved by the Forest Service prior to filing. FERC issued a letter approving the plan on July 16, 1999. FERC's letter stated that the submitted material fulfilled the requirements of Condition No. 8.

In addition, Forest Service 4(e) Condition No. 8 also requires that before starting any activities that the Forest Service determines to be of a land-disturbing nature on National Forest System land, SCE files with the Director, Office of Hydropower Licensing, a plan approved by the Forest Service for oil and hazardous substances storage and spill prevention and cleanup.

Spoil Disposal Plan

In accordance with Forest Service 4(e) Condition No. 9, before starting any activities that the Forest Service determines to be of a land-disturbing nature on National Forest System land, SCE files with the Director, Office of Hydropower Licensing, a plan approved by the Forest Service for the storage and/or disposal of excess construction/tunnel spoils and slide material.

Visual Resource Protection

In accordance with Forest Service 4(e) Condition No. 10, before starting any activities that the Forest Service determines to be of a land-disturbing nature on National Forest System land, SCE files with the Director, Office of Hydropower Licensing, a plan approved by the Forest Service for the design and construction of the Project facilities in order to preserve or enhance its visual character.

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5.1.7.6 Recreation Resources

Recreation Monitoring Plan

As required by License Article 409, SCE filed a Recreation Monitoring Plan with FERC on October 28, 1999. The intent of the plan was to monitor recreation use in the Project's bypassed reach to determine whether future demands for river recreation would warrant any changes to the Project's operating scheme to protect and enhance recreational values along the Kern River. On March 10, 2000, an order modifying and approving the Recreation Monitoring Plan was issued by FERC. The recreation use study was implemented for five years from April 2000 to May 2005, and the final report was filed in December 2005. On May 31, 2006, FERC issued a letter approving the five-year recreation use report and concurring with SCE's findings that no additional monitoring or modifications to existing Project operations are warranted or recommended.

Recreation Flow Information Dissemination

As required by License Article 410, a Flow Information Plan was filed with FERC on October 28, 1999, which detailed a mechanism to provide flow information to the public. The plan was approved by FERC in February 2000. In March 2000, an automated flow phone for the Kern River became operational, and in December 2022, the phone line was replaced with a website (https://www.hydrometcloud.com/ScedisonDemocrat/tw/jsp/).

Recreation Plan

Pursuant to Forest Service 4(e) Condition No. 5, a Recreation Plan was filed with FERC on February 28, 2000. The plan was prepared by SCE in consultation with the Forest Service and identified improvements to be implemented at the four recreation areas that are currently managed by the Sequoia National Forest. Identified improvements included, but were not limited to, implementing accessible parking spaces, adding concrete bumpers in parking areas, widening paved pathways, addition of barbecue grills, and addition of toilets. In October 2003, the Forest Service filed a letter with FERC verifying that SCE had satisfactorily completed the requirements set forth in Condition No. 5.

5.1.7.7 Threatened and Endangered Species

Protection of Sensitive and Threatened and Endangered Species

In accordance with Forest Service 4(e) Condition No. 11, before starting any activities that the Forest Service determines to be of a land-disturbing nature on National Forest System land, SCE prepares a Biological Evaluation evaluating the potential impact of the action on the species or its habitat and submits it to the Forest Service for approval.

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5.1.8 Project Compliance History

5.1.8.1 FERC Inspections

FERC conducts two types of inspections of the Project to verify license compliance: (1) dam safety inspections, and (2) environmental inspections. Dam safety inspections are conducted pursuant to part 12 of the Commission's regulations to verify that (1) the Project is being properly maintained to ensure the continued safety of the structures, (2) no unauthorized modifications have been made to the Project, and (3) the Project is being operated efficiently and safely and in compliance with the terms and conditions of the license. Democrat Dam and forebay were inspected by FERC on September 23, 2023.

FERC also conducts periodic environmental inspections to provide a thorough review of environmental requirements of the license, including those related to cultural resources, biological resources, public safety, and other environmental resources. The most recent environmental inspection was conducted on September 25, 2018.

SCE has completed all necessary corrective actions to address comments and recommendations arising from FERC inspections.

5.1.8.2 Incidents and License Deviations

SCE reviewed the Project compliance history and found no instances of reoccurring non-compliance. Over the term of the current license, SCE filed six incident reports with FERC as summarized in Table 5-4. In all cases, SCE timely notified FERC of the incident, filed a written incident report, and made any necessary repairs / corrections as soon as safely possible. SCE has not been cited for a license violation during the current license term and has never received a Notice of Violation from FERC related to the Project. The complete compliance record for the Project for the current license term can be found on FERC's eLibrary.

5.1.8.3 Emergency Action Plan

Pursuant to 18 CFR § 12.20(a), FERC requires licensees to develop and file an Emergency Action Plan (EAP) with the Regional Engineer, unless granted a written exemption in accordance with § 12.21(a) of the regulations.

FERC classifies hydropower projects based on their hazard potential. The Project forebay is classified as having "significant" hazard potential due to the possibility for disruption of an important transportation artery (SR 178) in the event of an uncontrolled release of water. The forebay was reclassified from "low" to "significant" after it was overtopped on August 19, 2013, following heavy rainfall that caused debris to be conveyed from Adit 17/18 to the forebay, blocking the trash rack. As a result of this event and in accordance with 18 CFR § 12.11(a)(1), SCE maintains an EAP for the Kern River No. 1 Forebay, Adit 17/18, and Stark Flume. An Updated EAP was submitted in May 2023, and the most recent Annual EAP Status Report was filed in December 2024.

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Democrat Dam is classified by FERC as having a "low" hazard potential. As such, SCE is exempt from filing an EAP for Democrat Dam. To support this exemption, SCE annually performs a field reconnaissance to determine if there were any changes to upstream and downstream conditions affecting the determination. In addition, SCE verifies contact information that would be used if the dam is in danger of failing or has failed. This information is submitted to FERC by December 31 of each year. To date, FERC has agreed with SCE's annual assessment and determined that an EAP is not required for Democrat Dam.

5.1.8.4 Project Safety Features

SCE maintains the following features aimed at protecting public health and safety and wildlife:

- Signage: SCE uses signage to warn the public of hazardous areas and potentially dangerous conditions and are located near facilities that may pose a danger to the public:
  - Signage is posted near above-ground, uncovered sections of the flowline; around Democrat Dam; near the powerhouse, and forebay operations area.
  - Signage is also posted along the river upstream of the Democrat Dam warning boaters about Democrat Dam and to exit the river upstream of the dam.
- Physical restraining devices: SCE uses various devices to restrict public access around hazardous areas:
  - Fences around above-ground, uncovered sections of the flowline and around Democrat Dam and intake structures.
  - Gates and fences limiting access to Project facilities.
- River safety measures: A horizontal safety cable (buoy line) is strung across Democrat Impoundment (Kern River), just upstream of the Democrat Dam. This cable is intended to deter boaters from going over the dam.

5.2 PROPOSED ACTION ALTERNATIVE

Under the Proposed Action, SCE would continue to operate the Project as described in Section 5.1, *No-Action Alternative*, with minor adjustments to Project operation and maintenance activities in response to implementing environmental measures, management and monitoring plans, which are described below.

5.2.1 FERC Project Boundary Modifications

Pursuant to 18 CFR § 4.41, the FERC Project boundary must encompass only those lands necessary for Project purposes, including the operation and maintenance of the Project over the term of the FERC license. The FERC Project boundary would be modified

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(increased and/or decreased) under the Proposed Action to (1) include all lands necessary for Project operation and maintenance; (2) remove lands no longer necessary for Project operation and maintenance; and (3) correct known errors in the current Exhibit G, *Project Maps*, for the Project. These revisions will be depicted on maps provided in Exhibit G as part of the Final License Application (FLA).

5.2.2 Project Facilities

The existing Project facilities and storage/generation capacity, which are provided in Section 5.1, *No-Action Alternative*, would remain unchanged under the Proposed Action.

5.2.3 Project Operations

SCE would continue to operate the Project to generate power for SCE customers consistent with regulatory requirements (i.e., FERC License Articles as modified by conditions included in the Proposed Action and existing water rights held by SCE). SCE would continue to operate the Project in run-of-river mode generally consistent with water management practices described in Section 5.1.4, *Project Operations*, and Section 5.1.5, *Project Maintenance*, with the changes described below, including minor adjustments in response to the implementation of environmental measures.

5.2.4 Project Generation

SCE is not proposing changes to Project operations that would affect energy generation.

5.2.5 Project Maintenance

Under the Proposed Action, SCE would continue to implement routine inspection and maintenance activities as described for the No-Action Alternative (Section 5.1.5, *Project Maintenance*).

5.2.6 Proposed Environmental Measures, Management Plans, and Monitoring Plans

Under the Proposed Action, SCE proposes to implement environmental measures, management plans, and monitoring plans associated with ongoing Project operation and maintenance activities that are designed to protect, maintain, or enhance environmental and cultural resources over the term of the new license. These measures, management and monitoring plans are listed below and drafts of each are provided in Appendix E.1, except as noted.

- Minimum Instream Flow Measure
- Stream Gaging Plan
- Sediment Management Plan
- Fish Population Monitoring Plan

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- Project Access Roads and Trails Management Plan
- Vegetation Management Plan
- Wildlife Resources Management Plan
- Historic Properties Management Plan (included in Volume 5, *Confidential Cultural and Tribal Resources Information*)
- Visual Resources Protection Plan

5.3 REFERENCES

FERC (Federal Energy Regulatory Commission). 1998. Order Issuing New License (83 FERC ¶ 62,241). June 16.

_____. 2000. Order Amending License and Approving Revised Exhibits (90 FERC ¶ 62,227). March 30.

_____. 2013. Order Approving Exhibit G Drawing and Revising Annual Charges (142 FERC ¶ 62,230). March 20.

USACE (U.S. Army Corps of Engineers). 1953. Lake Isabella, Kern River, California, Reservoir Regulation Manual. Department of the Army, Sacramento District, Corps of Engineers, Sacramento, California. Amended January 1978.

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TABLES

Table 5-1. Project Facilities[1]

Diversion Dam
Democrat Dam
Impoundment
Democrat Dam Impoundment
Water Conveyance System
Sandbox
Tunnels, Flumes, Conduits, and Adits
Forebay
Forebay Overflow Spillway
Penstock
Powerhouse and Switchyard
Kern River No. 1 Powerhouse
Kern River No. 1 Switchyard
Access Roads
Willow Spring Creek Road (also referred to as Democrat Dam Road)
Powerline Road
Flume No. 1 Road
Dougherty Creek Road
Stark Creek Road
Forebay Operations Area Road
Lower Powerhouse Road
Upper Powerhouse Road
Access Trails
Democrat Gage Trail
Conduit No. 3 Trail
Cow Flat Creek Trail
Cow Flat Creek to Conduit No. 6 Trail
Lucas Creek Trail
Dougherty Creek Trail
Stark Creek Trail
Forebay to Conduit No. 9 Trail
Overflow Spillway Trail
Forebay Operations Area to Aerial Tram Upper Landing Trail
Access Trail to Aerial Cable Upper Mount
Communication and Power Lines
Erskine 12 kV Distribution Line
Camp 2.4 kV Distribution / Communication Line

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Gages and Stilling Wells
USGS Gage No. 11192500 / SCE Gage No. 409 (Kern River near Democrat Springs)
USGS Gage No. 11192000 / SCE Gage No. 410 (Kern River No. 1 Conduit near Democrat Springs)
USGS Gage No. 11192501 (Kern River near Democrat Springs; calculated 11192500+11192000)
Ancillary and Support Facilities
Democrat Dam Area
Buoy Line
Democrat Dam Intake Gatehouse
Democrat Dam Drainage Tower
Democrat Dam Drainage Tunnel
Democrat Dam Drainage Tunnel Outlet
Democrat Dam Access Walkway
Sandbox Drainage Channel
Gaging Cableway
Water Conveyance
Flume No. 6 Access Platform
Forebay Operations Area
Building No. 0110 (Admin Building)
Building No. 0146 (Garage)
Building No. 0133 (Garage)
Building No. 0118 (Ice House)
Water Tank
Aerial Cable Tower
Building No. 0111 (Aerial Tram Hoist House)
Aerial Tram Lower Landing
Aerial Tram
Aerial Tram Upper Landing
Aerial Tram Upper Landing to Forebay Walkway
Communication Site
Forebay Operations Area Perimeter Fence
Forebay Perimeter Fence
Chlorinator House
Powerhouse Area
Building No. 0112 (Machine Shop)
Office / Lunchroom
Building No. 0142 (Restroom)
Powerhouse and Switchyard Perimeter Fence

Notes: 1 The list of Project facilities included in the Pre-Application Document was updated/revised during development of the Application for New License based on study results and additional information becoming available. Table 5-1 represents the most current list of Project facilities.

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Table 5-2. Project Facility Specifications

General Information	
Owner and Operator	Southern California Edison
FERC Project Number	1930
Current License Term	30 years, expires May 31, 2028
Commenced Commercial Operations	1907
County	Kern
Watershed	Kern River
Diversion Dam	
Dam Location	Kern River SW ¼ of NW ¼ of Section 5, T.28 S., R.31 E., Mount Diablo Meridian
Constructed	1901–1907
Drainage Area (mi2)	2,258 square miles (Kern River above Democrat Dam)
Type	Cyclopean-concrete overflow gravity dam
Height of Dam Crest above Streambed	29 feet
Dam Crest Length	204 feet
Dam Thickness	85 feet at base
Elevation of Dam Crest	1,913 feet
Spillway	Crest of Democrat Dam also serves as a spillway
Elevation of Streambed	1,884 feet
Impoundment above Democrat Dam	
Capacity (approx.)	27 acres at crest elevation of 1,913 feet
Drainage Tunnel Length	329 feet long
Drainage Tunnel Diameter	7 feet, 6 inches
Drainage Tunnel Controls	72-inch electric motor operated sluice gate
Elevation of Drainage Tunnel (bottom)	1,875 feet (upper end of unlined section)
Water Conveyance System	
Intake Structure	• Two steel bar rack screens (trash rack); 2-inch centers with overall width of 36 feet and 30 feet • Two intake gates measuring 6 feet, 7.5 inches wide by 7 feet high • Elevation invert: 1,902 feet
Sandbox (Sediment Trap)	• 104 feet long, 20 feet wide • Includes two 24-inch slide gate valves for draining and instream flow releases
Instream Flow Release	• One of the two 24-inch slide gate valves located in the bottom of the sandbox provides FERC continuous minimum instream flow release requirements

Flowline	• Overall length: 44,790 feet; 8.5 miles • 42,884 feet of concrete tunnel • 390 feet of rectangular flume • 904 feet of Lennon flume on steel structures • 612 feet of arched-concrete conduit • Capacity: 412 cfs
Forebay	• 45-foot-long, 33-foot-wide, 11-foot-deep concrete structure that discharges directly into penstock or spillway pipe • Capacity: 10,263 cubic feet
Penstock	• Single 1,693-foot-long buried steel pipe • Diameter varies from 108–71 3/8 inches inside diameter
Spillway	• 1,362-foot-long steel pipe • Diameter varies from 65–44 inches inside diameter
Powerhouse	
Dimensions	170-foot long, 71-foot wide
Type	Reinforced concrete
Turbines	
• Number	Four identical units
• Type	Double overhung, single-jet, impulse turbines
• Manufacturer	Allis-Chalmers
• Horsepower (HP) (each unit)	10,750 HP
• Design Head (each unit)	865 feet
• RPM (each unit)	300 RPM
• Total Combined Rating	43,000 HP
• Static Head	374 psi
• Maximum Hydraulic Capacity	412 cfs
Generators	
• Number	Four identical units
• Type	Horizontal shaft
• Manufacturer	General Electric
• Installed Capacity (each unit)	6,570 kW, 0.9 power factor, 2.7 kV, three-phase, 60 Hz
• Total Installed Capacity	26,280 kW (26.3 MW)
Tailrace	Water is discharged into a concrete tailrace, with an approximate surface area of 4,350 square feet, before being released back into the Kern River

Key: cfs = cubic feet per second
HP = horsepower
Hz = hertz
kV = kilovolt
kW = kilowatt
mi^2 = square miles
MW = megawatt
psi = pounds per square inch
RPM = revolutions per minute

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Table 5-3. Description of Project Access Roads and Trails

Project Facility[1]	Start	End	Overall Length		Width (feet)	Surface Treatment	Gated
			Feet	Mile			
Project Access Roads							
Willow Spring Creek Road[2]	Kern Canyon Road (SR 178)	Conduit No. 2	4,892	0.93	16	Paved/ Aggregate	Yes
Powerline Road	Willow Spring Creek Road	Intake Gatehouse to Flume No. 1 Powerline	484	0.09	16	Native	Yes
Flume No. 1 Road	Willow Spring Creek Road	Flume No. 1	497	0.09	20	Native	Yes
Dougherty Creek Road	Stark Creek Road	Dougherty Creek Trail	577	0.11	20	Native	Yes
Stark Creek Road	Kern Canyon Road (SR 178)	Flume No. 6 Stark Creek	4,338	0.82	20	Paved/ Aggregate	Yes
Forebay Operations Area Road	Kern Canyon Road (SR 178)	Forebay Operations Area	670	0.13	10	Paved	Yes
Lower Powerhouse Road	Upper Powerhouse Road	Switchyard	483	0.09	20	Paved/ Aggregate	Yes
Upper Powerhouse Road	Kern Canyon Road (SR 178)	Powerhouse	521	0.10	40	Paved	Yes
Project Access Trails							
Democrat Gage Trail	Flume No. 1 Road	Gaging Cableway	1,579	0.30	4	Native	No
Conduit No. 3 Trail	Kern Canyon Road (SR 178)	Conduit No. 3	266	0.05	4	Native	No
Cow Flat Creek Trail	Kern Canyon Road (SR 178)	Flume No. 2 Cow Flat Creek	727	0.14	4	Native	No
Cow Flat Creek to Conduit No. 6 Trail[3]	Cow Flat Creek	Conduit No. 6	3,246	0.61	4	Native	No
Lucas Creek Trail	Kern Canyon Road (SR 178)	Flume No. 4 Lucas Creek	2,758	0.52	4	Native	No
Dougherty Creek Trail	Dougherty Creek Road	Flume No. 5 Dougherty Creek	2,351	0.45	4	Native	No
Stark Creek Trail	Stark Creek Road	Adit 13 & 14	6,081	1.15	4	Native	No

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Project Facility[1]	Start	End	Overall Length		Width (feet)	Surface Treatment	Gated
			Feet	Mile			
Forebay to Conduit No. 9 Trail	Forebay	Conduit No. 9	3,580	0.68	4	Native	Yes
Overflow Spillway Trail	Forebay Operations Area Lot	Forebay Overflow Spillway	629	0.12	4	Native	No
Forebay Operations Area to Aerial Tram Upper Landing Trail	Forebay Operations Area Lot	Aerial Tram Upper Landing	2,719	0.51	4	Native	No
Access Trail to Aerial Cable Upper Mount	Aerial Tram Upper Landing to Forebay Walkway	Aerial Cable Upper Mount	234	0.04	4	Native	No

Notes: [1] The list of Project facilities included in the Pre-Application Document was updated/revised during development of the Application for New License based on study results and additional information becoming available. Table 5-3 includes the most current list of Project access roads and trails.
[2] Willow Spring Creek Road is also referred to as Democrat Dam Road
[3] The current Exhibit G maps on file with FERC indicate a trail extends from SR 178 up to Flume No. 3. However, during field reconnaissance staff confirmed this trail does not connect to SR 178. Instead, this trail runs along a portion of the Forest Service's Powerhouse Trail (from Cow Flat Creek to Conduit No. 6).

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Table 5-4. Summary of Incidents over the Current License Term (1998–2024)

Date of Incident	Brief Description of Incident
June 11, 2002	**Tunnel Collapse** Approximately 30 cubic yards of rock and concrete from the tunnel ceiling fell, blocking part of the Kern River No. 1 water conveyance system (approximately 1.25 miles downstream of Stark Flume). It was determined that the incident was caused by deteriorated concrete at the interface between the arch top and the culvert side walls. The rock fall caused the failure of approximately 13 feet of un-reinforced concrete arch ceiling. Flows of approximately 60 cfs overflowed at an adit approximately 1 mile upstream of the tunnel collapse. Flows continued along a rocky embankment then over and under Highway 178 before entering the Kern River. Additionally, an undetermined amount of water overflowed Stark Creek Flume and entered the natural streambed. No erosion or other environmental damage is known to have occurred. By July 15, the tunnel debris removal effort was completed. No immediate repairs were necessary however, a tunnel investigation was completed in the fall of 2002 to identify and determine the magnitude of needed repairs. Repairs were implemented in the fall of 2003. Prior to the completion of repairs, the Project operated under restricted flow conditions.
December 20, 2010	**Rockslide Blocking Access to Powerhouse** Unusually heavy rainfall in late December caused large rocks to slough from the steep Kern Canyon walls blocking SR 178 which provides access to the powerhouse. Because the canyon walls remained unstable and the road was littered with rocks and damaged from the falling rocks, subsequent access to the powerhouse was not allowed by Caltrans until the road was reopened on January 6, 2011. No damage occurred to Project facilities as a result of the rockslide.
June 16, 2011	**Democrat Dam Buoy Line Detachment** Due to an accumulation of debris from high flows brought on by unseasonably high spring runoff, the Democrat Dam Impoundment Buoy Line became detached from its anchor. As soon as flows receded enough to enable safe access, the anchor was repaired and the buoy line reinstalled.
July 11, 2011	**Recreationist Death** On July 2, 2011, the victim entered the Kern River below the Sandy Flat Day Use Area, not wearing a life jacket. The Sandy Flat Day Use Area is over 10 miles upstream of the Kern River No. 1 Diversion Dam. The victim was found on July 10, 2011, below the diversion. Due to the location where the victim went into the water and where he was found, and the eight-day time lapse from when he went missing to the time of discovery, the drowning was determined not to be Project related.
August 19, 2013	**Forebay Overtopping** On August 19, 2013, a severe storm event initiated a rock and mudslide above Adit 17/18 (approximately 1-mile upstream of the forebay), causing large amounts of debris to wash into the conveyance tunnel opening at Adit 17/18. Debris was transported through the tunnel to the forebay where it plugged the overflow spillway pipe. Overtopping of the forebay ensued, followed by severe erosion below the forebay and along the overflow spillway pipe supports. The incident resulted in the closure of SR 178. Following the incident, the Project was taken offline, and repairs were completed in 2014.

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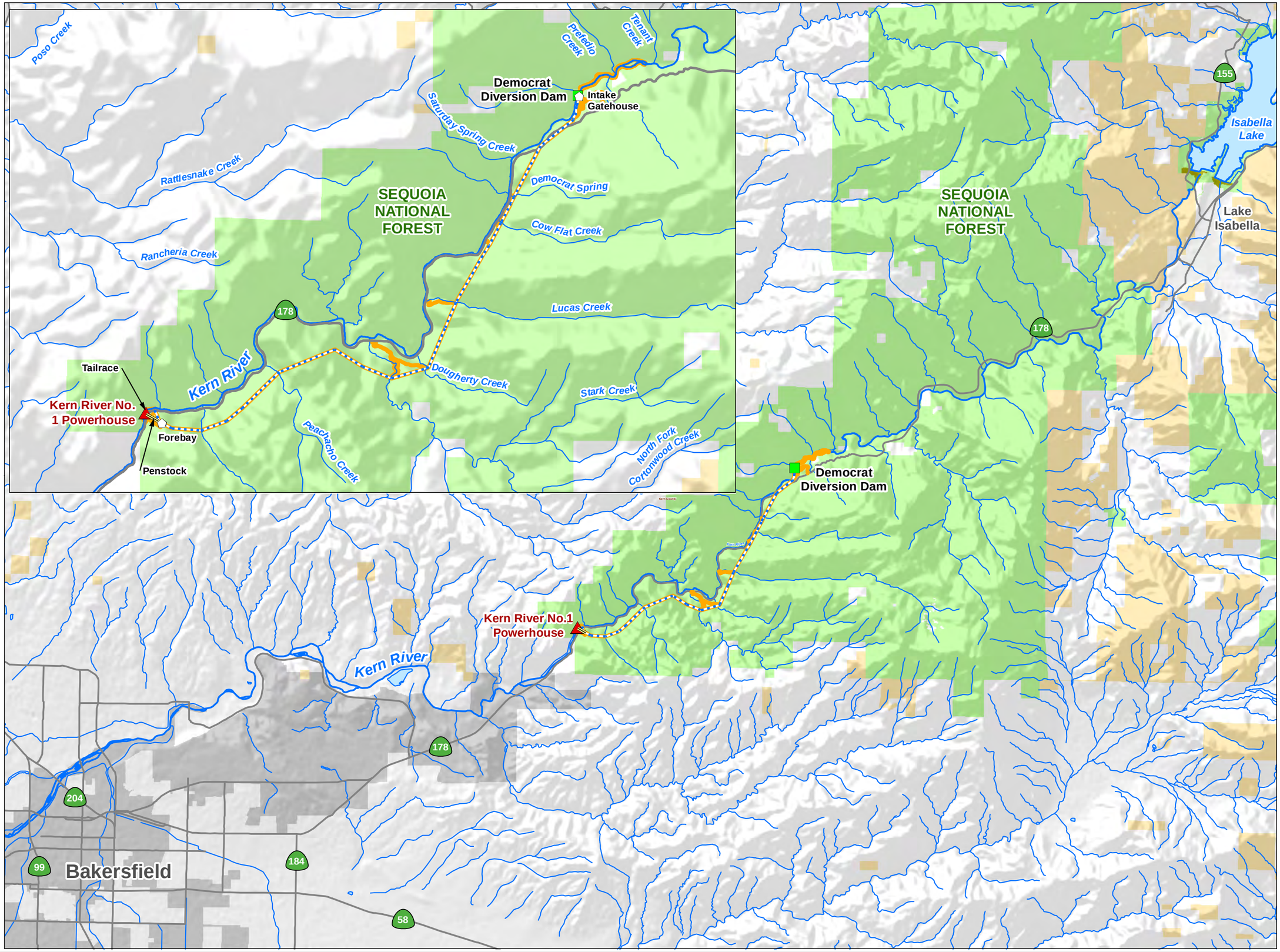
Date of Incident	Brief Description of Incident
January 5, 2017	**Rockslide** From the hillside (right bank) across from the Kern River No. 1 Powerhouse, a large boulder fell into the Kern River, broke apart, and fragments were projected across the river into the Kern River No. 1 Switchyard, causing a loss of power. The rock fall also caused severe damage to the adjacent Kern Canyon Project Diversion Dam (FERC Project No. 178), causing it to be out of operation. Subsequently, on January 10, 2017, additional storm damage was discovered at a section of flume on the Kern River No. 1 Flowline near Dougherty Creek. Damages resulting from this incident were described as repaired in a report filed with FERC in the fall of 2017.

MAPS



Facilities

- Dam
- Powerhouse
- Water Conveyence Feature
- Flowline
- Penstock
- FERC Boundary

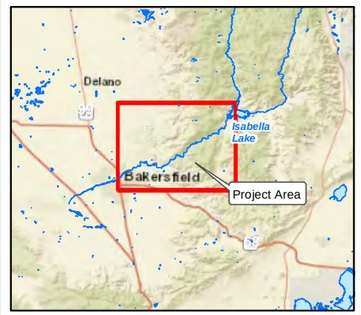
Other Features

- Highway
- Watercourse
- Water Body

Land Jurisdiction*

- U.S. Forest Service
- U.S. Bureau of Land Management
- U.S. Army Corps of Engineers
- Private (Blank)

*SOURCE: BLM 2021



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Energy for What's Ahead™

Kern River No. 1 Hydroelectric Project
FERC Project No. 1930

Map 5-1

Project Vicinity and Land Jurisdiction

0 0.5 1 2 Miles

Projection: UTM Zone 11
Datum: NAD 83

Date: 10/9/2025

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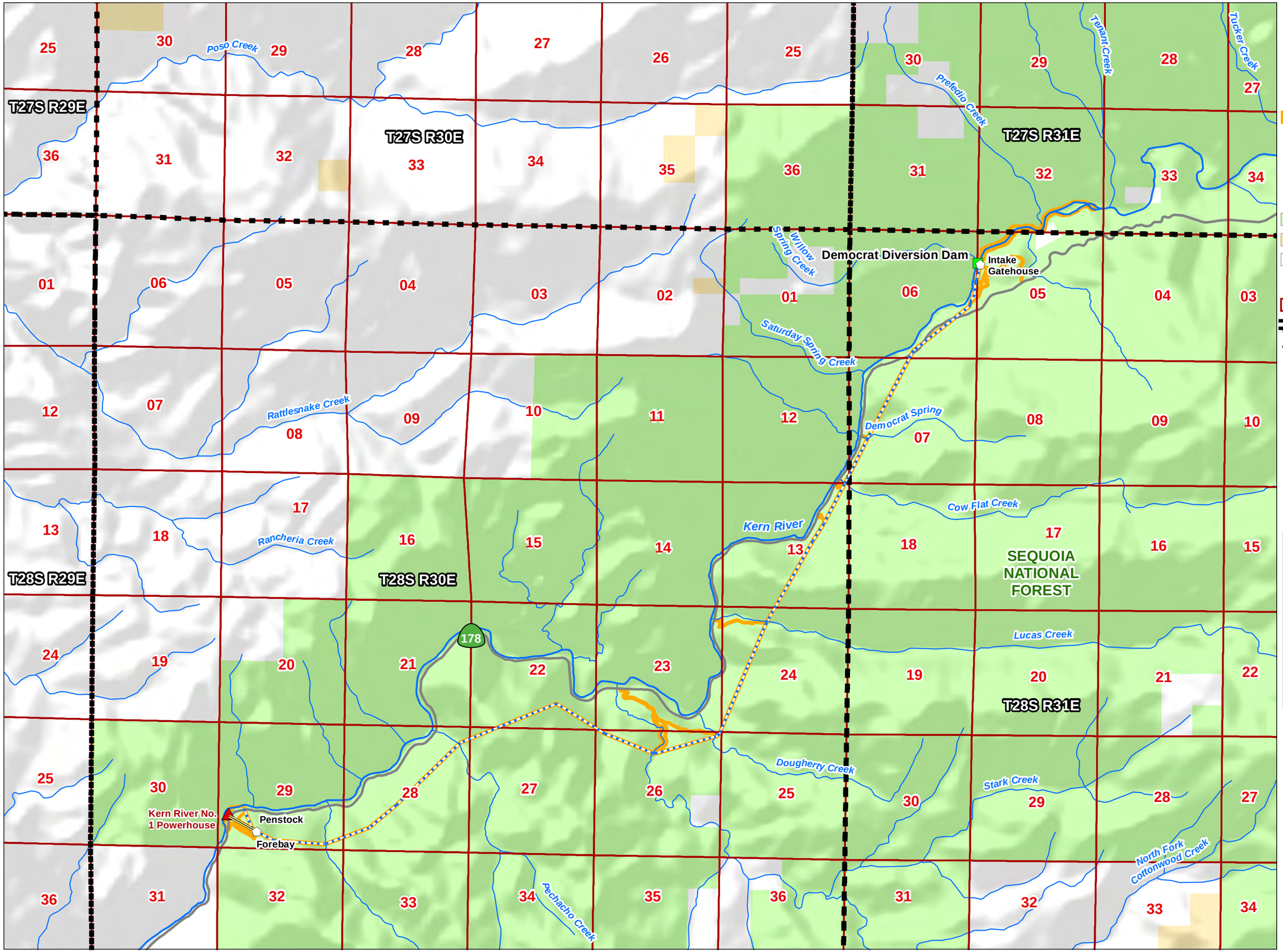


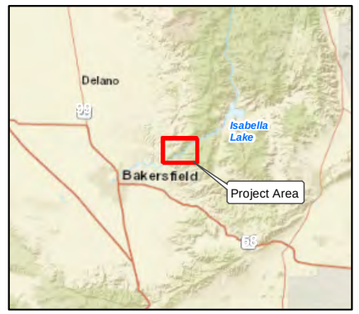
Facilities
- Dam
- Powerhouse
- Water Conveyence Feature
- Flowline
- Penstock
- FERC Boundary

Other Features
- Watercourse
- Highway

Land Jurisdiction*
- U.S. Forest Service
- U.S. Bureau of Land Management
- Private (Blank)

Public Land Survey System*
- Section
- Township / Range

*SOURCE: BLM 2021



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Kern River No. 1 Hydroelectric Project
FERC Project No. 1930

Map 5-2

Lands and Water within the FERC Project Boundary by Township, Range, and Section

0 0.25 0.5 Miles

Projection: UTM Zone 11
Datum: NAD 83

Date: 10/9/2025

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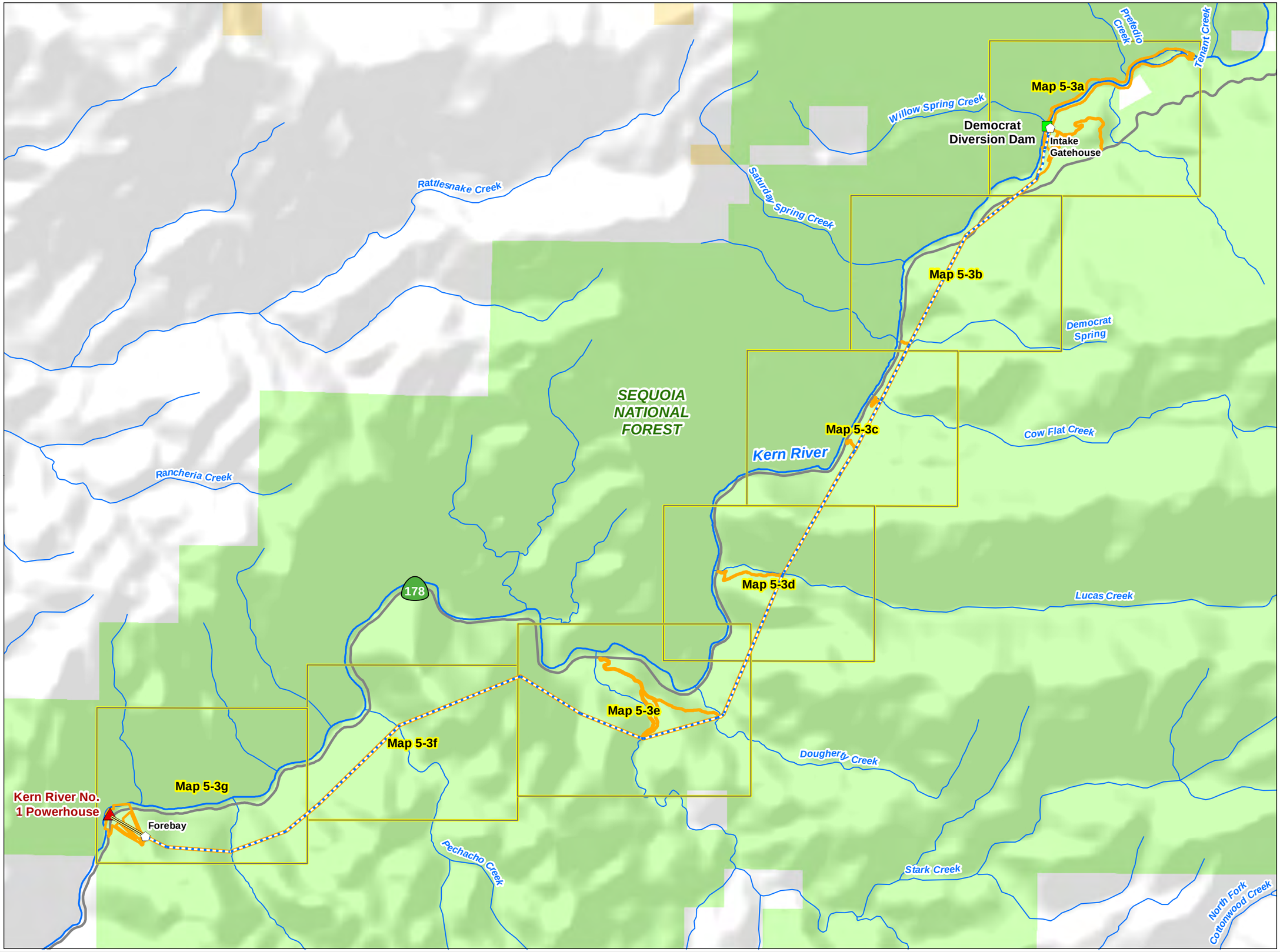


Facilities

- Dam
- Powerhouse
- Water Conveyence Feature
- Flowline
- Penstock
- FERC Boundary

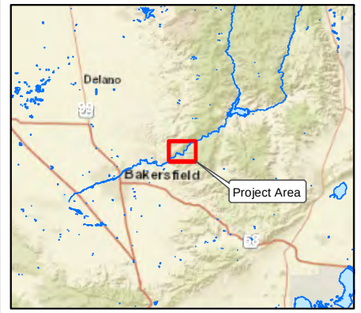
Other Features

- Watercourse
- Highway

Land Jurisdiction*

- U.S. Forest Service
- U.S. Bureau of Land Management
- Private (Blank)

*SOURCE: BLM 2021



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Kern River No. 1 Hydroelectric Project
FERC Project No. 1930

Map 5-3

Project Facilities Map Index

0 0.25 0.5
Miles
Projection: UTM Zone 11
Datum: NAD 83

Date: 10/9/2025

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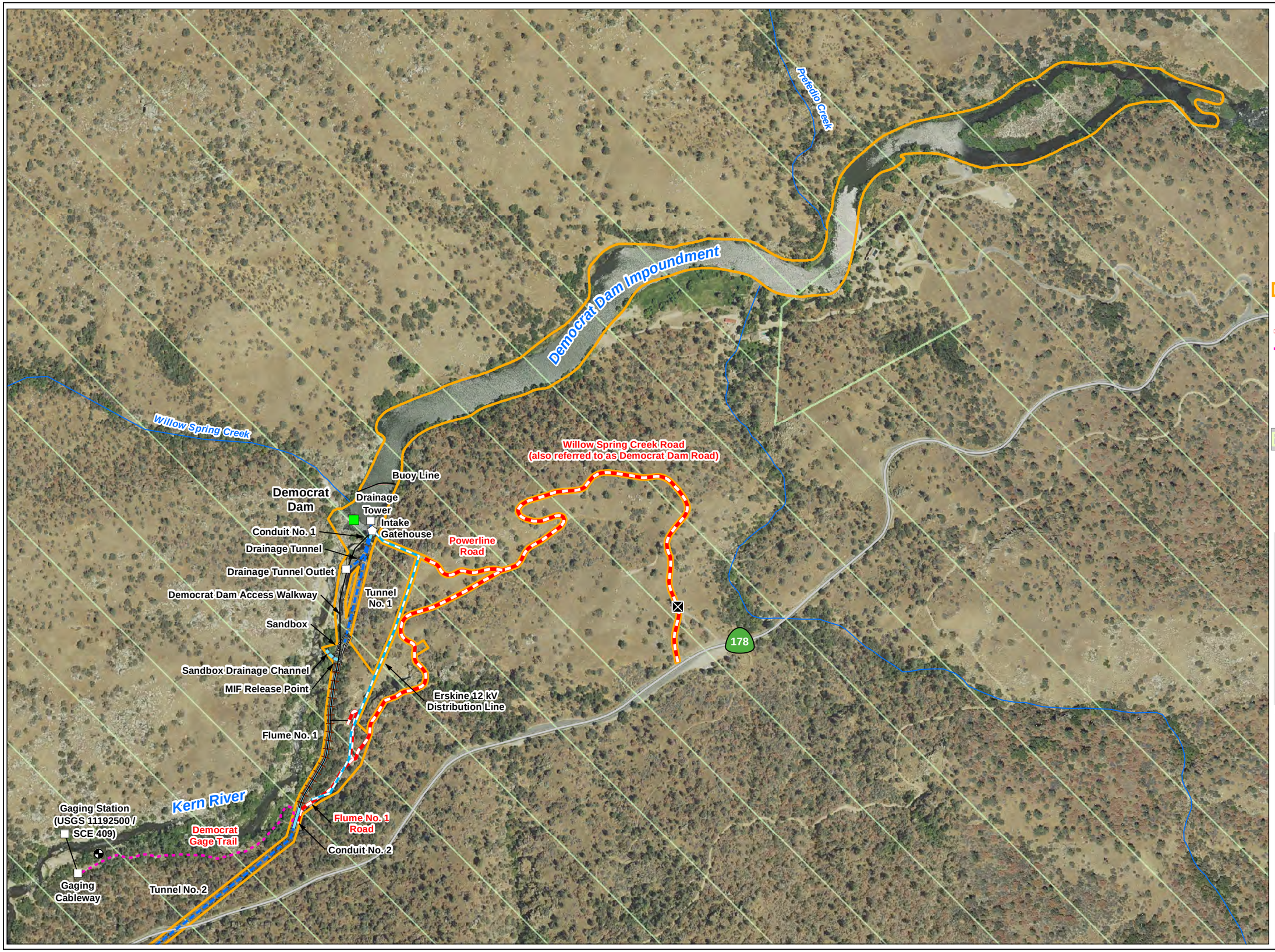


Facilities

- Dam
- Powerhouse
- Water Conveyence Feature
- Tunnel
- Flume
- Conduit
- Sandbox
- Penstock
- Spillway
- Tailrace
- Gage
- Ancillary Facility
- Ancillary Feature
- Powerline
- Communication / Powerline
- FERC Boundary

Transportation

- Project Road
- Project Trail
- Other Road
- Gate

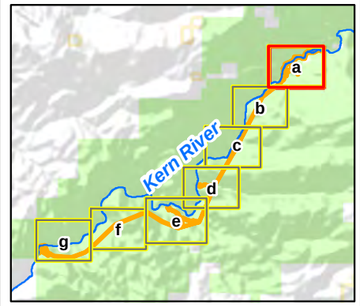
Other Features

- Watercourse

Land Jurisdiction*

- U.S. Forest Service

*SOURCE: BLM 2021



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Kern River No. 1 Hydroelectric Project
FERC Project No. 1930

Map 5-3a

Project Facilities

0 250 500
Feet
Projection: UTM Zone 11
Datum: NAD 83

Date: 10/9/2025

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Tunnel No. 2
Adit 2 & 3
178
Kern River
Saturday Spring Creek
Tunnel No. 3
Democrat Spring
Conduit No. 3 Trail
Conduit No. 3
Tunnel No. 4

Facilities

- Dam
- Powerhouse
- Water Conveyence Feature
- Tunnel
- Flume
- Conduit
- Sandbox
- Penstock
- Spillway
- Tailrace
- Gage
- Ancillary Facility
- Ancillary Feature
- Powerline
- Communication / Powerline
- FERC Boundary

Transportation

- Project Road
- Project Trail
- Other Road
- Gate

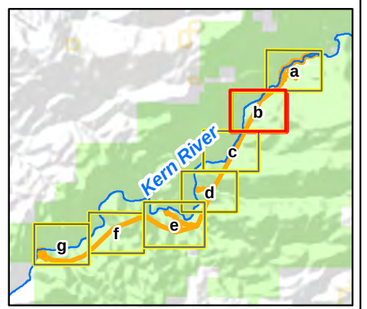
Other Features

- Watercourse

Land Jurisdiction*

- U.S. Forest Service

*SOURCE: BLM 2021



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Kern River No. 1 Hydroelectric Project
FERC Project No. 1930

Map 5-3b

Project Facilities

0 250 500
Feet
Projection: UTM Zone 11
Datum: NAD 83

Date: 10/8/2025

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Facilities

- Dam
- Powerhouse
- Water Conveyence Feature
- Tunnel
- Flume
- Conduit
- Sandbox
- Penstock
- Spillway
- Tailrace
- Gage
- Ancillary Facility
- Ancillary Feature
- Powerline
- Communication / Powerline
- FERC Boundary

Transportation

- Project Road
- Project Trail
- Other Road
- Gate

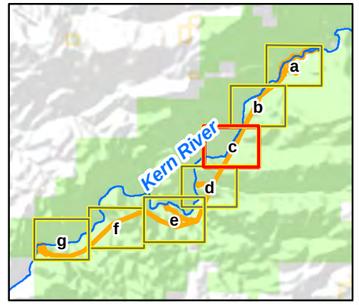
Other Features

- Watercourse

Land Jurisdiction*

- U.S. Forest Service

*SOURCE: BLM 2021



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Kern River No. 1 Hydroelectric Project
FERC Project No. 1930

Map 5-3c

Project Facilities

0 250 500
Feet
Projection: UTM Zone 11
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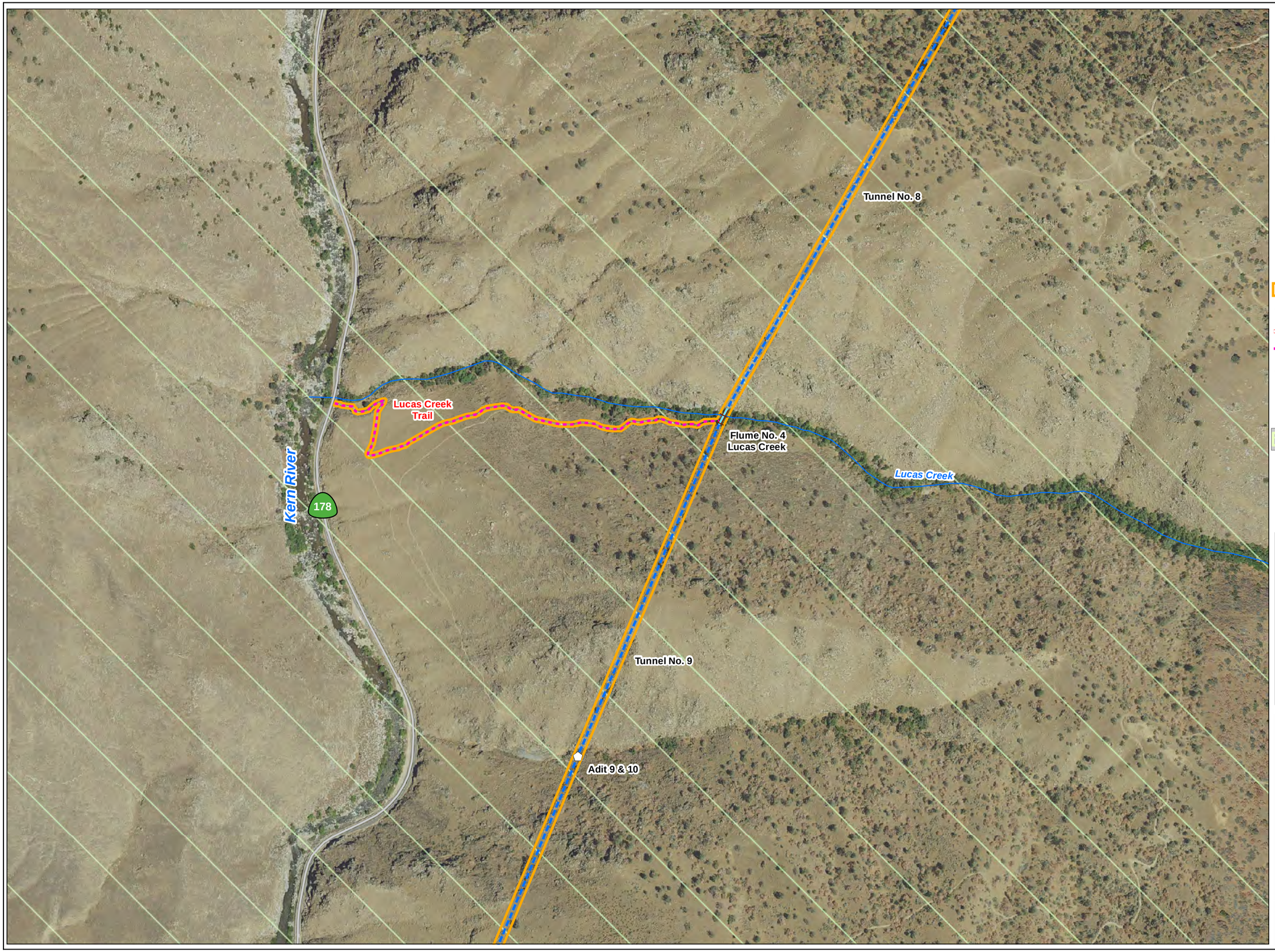


Facilities

- Dam
- Powerhouse
- Water Conveyence Feature
- Tunnel
- Flume
- Conduit
- Sandbox
- Penstock
- Spillway
- Tailrace
- Gage
- Ancillary Facility
- Ancillary Feature
- Powerline
- Communication / Powerline
- FERC Boundary

Transportation

- Project Road
- Project Trail
- Other Road
- Gate

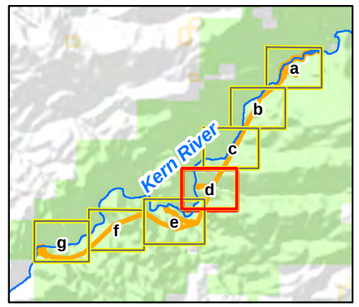
Other Features

- Watercourse

Land Jurisdiction*

- U.S. Forest Service

*SOURCE: BLM 2021



SOUTHERN CALIFORNIA EDISON
Energy for What's Ahead™

Kern River No. 1 Hydroelectric Project
FERC Project No. 1930

Map 5-3d

Project Facilities

0 250 500
Feet
Projection: UTM Zone 11
Datum: NAD 83

Date: 10/8/2025

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Kern River
178
Stark Creek Road
Adit 13 & 14
Tunnel No. 13
Stark Creek
Stark Creek Trail
Dougherty Creek Road
Dougherty Creek Trail
Tunnel No. 10
Conduit No. 7
Flume No. 5 Dougherty Creek
Adit 12 & 13
Tunnel No. 12
Access Platform
Conduit No. 8
Flume No. 6 Stark Creek
Tunnel No. 11
Dougherty Creek

Facilities

- Dam
- Powerhouse
- Water Conveyence Feature
- Tunnel
- Flume
- Conduit
- Sandbox
- Penstock
- Spillway
- Tailrace
- Gage
- Ancillary Facility
- Ancillary Feature
- Powerline
- Communication / Powerline
- FERC Boundary

Transportation

- Project Road
- Project Trail
- Other Road
- Gate

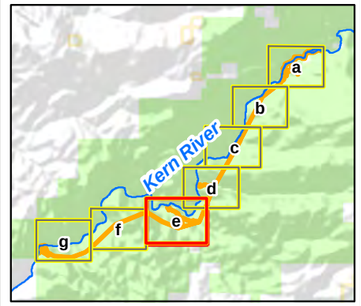
Other Features

- Watercourse

Land Jurisdiction*

- U.S. Forest Service

*SOURCE: BLM 2021



SOUTHERN CALIFORNIA EDISON
Energy for What's Ahead℠

Kern River No. 1 Hydroelectric Project
FERC Project No. 1930

Map 5-3e

Project Facilities

0 250 500
Feet
Projection: UTM Zone 11
Datum: NAD 83

Date: 10/8/2025

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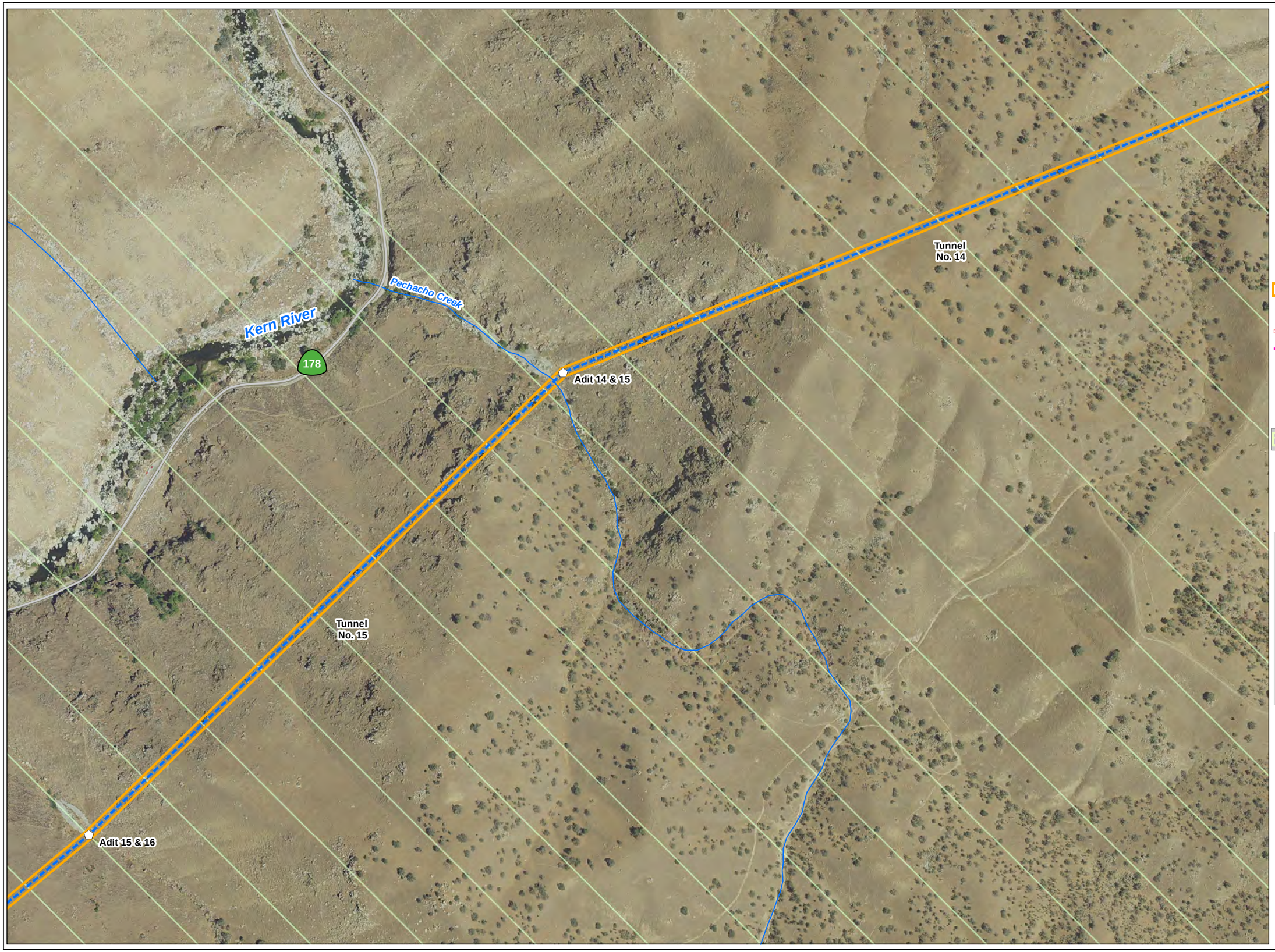


Facilities

- Dam
- Powerhouse
- Water Conveyence Feature
- Tunnel
- Flume
- Conduit
- Sandbox
- Penstock
- Spillway
- Tailrace
- Gage
- Ancillary Facility
- Ancillary Feature
- Powerline
- Communication / Powerline
- FERC Boundary

Transportation

- Project Road
- Project Trail
- Other Road
- Gate

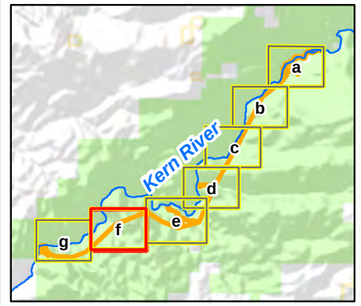
Other Features

- Watercourse

Land Jurisdiction*

- U.S. Forest Service

*SOURCE: BLM 2021



SOUTHERN CALIFORNIA EDISON
Energy for What's Ahead™

Kern River No. 1 Hydroelectric Project
FERC Project No. 1930

Map 5-3f

Project Facilities

0 250 500
Feet
Projection: UTM Zone 11
Datum: NAD 83

Date: 10/8/2025

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Tailrace
Perimeter Fence
Perimeter Fence
Kern River No. 1 Powerhouse
Kern River No. 1 Switchyard
178
Overflow Spillway Trail
Aerial Tram Lower Landing
Bldg. 0112
Aerial Cable Tower
Chlorinator House
Bldg. 0142
Bldg. 0146
Bldg. 0111
Bldg. 0133
Water Tank
Bldg. 0118
Bldg. 0110
Office / Lunch Room
KR 1 Penstock
Lower Powerhouse Road
Forebay Operations Area to Aerial Tram Upper Landing Trail
Distribution / Communication Line
Camp 2.4kV
Upper Powerhouse Road
Forebay Operations Area Road

Kern River No. 1 Powerhouse
Kern River No. 1 Switchyard
Overflow Spillway Trail
Forebay Overflow Spillway
Water Tank
Aerial Tram
Penstock
Hoist Cable
Tram Upper Landing to Forebay Walkway
Forebay
Lower Powerhouse Road
Upper Powerhouse Road
Forebay Operations Area Road
Aerial Tram Upper Landing
Communication Site
Tunnel No. 19
Access Trail to Aerial Cable Upper Mount
Kern River
178
Forebay to Conduit No. 9 Trail
Adit 18 & 19
Tunnel No. 18
Tunnel No. 17
Conduit No. 9
Adit 16 & 17
Tunnel No. 16

Facilities

- Dam
- Powerhouse
- Water Conveyence Feature
- Tunnel
- Flume
- Conduit
- Sandbox
- Penstock
- Spillway
- Tailrace
- Gage
- Ancillary Facility
- Ancillary Feature
- Powerline
- Communication / Powerline
- FERC Boundary

Transportation

- Project Road
- Project Trail
- Other Road
- Gate

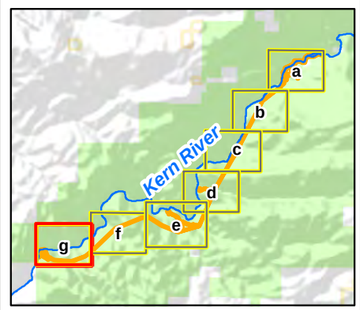
Other Features

- Watercourse

Land Jurisdiction*

- U.S. Forest Service

*SOURCE: BLM 2021



SOUTHERN CALIFORNIA EDISON
Energy for What's Ahead

Kern River No. 1 Hydroelectric Project
FERC Project No. 1930

Map 5-3g

Project Facilities

0 250 500
Feet
Projection: UTM Zone 11
Datum: NAD 83

Date: 10/8/2025

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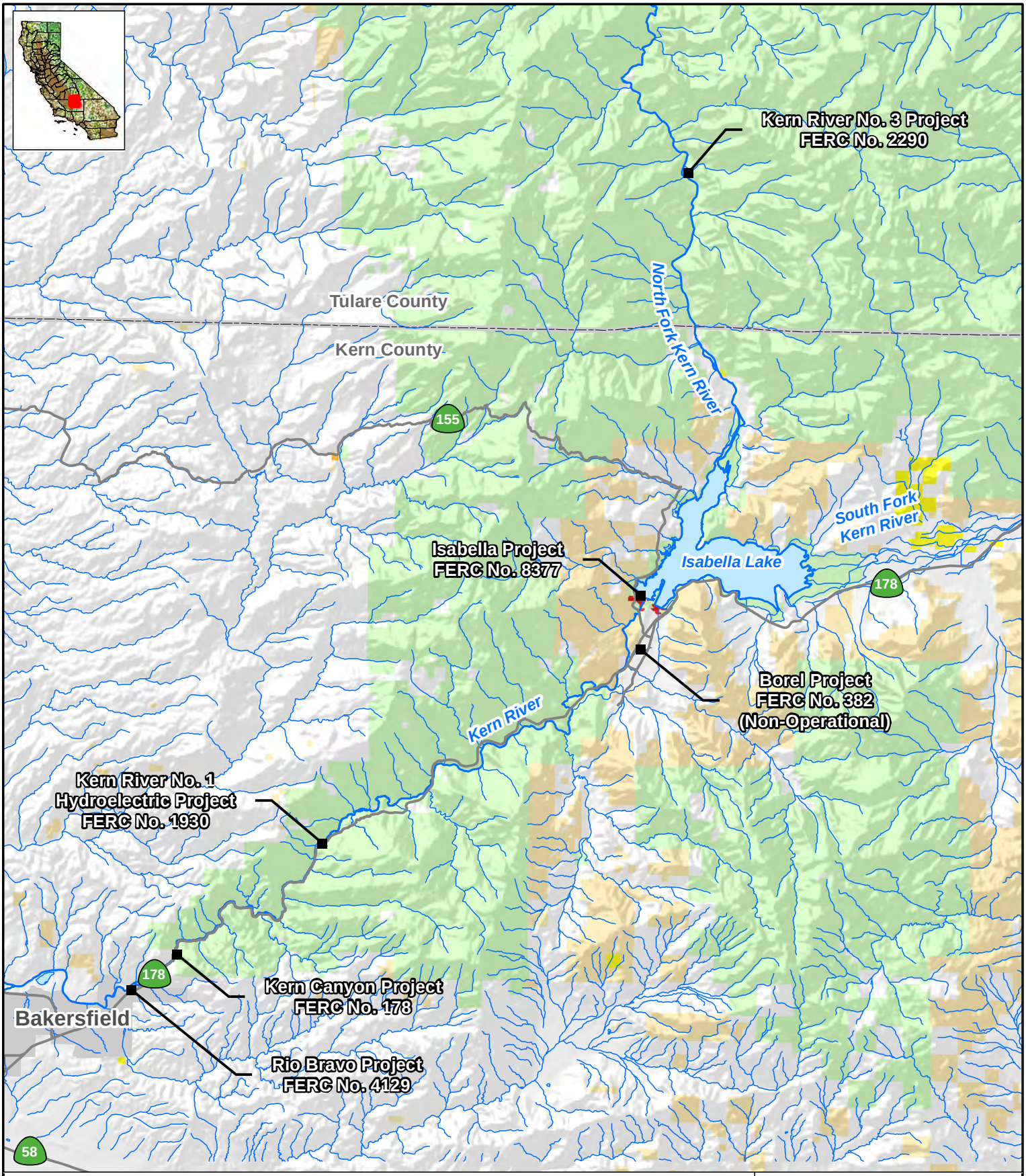

County Boundary
Highway
Watercourse
Water Body

Land Ownership (BLM, 2021)

U. S. Forest Service
U. S. Bureau of Land Management
U. S. Army Corps of Engineers
State of California
Private (Blank)

SOUTHERN CALIFORNIA EDISON
Energy for What's Ahead

Kern River No. 1 Hydroelectric Project
FERC Project No. 1930

Map 5-4

FERC-Licensed Projects in the Kern River Basin

Projection: UTM Zone 11 N Datum: NAD 83

Date: 8/25/2025

0 2.5 5 Miles

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LIST OF ACRONYMS

FERC	Federal Energy Regulatory Commission
Project	Kern River No. 1 Hydroelectric Project

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6.0 OTHER ALTERNATIVES

6.1 ALTERNATIVES CONSIDERED BUT ELIMINATED FROM DETAILED STUDY

6.1.1 Federal Government Takeover

Federal takeover is not a reasonable alternative to relicensing the Kern River No. 1 Hydroelectric Project (Project). Federal takeover and operation of the Project would require Congressional approval. While that fact alone would not preclude further consideration of this alternative, there is no evidence to indicate that federal takeover should be recommended to Congress. In Scoping Document 1 (Federal Energy Regulatory Commission [FERC] 2023a) and Scoping Document 2 (FERC 2023b), FERC concluded that federal takeover was not a reasonable alternative. Moreover, no party has suggested that a federal takeover would be appropriate, and no federal agency has expressed interest in operating the Project following any federal takeover.

6.1.2 Issuing a Non-Power License

A non-power license is a temporary license that FERC would terminate when it determines that another governmental agency is authorized and will assume regulatory authority and supervision over the lands and facilities covered by the non-power license. No governmental agency has suggested a willingness or ability to take over the Project, and no governmental entity has sought a non-power license. Thus, FERC has no basis for concluding that power operations at the Project should no longer be used to produce power. Thus, issuing a non-power license is not a realistic alternative to relicensing the Project.

6.1.3 Retiring the Project

Project retirement could be accomplished with or without dam removal. Either alternative would involve denial of the relicense application and surrender or termination of the current license with appropriate conditions. Southern California Edison is not proposing to decommission the Project, and the record to date does not demonstrate any serious resource concerns that cannot be mitigated if the Project is relicensed. As such, there is no reason to include decommissioning as a reasonable alternative to be evaluated and studied.

6.2 REFERENCES

FERC (Federal Energy Regulatory Commission). 2023a. Scoping Document 1 for the Kern River No. 1 Hydroelectric Project. Accession No. 20230629-3043. June 29.

_____. 2023b. Scoping Document 2 for the Kern River No. 1 Hydroelectric Project. Accession No. 20231017-3020. October 17.

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7.0 Environmental Analysis 7-1

LIST OF ACRONYMS

CFR	Code of Federal Regulations
FERC	Federal Energy Regulatory Commission
Project	Kern River No. 1 Hydroelectric Project
SCE	Southern California Edison

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7.0 ENVIRONMENTAL ANALYSIS

This section identifies and evaluates potential environmental effects of the Proposed Action for Southern California Edison's (SCE) Kern River No. 1 Hydroelectric Project (Project). Each resource section is organized as follows:

- Affected Environment
- Proposed Environmental Measures
- Potential Environmental Effects
- Unavoidable Adverse Effects

This section follows the Federal Energy Regulatory Commission's (FERC) content requirements under the Code of Federal Regulations (CFR), Title 18, Section 5.18(b)(5)(ii) (18 CFR § 5.18(5)(ii)) and FERC's "Preparing Environmental Documents: Guidelines for Applicants, Contractors, and Staff" (FERC 2008). Each subsection is further described below.

Affected Environment

The affected environment sections for each resource follow FERC's content requirements at 18 CFR § 5.18(b)(5)(ii)(A), which specify that, "the applicant must provide a detailed description of the affected environment or area(s) to be affected by the proposed project by each resource area. This description must include the information on the affected environment filed in the Pre-Application Document provided for in § 5.6, developed under the applicant's approved study plan, and otherwise developed or obtained by the applicant. The section must include a general description of socio-economic conditions in the vicinity of the project including general land use patterns (e.g., urban, agricultural, forested), population patterns, and sources of employment in the project vicinity."

The affected environment discussion was developed with information from SCE's Pre-Application Document and collected during implementation of the 14 FERC-approved Technical Study Plans developed for the Project relicensing. Results of these studies are provided in technical memorandums included in Appendix E.2 of this Application. The affected environment discussion identifies existing resource conditions under current operations and maintenance of the Project, which represent baseline conditions.[1]

Proposed Environmental Measures

The proposed environmental measures sections for each resource follow FERC's content requirements at 18 CFR § 5.18(b)(5)(ii)(C), which specify that "the applicant must provide, by resource area, any proposed new environmental measures, including, but not limited

[1] The baseline environmental conditions are those that would exist for each resource area if the Project continued to be operated and maintained according to the current FERC license.

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to, changes in the project design or operations, to address the environmental effects identified above and its basis for proposing the measures. The applicant must describe how each proposed measure would protect or enhance the existing environment, including, where possible, a non-monetary quantification of the anticipated environmental benefits of the measure. This section must also include a statement of existing measures to be continued for the purpose of protecting and improving the environment and any proposed preliminary environmental measures received from the consulted resource agencies, Indian tribes, or the public. If an applicant does not adopt a preliminary environmental measure proposed by a resource agency, Indian tribe, or member of the public, it must include its reasons, based on project-specific information." Proposed environmental measures are included in Appendix E.1 of this Application.

Potential Environmental Effects

The potential environmental effects sections for each resource follow FERC's content requirements at 18 CFR § 5.18(b)(5)(ii)(B), which specify that "the applicant must present the results of its studies conducted under the approved study plan by resource area and use the data generated by the studies to evaluate the beneficial and adverse environmental effects of its proposed project. This section must also include, if applicable, a description of any anticipated continuing environmental impacts of continued operation of the project, and the incremental impact of proposed new development of project works or changes in project operation. This analysis must be based on the information filed in the Pre-Application Document provided for in § 5.6, developed under the applicant's approved study plan, and other appropriate information, and otherwise developed or obtained by the Applicant."

Potential effects are determined by analyzing the changes in a resource that may result from activities implemented under the Proposed Action (Section 5.2) compared to the No-Action Alternative (baseline condition) (Section 5.1). Final effects determinations consider environmental measures to be included under the Proposed Action (refer to Appendix E.1). The following effects determinations are used in the analysis:

- **No Effect** – Implementation of the Proposed Action would protect and maintain a resource.

- **Negligible Effect** – Implementation of the Proposed Action would have a negligible effect on a resource, or the implementation of environmental measures would reduce the effect to a negligible level.

- **Adverse Effect** – Implementation of the Proposed Action would have a significant effect on a resource that may be reduced, but not to a negligible level, through implementation of new environmental measures.

- **Beneficial Effect (Enhancement)** – Implementation of the Proposed Action would benefit the resource.

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Unavoidable Adverse Effects

The unavoidable adverse effects sections for each resource follow FERC's content requirements at 18 CFR § 5.18(b)(5)(ii)(D), which specify that "based on the environmental analysis, discuss any adverse impacts that would occur despite the recommended environmental measures. Discuss whether any such impacts are short- or long-term, minor or major, cumulative or site-specific."

References

FERC (Federal Energy Regulatory Commission). 2008. Preparing Environmental Documents: Guidelines for Applicants, Contractors, and Staff. Office of Energy Projects Division of Hydropower Licensing. September.

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LIST OF ACRONYMS

°F	degrees Fahrenheit
amsl	above mean sea level
BLM	Bureau of Land Management
CAEPA	California Environmental Protection Agency
cfs	cubic feet per second
CRWQCB	California Regional Water Quality Control Board
FERC	Federal Energy Regulatory Commission
Forest Service	United States Forest Service
HUC	Hydrologic Unit Code
ISB	Isabella Dam
mi^2	square mile(s)
Project	Kern River No. 1 Hydroelectric Project
RM	river mile
SCE	Southern California Edison
USACE	United States Army Corps of Engineers
USGS	United States Geological Survey

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7.1 GENERAL DESCRIPTION OF THE RIVER BASIN

This section describes the Kern River Basin, where Southern California Edison's (SCE) Kern River No. 1 Hydroelectric Project (Project) is located. The Federal Energy Regulatory Commission's (FERC) content requirements for this section are specified in Title 18 of the Code of Federal Regulations § 5.18(b)(1).

This section provides an overview of the Kern River Basin, including information on the overall basin area and subbasin areas; length of stream reaches; waterbodies located within the basin including lakes and tributary streams; major land and water uses; and other dams and diversions in the basin.

7.1.1 Kern River Basin

The Kern River Basin is the southernmost of four major river basins in the larger Tulare-Buena Vista Lakes Basin (Tulare Lake Basin) (Hydrologic Unit Code [HUC[1]] 180300) draining to Tulare and Buena Vista lakes, and the southern-most major river system in the Sierra Nevada range (United States Geological Survey [USGS] 1981). The Kern River Basin is divided into three subbasins: Upper Kern Subbasin (HUC 18030001); South Fork Kern Subbasin (HUC 18030002); and the Middle Kern-Upper Tehachapi-Grapevine Subbasin (HUC 18030003) (Map 7.1-1). The Kern River Basin is characterized by a variety of terrain, including very high elevation Sierra Nevada peaks in the headwaters of the Upper Kern Subbasin and low elevation Central Valley terrain in the southern portion of the Middle Kern-Upper Tehachapi-Grapevine subbasin. The portion of the basin where the Project is located includes steep slopes and deeply incised channels within rugged canyons. The steep channels within the Basin are largely confined by narrow V-shaped valley bottoms and steep-side slopes with little to no developed floodplains and substrates dominated by bedrock and coarse sediment (i.e., boulders).

7.1.1.1 Upper Kern Subbasin

The North Fork Kern River (also referred to as the Upper Kern River) begins in the Upper Kern Subbasin in Sequoia National Park in northeastern Tulare County. The headwaters originate in small lakes northwest of Mount Whitney (14,505 feet above mean sea level [amsl]) on the west side of the Sierra Nevada. These headwaters are contained by the Great Western Divide to the west (a series of mountains in the Sierra Nevada range

[1] The USGS divides the U.S. into a nested six-level hierarchy of hydrologic units, with each level adding two digits to the Hydrologic Unit Code (HUC):

- Region level (HUC 2-digit): A broad, two-digit code that defines a major river system or the combined drainage of several rivers.
- Subregion level (HUC 4-digit): A four-digit code that further divides a region.
- Basin level (HUC 6-digit): A six-digit code that delineates a major river basin.
- Subbasin level (HUC 8-digit): An eight-digit code that breaks down the basins into smaller accounting units.
- Watershed level (HUC 10-digit): A ten-digit code for smaller watersheds, typically between 40,000 and 250,000 acres.
- Subwatershed level (HUC 12-digit): A twelve-digit code for the smallest, most detailed hydrological units, generally 10,000 to 40,000 acres in size.

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dividing Kings Canyon and Sequoia National Parks), the Kings-Kern Divide to the north, and the main Sierra Crest to the east, all of which have mountain peaks above 13,000 feet amsl (USGS 2022).

From its headwaters, the North Fork Kern River flows south through Kern Canyon, a deep glacier-carved canyon, and through the Inyo and Sequoia National Forests and the Golden Trout Wilderness, receiving water from Rock Creek, Big Arroyo, Golden Trout Creek, and Rattlesnake Creek (USGS 2022). At Hockett Peak, the North Fork Kern River is joined by the Little Kern River at Forks of the Kern (USGS 2022) and then continues south to Lake Isabella. The elevation of the Upper Kern Subbasin ranges from 14,505 feet amsl at Mt. Whitney to 2,065 feet amsl at Lake Isabella (FERC and Forest Service 1996). The North Fork Kern River is approximately 92 miles long and has a drainage area of approximately 1,093 square miles.

7.1.1.2 South Fork Kern Subbasin

The headwaters for the South Fork Kern River begin in the Sierra Nevada Mountains of the Inyo National Forest in northeastern Tulare County, about 10 miles east of the Upper Kern River in the South Fork Kern Subbasin (Map 7.1-1). The headwaters begin in the Golden Trout Wilderness, flowing south into the Sequoia National Forest. The South Fork Kern River is 100 miles long and has a drainage area of approximately 981 square miles.

7.1.1.3 Lake Isabella

The Upper Kern and South Fork Kern subbasins both drain into Lake Isabella, which is impounded by Isabella Dam. The dam is located at the upstream boundary of the Middle Kern-Upper Tehachapi-Grapevine subbasin. Details related to Lake Isabella are provided below in Section 7.1.1.2 Dams, Reservoirs and Diversions.

7.1.1.4 Middle Kern-Upper Tehachapi-Grapevine Subbasin – Cottonwood Creek-Kern River Subbasin

Below Lake Isabella, the Kern River (also referred to as the lower Kern River) enters and flows approximately 75 miles through the Middle Kern-Upper Tehachapi-Grapevine Subbasin (HUC 18030003 with a drainage area of 2,612 square miles, see Map 7.1-1). The Project is located within the Cottonwood Creek-Kern River HUC Level 10 subbasin, and specifically in the Stark Creek-Kern River, Lucas Creek-Kern River, and Mill Creek-Kern River HUC Level 12 subbasins (Map 7.1-2). Table 7.1-1 provides a summary of the subbasin areas, stream length, and elevations in the vicinity of the Project.

Project facilities span elevations ranging from approximately 1,913 feet amsl at Democrat Dam to approximately 924 feet amsl at the Kern River No. 1 Powerhouse. The longitudinal profile of the lower Kern River, extending from Isabella Dam to the mouth of Kern Canyon, is illustrated in Figure 7.1-1. Between Isabella Dam and Democrat Dam the average slope of the river is 0.5%. Downstream of Democrat Dam, the river's slope increases, as shown in the longitudinal profile for the lower Kern River from Democrat Dam Impoundment to the Kern River No. 1 Powerhouse (Figure 7.1-2). The channel slope from Democrat Dam to the confluence with Peachacho Creek is on average 1.5% and steepens to approximately 3.5% in the reach from Peachacho Creek to the mouth of Kern Canyon.

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The largest tributaries in the vicinity of the Project are Lucas and Stark creeks, containing upstream drainages of approximately 35 to 45 square miles each. Localized gradients in the Project bypass reach are 1.2% to 3.5%. The lower Kern River within the bypass reach is a bedrock-controlled channel that is limited in its ability to adjust either vertically or laterally.

7.1.2 Dams, Reservoirs and Diversions

There are six FERC-licensed hydroelectric projects located on the Kern River (Map 7.1-3; Table 7.1-2). Three of these are upstream of the Kern River No. 1 Project (Kern River No. 3 Project, SCE; Isabella Project, Isabella Partners; and the non-operational Borel Project, SCE) and two are downstream of the SCE Kern River No. 1 Project (Kern Canyon Project, Kern & Tule Hydro, LLC; and Rio Bravo Project, Olcese Water District). In addition to these, the United States Army Corps of Engineers (USACE) operates Isabella Lake, a major flood control and storage reservoir located upstream of the Kern River No. 1 Hydroelectric Project.

7.1.2.1 Kern No. 3 Project

The furthest upstream FERC-licensed facility is SCE's Kern River No. 3 Project (FERC No. 2290), situated on the North Fork Kern River. This project operates in run-of-river mode and includes a main diversion dam and two feeder dams, ultimately discharging back to the North Fork Kern River at the Kern River No. 3 Powerhouse near Kernville, CA.

7.1.2.2 Lake Isabella, Isabella Dam, and Borel Project

Lake Isabella is a 568,075 acre-foot reservoir located at the junction of three subbasins: the Upper Kern, South Fork Kern, and Middle Kern–Upper Tehachapi–Grapevine. Lake Isabella captures water and sediment from both the North Kern and South Fork Kern river systems and functions as a sediment retention basin. Estimates of sediment deposits in Isabella Lake are made based on sedimentation data collected by the USACE. Data collected through 1969 shows that the annual sediment transport above Lake Isabella is 0.12 acre-feet per square mile or approximately 250 acre-foot annually (USACE 1975). Recent topographic data collection (bathymetry and lidar) has occurred but a report of the sedimentation was not available. Constructed by USACE between 1948 and 1953, the reservoir provides critical flood-risk management, irrigation water storage, and recreational opportunities. The Lake Isabella Dam complex includes a main dam on the Kern River channel and an auxiliary dam immediately to the east, with the main service spillway located between the two.

During construction, the Isabella Auxiliary Dam was built over a portion of the canal system for SCE’s non-operational Borel Hydroelectric Project (FERC No. 382). To accommodate continued operation of the Borel Project, USACE incorporated a controlled conduit through the auxiliary dam. As part of project operations, water was diverted from Lake Isabella into an open canal and flume system before discharging back into the Kern River via the Borel Powerhouse located 7 miles downstream. Additionally, the Isabella Partners Project (FERC No. 8377) generates hydropower from reservoir releases at the

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Isabella Main Dam, as directed by the Kern River Watermaster. In 2017, the USACE implemented a safety modification to the Isabella Auxiliary Dam, in which the USACE condemned 10.7 acres of private and public land associated with the Borel Project and sealed off the existing section of conduit through the Auxiliary Dam by filling it with concrete and abandoning it in-place, thus rendering the Borel Project non-operational. Consequently, the FERC requested that SCE file a plan and schedule for surrendering the Borel Project license. On May 1, 2023, SCE filed its Application for Surrender of License for the Borel Project with FERC. On July 29, 2024, FERC issued an Environmental Assessment for Decommissioning of Project Features and Surrender of Project License.

The highest outflow from Lake Isabella Dam into the Kern River typically occurs during the summer months, resulting from irrigation releases from Isabella Dam to meet water delivery commitments in the California Central Valley. Isabella Dam occasionally spills water over the main service spillway during periods of exceptional inflow. However, Isabella Dam did not spill water in recent years due to a storage restriction in place from 2006 to 2023, which limited storage in Lake Isabella to 361,250 acre-feet outside of flood season and 170,000 acre-feet during flood season (November–March). The storage restriction was to address seismic, hydrologic (potential overtopping during an extreme flood event), and seepage concerns at the dams until a permanent structural solution could be implemented.

A USACE dam safety modification project at Isabella Dam was initiated in 2017, and consisted of: constructing a full height filter and drain on the downstream slope of the main dam; raising the crest height of the main and auxiliary dams by 16 feet; fortifying the main service spillway; constructing a new 300-foot-wide emergency spillway between the main and auxiliary dams; adding a 80-foot wide buttress to the auxiliary dam; and sealing the Borel conduit through the Auxiliary Dam. The USACE completed construction in 2023 and the storage restrictions have now been removed.

7.1.2.3 Kern River No. 1 Project

Downstream of Lake Isabella, the Kern River is undiverted for 13 miles until it reaches Democrat Dam, which diverts water into the Kern River No. 1 Hydroelectric Project. Thus, the Kern River No. 1 Hydroelectric Project inflow, including water quality parameters like turbidity, is almost entirely regulated by upstream operations at Isabella Dam, save for a few small tributaries between Isabella Dam and Democrat Dam. Water is diverted at Democrat Dam for the Kern River No. 1 Hydroelectric Project (intake capacity of 412 cubic feet per second [cfs]) when flows exceed the minimum flow requirements of the license. The Project license (Article 401) requires 50 cfs to be released to the bypass reach from June 1 to September 30 and 15 cfs to be released between October 1 and May 31, or inflow if lower than the seasonal flow requirement. Water travels through the water conveyance system for 10.2 miles to the Kern River No. 1 Powerhouse. Water exits the powerhouse via a short tailrace.

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7.1.2.4 Kern Canyon Project

Water released from the Kern River No. 1 Powerhouse is immediately diverted from the river for the Kern and Tule Hydro LLC's Kern Canyon Project (FERC No. 178). Diverted water from the Kern Canyon Project is released 1.6 miles downstream at the Kern Canyon Powerhouse.

7.1.2.5 Rio Bravo Hydro Project

Kern River water for the Rio Bravo Hydro Project (FERC No. 4129) is diverted 500 feet downstream of the Kern Canyon Powerhouse by the Olcese Water District. The Rio Bravo Project returns diverted water back to the Kern River 2 miles downstream at the Rio Bravo Powerhouse.

7.1.2.6 Consumptive Water Diversions

Water released from the Rio Bravo Powerhouse enters the Kern River and continues downstream through the City of Bakersfield into the California Central Valley where it is almost entirely allocated to consumptive uses (see Section 7.1.1.3, Major Water Uses).

7.1.3 Major Water Uses

Upstream of the Project, water from the North Fork Kern River and South Fork Kern River flows into Lake Isabella. From the reservoir, these waters then flow into the Kern River. SCE operates the Kern River No. 1 Project in a run-of-river mode for hydropower generation. Minimum instream flow releases are set at levels to benefit aquatic resources, to provide recreational opportunities, and to preserve aesthetic resources. No consumptive water use occurs until the Kern River reaches the mouth of the Kern River Canyon (downstream of the Project), where it is then diverted by several water users, primarily for agricultural purposes.

The Kings, Kaweah, and Tule rivers supply the majority of the surface water supply to the Tulare Lake Basin (California Regional Water Quality Control Board [CRWQCB] 2018). Water from the Kern River is principally diverted for agriculture, with minor quantities being diverted for the urban area around Bakersfield and Oildale (Dale et al. 1966). At the southern end of the Kern River, the water is almost entirely diverted for irrigation and aquifer recharge, with any excess water directed into the California Aqueduct (part of the California State Water Project) or Buena Vista Lake. In addition to agriculture and domestic uses, large areas of land downstream from the Project have also been developed (i.e., water banks) for the purposes of conserving the Kern River and other water supplies not needed for crop irrigation, which has allowed for underground storage of this water for future use (City of Bakersfield 2003).

Water rights diversions from the Kern River for these agricultural and domestic purposes date back to the 1860s (California Environmental Protection Agency [CAEPA] 2008). The present distribution, use, and basis of water rights in the Kern River is complex and based

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on various other decrees and agreements developed over the last 100 years (CAEPA 2008).[2]

7.1.4 Major Land Uses

The Project is located in a rural area bounded by a narrow canyon. The Project is located entirely on National Forest System lands in the Sequoia National Forest, which is administered by the United States Forest Service (Forest Service). There is no development within the immediate vicinity of the Project area except for recreational facilities and river access sites owned and operated by the Forest Service. The main recreational activities in the vicinity of the Project include whitewater rafting, fishing, hiking, and picnicking (see Section 7.10, Recreation Resources for additional information).

Small residential communities are located upstream of the Project and around Lake Isabella, which include the towns of Wofford Heights, Lake Isabella, Keyesville, and Bodfish. The closest major city is Bakersfield which is located about 15 miles southwest of the Project. The Kern River has long served as a vital resource for the Bakersfield area, supplying municipal water, supporting agricultural irrigation and providing recreational opportunities – contributions that have played a key role in the city's growth into a major metropolitan center (County of Kern 2003).

Agricultural activities – including cultivated crops and hay production – occur throughout the Kern River Subbasins, particularly in the area around Bakersfield. Rangeland is found northeast of the project area, near Lake Isabella, where grazing occurs on Bureau of Land Management (BLM) grazing allotments (BLM 2020). A more detailed discussion of land use in the vicinity of the Project can be found in Section 7.9, Land Use.

7.1.5 Climate

The Kern River Basin is characterized as a Mediterranean subtropical climate with cold, wet winters, and hot, dry summers. Winter precipitation falls as snow in the higher elevations, generally above Lake Isabella at elevations of 5,000 feet amsl or higher. In the vicinity of the Project, precipitation generally occurs in the form of rain. Mean annual precipitation measured at Isabella Dam from 2002 to 2024 is 13.34 inches (Table 7.1-3). Nearly 90% of the mean annual precipitation falls in the six months from November through April. Temperature, measured approximately 2.5 miles east of Democrat Dam between 2002 and 2024 is variable throughout the year, with July having the highest average temperature of 83.3 Fahrenheit (°F) (96.6°F average high and 67.0°F average low) and December having the lowest average temperature of 46.3°F (58.5°F and 37.7°F in December (Table 7.1-3).

[2] See *Lux v. Haggin* (1886) 69 Cal. 255; *Farmers Canal Company v. J.R. Simmons* (Super. Ct., Kern County, 1900, No. 1901); Miller-Haggin Agreement, 1888; Amendment to the Miller-Haggin Agreement, 1930; Amendment to the Miller-Haggin Agreement, 1955; Kern River Water Rights and Storage Agreement, 1962; Lake Isabella Recreation Pool Agreement, 1963.

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TABLES

Table 7.1-1. Summary of Drainage Area and Stream Length of Waters in the Cottonwood Creek-Kern River Subbasins

Cottonwood Creek-Kern River Subbasin	Total Area (mi^2)	Subdivided Areas (mi^2)	Stream Length (miles)	Elevation (feet)
Mill Creek – Kern River	112.5	45.3	7.6	2,018 to 7,535 feet
Lucas Creek – Kern River		34.0	8.7	1,554 to 7,458 feet
Stark Creek – Kern River		33.2	10.7	552 to 6,251 feet

Notes: mi = miles
mi^2 = square miles

Table 7.1-2. Summary of FERC-licensed Hydropower Projects in the Kern River Basin

Project	Licensee	Powerhouse Capacity (megawatts)	Location of Diversion Dam (RM)	Intake Capacity (cfs)	Bypass Reach Length (miles)	Minimum Flow Requirements
Kern River No. 3 (FERC No. 2290)	SCE	40.2	RM 100.5 [RM 18.6[1]] (Fairview Dam) RM 95.1 [RM 13.2[1]] (Salmon Creek Diversion) RM 91.1 [RM 9.2[1]] (Corral Creek Diversion RM 85 [RM 3.1[1]] (Powerhouse)	600 cfs	15.5	80 cfs (October) 40 cfs or inflow (Nov- Feb) 70 cfs (March) 100 cfs (April-June) 130 cfs of inflow (July-Aug) 100 cfs (September)
Isabella (FERC No. 8377)	Isabella Partners	11.95	RM 74.9	> 605	0	Run-of-river operation w/ USACE operations
Borel (FERC No. 382) [Decommis-sioned]	SCE	12	RM 74.9	605	7	25 cfs (Nov–Apr) 30 cfs (May, Oct) 60 cfs (Jun–Sep)

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Project	Licensee	Powerhouse Capacity (megawatts)	Location of Diversion Dam (RM)	Intake Capacity (cfs)	Bypass Reach Length (miles)	Minimum Flow Requirements
Kern River No. 1 (FERC No. 1930)	SCE	26.3	RM 54.4	412	10.2	50 cfs or inflow (June 1–Sept 30) 15 cfs or inflow (Oct 1–May 31)
Kern Canyon (FERC No. 178)	Kern & Tule Hydro, LLC	11.475	RM 43.9	720	1.6	25 cfs (year-round) 60 cfs (June–October) in wet years
Rio Bravo (FERC No. 4129)	Olcese Water District	14	RM 41.8	1,600	2	50 cfs (year-round)

Notes: [1] RM zero defined as the North Fork Kern River confluence with the highwater line of Isabella Lake.
cfs = cubic feet per second
FERC = Federal Energy Regulatory Commission
RM = river mile
SCE = Southern California Edison

Table 7.1-3. Average Monthly Temperature above Democrat Dam and Precipitation at Lake Isabella (2002–2024)

Month	Democrat Dam Air Temperature (2002–2024)			Average Precipitation (inches)
	Average Temperature (°F)	Average High Temperature (°F)	Average Low Temperature (°F)	
January	46.9	59.7	37.8	2.73
February	48.1	60.8	38.1	2.19
March	51.9	64.5	40.5	1.86
April	56.9	70.5	43.7	0.65
May	65.6	79.6	50.6	0.40
June	76.2	90.5	59.7	0.10
July	83.3	98.5	67.0	0.20
August	80.4	96.6	64.3	0.37
September	73.8	90.6	58.5	0.21
October	62.4	78.9	49.1	0.38
November	52.3	67.1	41.9	1.25

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Month	Democrat Dam Air Temperature (2002–2024)			Average Precipitation (inches)
	Average Temperature (°F)	Average High Temperature (°F)	Average Low Temperature (°F)	
December	46.3	58.5	37.7	3.00
Average Annual	62.02	76.32	49.08	13.34

Source: National Oceanic and Atmospheric Administration, Weather Station USR0000CDMC – Democrat California and California Data Exchange Center Precipitation Data – Isabella Dam (ISB): accessed November 2022

Notes: °F = degrees Fahrenheit

FIGURES

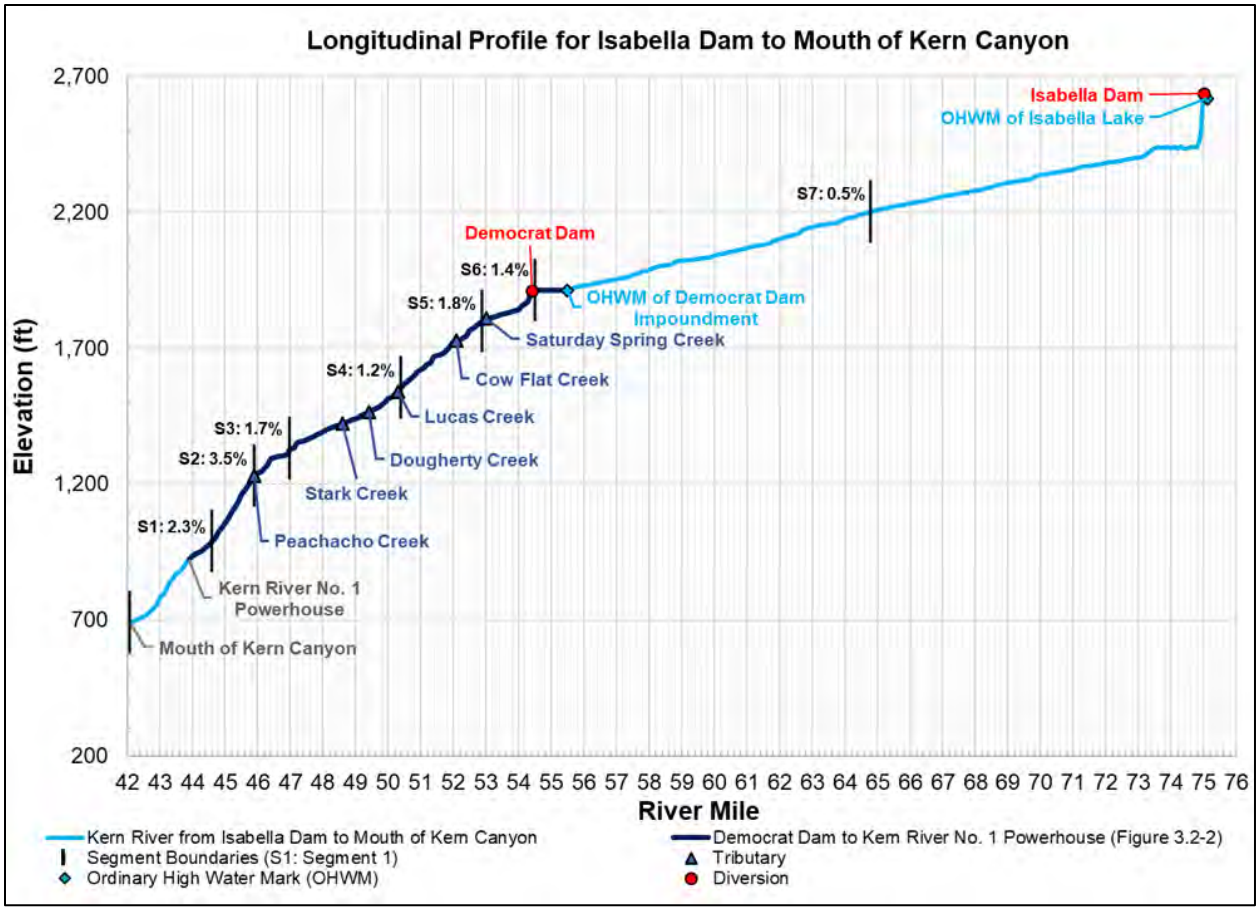


Figure 7.1-1. Longitudinal Profile of Lower Kern River from Isabella Dam to the Mouth of Kern Canyon

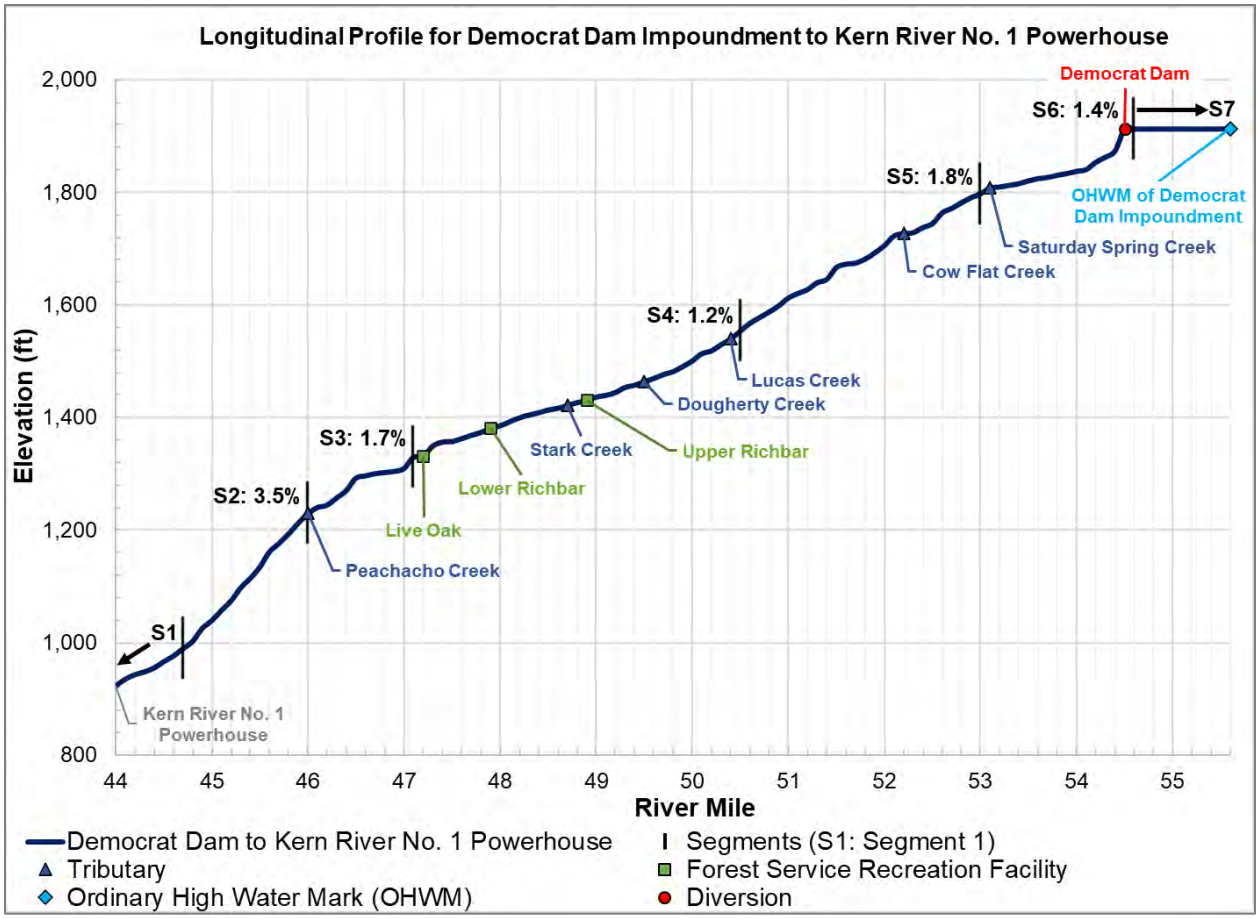
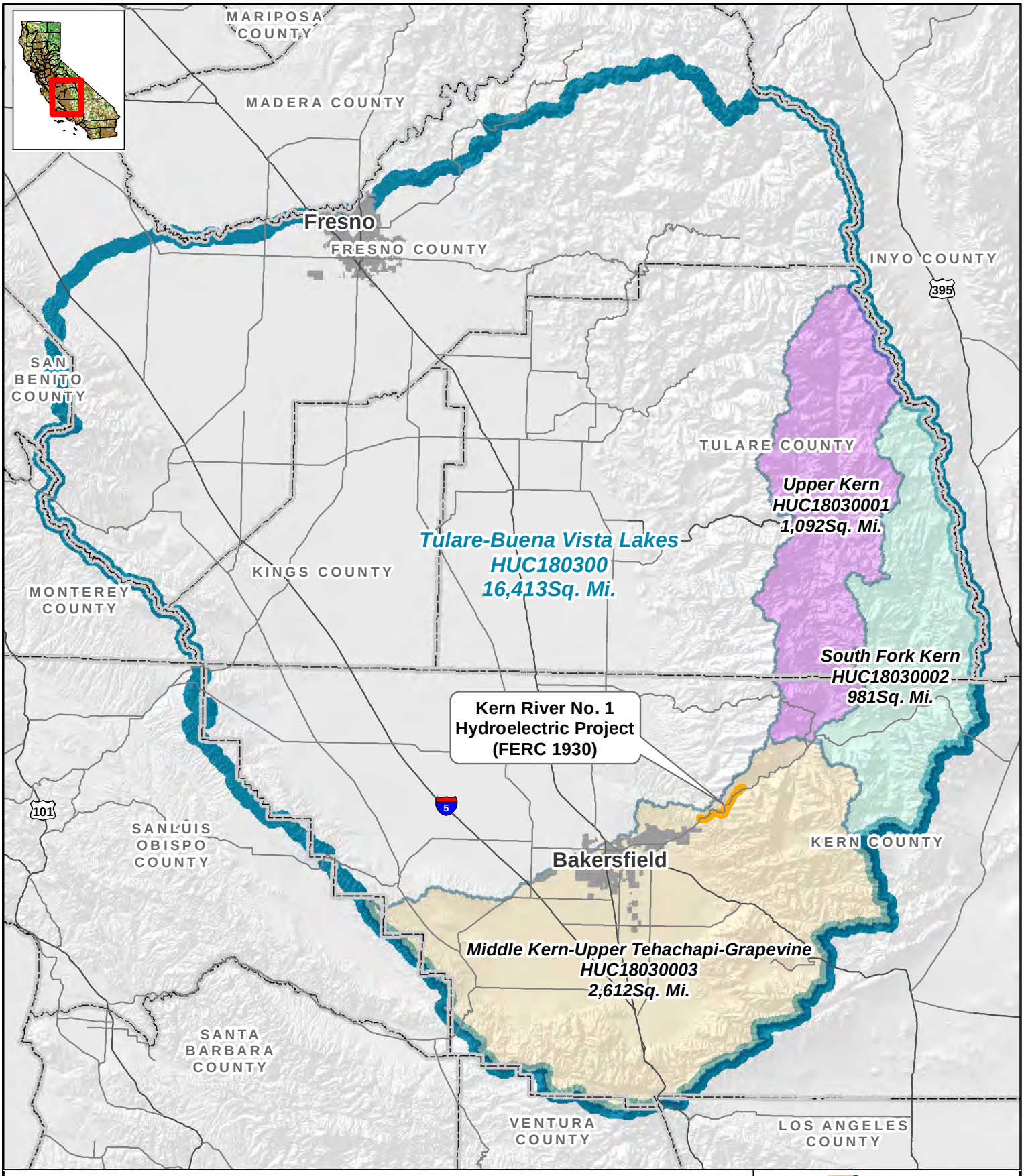


Figure 7.1-2. Longitudinal Profile of Lower Kern River from Democrat Dam to the Kern River No. 1 Powerhouse

MAPS



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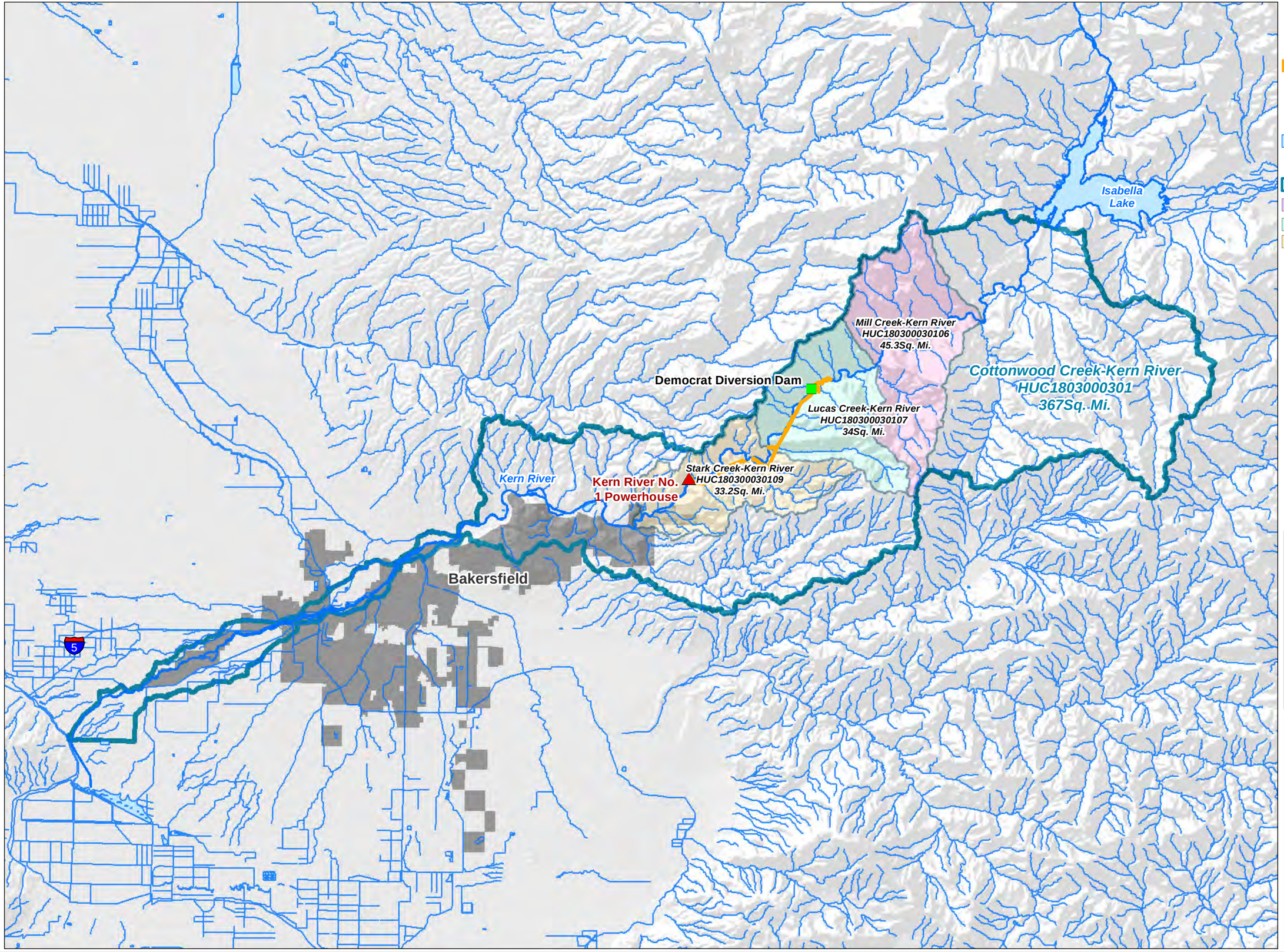


Facilities

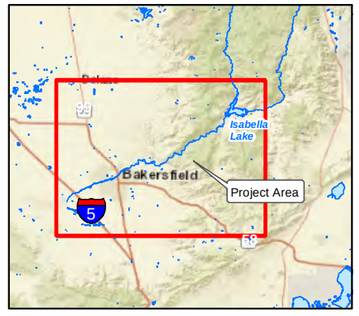
- Dam
- Powerhouse
- FERC Boundary

Other Features

- Highway
- Watercourse
- Water Body

HUC 10 and HUC 12 Basins/Sub-basins

- Cottonwood Creek-Kern River (HUC10)
- Mill Creek-Kern River (HUC 12)
- Lucas Creek-Kern River (HUC12)
- Stark Creek-Kern River (HUC12)



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Kern River No. 1 Hydroelectric Project
FERC Project No. 1930

Map 7.1-2

Cottonwood Creek-Kern River HUC and HUC12 Sub-basins

0 2.5 5 Miles

Projection: UTM Zone 11
Datum: NAD 83

Date: 8/25/2025

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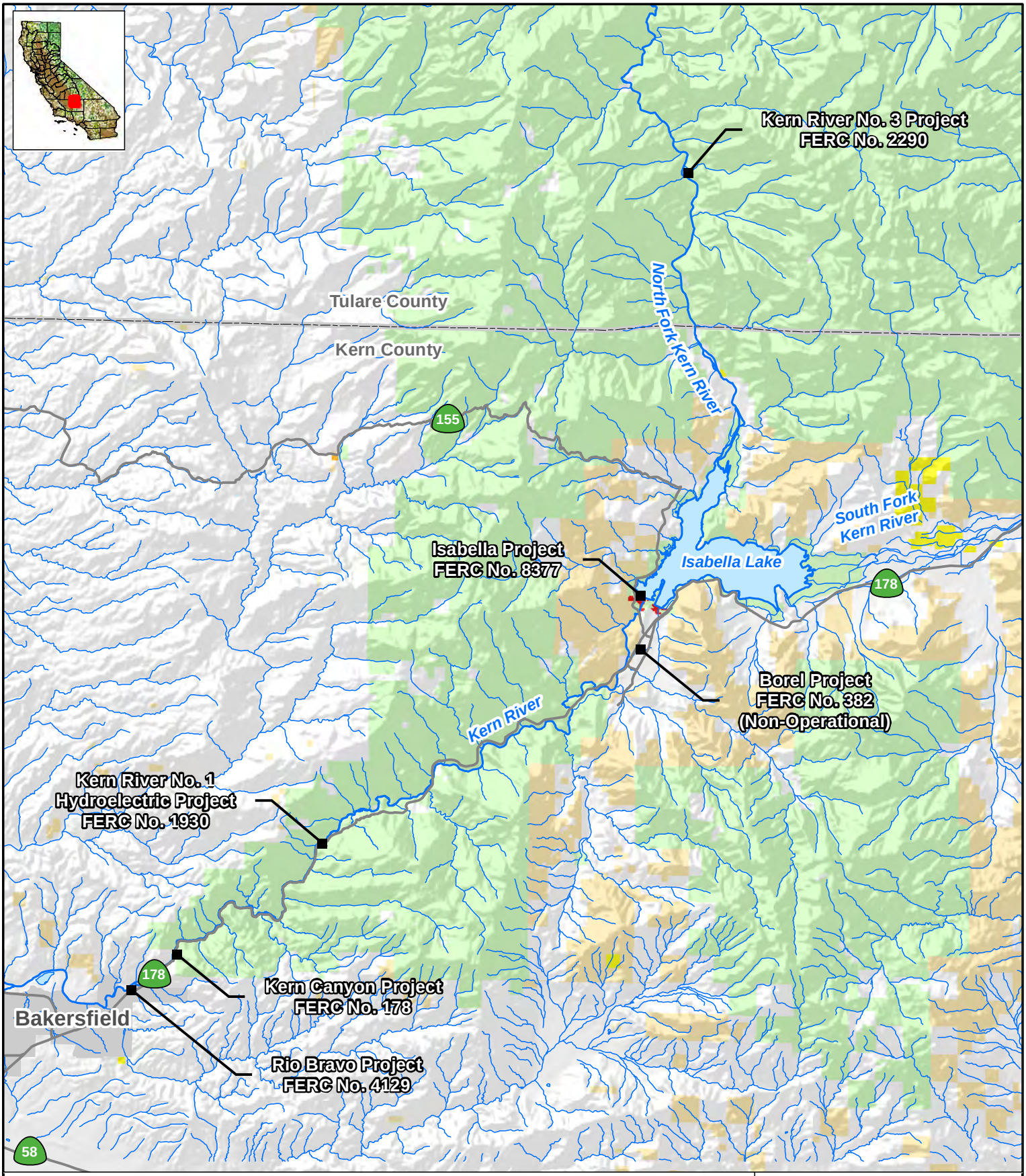

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APPENDICES

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Appendix 7.2-B Table of Monthly Summary Statistics (maximum, minimum, mean discharge) and Exceedances for Gaging Stations (1999–2023) – Inflow, Bypass Reach, and Diversion Conduit Associated with the Kern River No. 1 Hydroelectric Project

Appendix 7.2-C Monthly Mean Flows (cfs) by Year (1999–2023) – Inflow, Bypass Reach and Diversion Conduit Associated with the Kern River No. 1 Hydroelectric Project

Appendix 7.2-D Annual Maximum Peak Flows (cfs) (1999–2023) – Inflow, Bypass Reach, and Diversion Conduit Associated with the Kern River No. 1 Hydroelectric Project

Appendix 7.2-E Example Operations Associated with the Kern River No. 1 Hydroelectric Project

LIST OF ACRONYMS

AQ 1 Study	AQ 1 – Hydrology Study
AQ 1 TM	AQ 1 – Hydrology Technical Memorandum
Basin Plan	Water Quality Control Plan for the Tulare Lake Basin
cfs	cubic feet per second
CRWQCB	California Regional Water Quality Control Board
FERC	Federal Energy Regulatory Commission
MWh	megawatt hours
PM&E	protection, mitigation, and enhancement
Project	Kern River No. 1 Hydroelectric Project
SCE	Southern California Edison
USACE	United States Army Corps of Engineers
USGS	United States Geological Survey
WY	water year

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7.2 WATER USE AND HYDROLOGY

This section describes water use and hydrology in the Kern River, as they relate to Southern California Edison's (SCE) Kern River No. 1 Hydroelectric Project (Project). Federal Energy Regulatory Commission (FERC) regulations require information on water quantity (water use and hydrology) and water quality (chemical/physical parameters) for waters affected by the Project. This section presents information on water quantity. Information on water quality is addressed in Section 7.3, *Water Quality*.

Section 7.2.1 describes the affected environment and resource conditions under current Project operations and maintenance (i.e., baseline condition). Section 7.2.2 identifies proposed environmental measures, management, and monitoring plans (collectively referred to as protection, mitigation, and enhancement measures [PM&E measures]) to be implemented under the Proposed Action (see Appendix E.1 for a full description of proposed PM&E measures). Section 7.2.3 includes an analysis of the potential effects of the Proposed Action, including potential beneficial effects of proposed PM&E measures, on water use and hydrology. Section 7.2.4 describes unavoidable adverse effects[1] of the Proposed Action on water use and hydrology.

7.2.1 Affected Environment

7.2.1.1 Information Sources

This section was developed using existing, relevant, and reasonably available information from the following primary sources. Additional references are cited in the text, as appropriate.

- Stream gaging data from the United States Geological Survey (USGS) (USGS 2024a, 2024b, 2024c) and from SCE
- California Regional Water Quality Control Board (CRWQCB) Water Quality Control Plan for the Tulare Lake Basin (CRWQCB 2018)
- Powerhouse generation data from SCE (SCE 2024)
- SCE Technical Memoranda developed for the relicensing that are provided in Appendix E.2, including:
    - AQ 1 – Hydrology Technical Memorandum (AQ 1 TM) (SCE 2025)

7.2.1.2 Kern River Basin Overview

The Kern River consists of two principal forks, the North Fork and South Fork, and the lower Kern River. Both forks flow south and west, respectively, and converge at Lake Isabella. The lower Kern River exits Lake Isabella and flows west toward the San Joaquin

[1] FERC (2008) defines unavoidable adverse effects as "*any adverse environmental effects that cannot be avoided should the proposal be implemented, as required by 40 CFR, section 1502.14, including effects of protection, mitigation, and enhancement measures.*"

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Valley and terminates in Buena Vista Lake about 20 miles southwest of the City of Bakersfield. The Project is in the lower Kern River, approximately 20 miles downstream of Lake Isabella (see Map 7.1.3). The Project consists of one small reservoir (Democrat Dam Impoundment), an approximately 10.2-mile-long bypass reach of the Kern River, the water diversion and conveyance system to the powerhouse, and the tailrace. Additional information about Project facilities and operations is provided in Section 5.1.2, *Project Facilities*, and Section 5.1.4, *Project Operations*. Additional information about the Kern River Watershed is provided in Section 7.1, *General Description of the River Basin.* As described in Section 7.1 and shown on Map 7.1-3, there are six FERC-licensed hydroelectric projects on the Kern River. In addition, the United States Army Corps of Engineers (USACE) operates Lake Isabella, a major flood control and storage reservoir, located upstream of the Project.

7.2.1.3 Existing Water Uses

This section describes existing water uses including: (1) Project water uses; (2) Project water rights and agreements; and (3) upstream and downstream requirements or constraints that may affect Project operations.

Project Water Uses

Existing beneficial uses that apply to the surface waters within the Kern River Watershed are identified in the Water Quality Control Plan for the Tulare Lake Basin (Basin Plan) (CRWQCB 2018). Beneficial uses identified in the Basin Plan that pertain to the Kern River from Lake Isabella to the Kern River No. 1 powerhouse (inclusive of the Project) include: (1) hydropower generation; (2) water contact recreation (3) non-contact water recreation; (4) warm freshwater habitat; (5) cold freshwater habitat; (6) wildlife habitat; and (7) rare, threatened, or endangered species.

SCE operates the Project in a run-of-river mode for hydroelectric generation. The Project has a single powerhouse containing four generating units. Water is diverted from the Kern River at Democrat Dam and directed through the Project's water conveyance system, comprised of approximately 8.5 miles of tunnels, flumes, and conduits. Water within the conveyance system is directed to a small concrete forebay, through a buried penstock, and into the Project powerhouse. The total installed capacity of the powerhouse is 26.3 megawatts. Water exiting the powerhouse is returned to the Kern River via a short tailrace located on the upstream side of the powerhouse (approximately 10.2 miles downstream of the dam). See Maps 5-3 a-g, *Project Facilities*.

Average annual net generation for the Project under the current FERC license (1999 through 2024) is 123,727 megawatt hours (MWh), with a 5-year average (2020 to 2024) of 146,532 MWh. The Project has experienced periods (days, weeks, and months) of no or reduced generation, which were the result of: (1) planned routine maintenance and inspections; (2) non-routine infrastructure repairs/upgrades; (3) unscheduled (forced) outages due to equipment malfunction; (4) periods of low inflow when SCE was required to meet minimum instream flow requirements in the Kern River downstream of Democrat Dam, and there was insufficient water remaining for generation; and/or (5) pausing generation during increased sediment loads in the Kern River upstream of the Project to

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reduce undue wear on the water conveyance system and generating units. Refer to Exhibit B, Item 2, *Capacity and Production*, of this License Application for additional information on average annual energy production.

The Democrat Dam Impoundment has a surface area of approximately 27 acres and a gross storage capacity of 247 acre-feet at an elevation of 1,913 feet. However, there is no usable storage at the diversion dam. Since Democrat Dam is operated run-of-river and its whole crest is a spillway, the dam regularly spills. Impoundment and tailrace levels are governed by flows in the Kern River, as released upstream from Isabella Dam. At the end of Project's water conveyance system, a small concrete forebay impounds water (less than 1 acre-foot) and is used to regulate flow to the powerhouse.

Project Water Rights / Agreements

The Project operates under Water Right Claim S007761, a pre-1914 water right with a direct diversion limit of 412 cubic feet per second (cfs) and incidental consumptive use at the powerhouse. This water right is senior to the water rights allowing operation at Lake Isabella, as such inflow up to 412 cfs into Lake Isabella must be bypassed through Isabella Dam to avoid injury to SCE.

SCE and the City of Bakersfield have an agreement that allows the City to request SCE reduce its water entitlement deliveries from Lake Isabella, provided the City compensates SCE for the associated loss of generation. In that case, the water remains in Lake Isabella in storage for future water supply deliveries to the City of Bakersfield.

Upstream Requirements or Constraints

Flows upstream of the Project are influenced by the retirement of SCE's Borel Project (FERC No. 382) and USACE's operation of Lake Isabella. SCE's Borel Project was originally licensed in 1925. The original Borel diversion structure is located approximately 4.2 miles upstream of Isabella Dam and the powerhouse is located approximately 7 miles downstream of Isabella Dam. Prior to the construction of Isabella Dam in 1953, the Borel Project was a run-of-river project that diverted water from the North Fork Kern River into an 11.2-mile-long canal and penstock conveyance system to the Borel powerhouse. The Borel Project had a 605 cfs diversion water right to support generation at the powerhouse.

The USACE built Isabella Dam to provide flood protection and water supply for irrigation. Isabella Dam consists of a main dam on the Kern River channel and an auxiliary dam located immediately to the east of the main dam with a main service spillway located between the two. At the time of construction, the Isabella Auxiliary Dam overlaid a portion of the canal system for the Borel Project. In response, the USACE incorporated a controlled conduit through the Isabella Auxiliary Dam to allow continued operation of the Borel Project.

In wet years, Isabella Dam regularly impounded enough water to inundate the open canal and flume system of the Borel Project upstream of the dam. In drier years, when Lake Isabella storage was low, SCE reverted to the original diversion structure (4.2 miles

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upstream of the dam) to divert water from the North Fork Kern River and into the canal/powerhouse.

In 2006, USACE determined that Isabella Dam did not meet earthquake safety standards and reduced the gross pool (restricted gross pool) to 361,250 acre-feet. In 2017, USACE began seismic safety modifications to the Auxiliary Dam that resulted in condemnation of the Borel canal conduit through the dam. The conduit was filled with concrete, cutting off the water supply and preventing the Borel Project from generating power, rendering it non-operational. SCE is currently in the process of surrendering the Borel Project license. The seismic safety modifications at Isabella Dam were completed in 2022. With the seismic safety modifications complete, the gross pool of Lake Isabella is 568,075 acre-feet (USACE 2012).

When it was in operation, the Borel Project would divert up to 605 cfs and return it to the Kern River below the Borel powerhouse. Because the Borel Project is no longer operational, releases for SCE from Lake Isabella have been reduced from a maximum of 605 cfs to 412 cfs (maximum capacity of the Kern River No. 1 Project). Given the current non-operative status of the Borel Project, inflow to the Kern River No. 1 Project is primarily a function of spill, minimum flow releases from the Isabella Dam, and additional irrigation releases as directed by the Kern River Watermaster. During the winter and spring runoff seasons, Lake Isabella stores water and then releases high flows in summer for agricultural uses. An example of typical annual Lake Isabella operations is shown in Figure 7.2-1.

Downstream Requirements or Constraints

Water exiting the Kern River No. 1 tailrace is immediately impounded behind Kern and Tule LLC's diversion for the Kern Canyon Project. Diverted water from the Kern Canyon Project is released back into the Kern River 1.6 miles downstream at the Kern Canyon powerhouse and then diverted again approximately 500 feet downstream by the Olcese Water District for its Rio Bravo Project. The Rio Bravo Project returns diverted water back to the Kern River 2 miles downstream at the Rio Bravo powerhouse. From this point, the Kern River continues downstream into the City of Bakersfield and the Central Valley where it is almost entirely utilized by consumptive uses. The Kern River terminates at Buena Vista Lake, a landlocked topographical depression located approximately 20 miles southwest of Bakersfield.

7.2.1.4 Hydrology

This section describes: (1) existing FERC license flow requirements, (2) flow gages used for Project operations and/or compliance, and (3) hydrology associated with operation of the Project.

Existing FERC License Flow Requirements

SCE’s existing license for the Project includes minimum instream flow requirements in the bypass reach and run-of-river operations. The minimum instream flow requirement is 50 cfs or inflow, whichever is less, from June 1 through September 30, and 15 cfs or inflow, whichever is less, from October 1 through May 31 of each year (Table 7.2-1).

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Flow Gages

SCE operates and maintains the following USGS gaging stations to monitor and record flows associated with Project operations (Table 7.2-2):

- USGS Gage No. 11192500; SCE Gage No. 409 (Kern River near Democrat Springs) – This gage is located about 0.4 mile downstream of the diversion dam. Streamflow is measured using a float and recorder. Data collected from this gage represents flow in the Kern River, below the diversion dam. Monthly flow statistics are shown in Table 7.2-3 (SCE 2024).

- USGS Gage No. 11192000; SCE Gage No. 410 (Kern River No. 1 Conduit near Democrat Springs) – This gage is located on the Kern River No. 1 flowline near Cow Flat Creek. Streamflow is measured using a float and recorder. Data collected from this gage represents flow diverted for generation at the Project. Monthly flow statistics are shown in Table 7.2-4 (SCE 2024).

The USGS also identifies Gage No. 11192501 (Kern River near Democrat Springs) in its records. Data for this gage is computed by combining the data collected in the bypass reach (USGS Gage No. 11192500) and the flowline (USGS Gage No. 11192000). For record keeping purposes, the USGS has numbered this gage 11192501 and compiles data as if it were an actual gage. The location of the flow gages associated with the Project are shown on Map 5-3a and 5-3c.

Hydrology Associated with Project Operations

Project-related Stream Flows

The period of record used to characterize flows associated with the Project extends from water year 1999 through water year 2023 (October 1, 1998, through September 30, 2023) (SCE 2025). This period represents Project operations since the issuance of the current FERC license in 1998. USGS data is missing in water year 2004 for the Kern River near Democrat Springs gage (USGS Gage No. 11192500; SCE Gage No. 409). This data gap was addressed by using SCE stream flow records.

Diversion amounts and timing are a function of several factors including Project inflow, existing water rights, minimum instream flow releases, and flowline capacity. Total annual inflow into the Project in water years 1999–2023 ranged from approximately 135,000 acre-feet (2015) to over 1,903,000 acre-feet (2023). The median total annual inflow was approximately 614,000 acre-feet during this period (Figure 7.2-2).

Monthly flow exceedances and mean monthly flows in the bypass reach and diversions to the powerhouse are shown in Figure 7.2-3, Figure 7.2-4, and Figure 7.2-5.

Flows in the bypass reach are most consistently high in the April through August period (Figure 7.2-5). Mean monthly flows typically range from approximately 100 cfs in November and December to more than 1,500 cfs in June; the maximum annual flow most often occurs in June or July (Figure 7.2-6). The highest mean daily flow measured in the bypass reach during the current license period was 7,620 cfs on May 26, 2023. The

highest mean daily flow measured in the flowline during the current license period was 421 cfs (May 5, 2001), which is slightly greater than the Project's 412 cfs capacity, likely a result of minor measurement errors at the gage.

COMPARISON OF REGULATED PROJECT INFLOWS AND REGULATED FLOWS RELEASED INTO THE BYPASS REACH

Flows in the Kern River upstream and downstream of Democrat Dam were compared using gage data from the bypass reach and the flowline. Project inflow was calculated as the sum of flow at these two gages and represents the streamflow that would be present without the diversion of water at Democrat Dam, whereas the regulated releases into the bypass reach is a result of existing Project operations.

As noted above, flows at the Project are heavily influenced by storage and releases at Lake Isabella. Figure 7.2-7 shows the mean monthly Project inflow above Democrat Dam and releases to the bypass reach below Democrat Dam, where the flow above the dam is the sum of USGS gages 11192000 and 11192500, and the regulated release into the bypass reach is USGS gage 11192500.

A detailed summary of the hydrology (inflow, bypass reach, and conveyance) using Project gages is provided in the following appendices:

- Appendix 7.2-A provides daily flow graphs (1999–2023) for inflow, the bypass reach, and the diversion conduit associated with the Project.
- Appendix 7.2-B includes tables of monthly summary statistics (minimum, maximum, and mean discharge) and exceedances (10 percent, 50 percent, and 90 percent) for gaging stations (1999–2023) for inflow, the bypass reach, and the diversion conduit associated with the Project.
- Appendix 7.2-C includes tables summarizing mean monthly flows (1999–2023) for inflow, the bypass reach, and the diversion conduit associated with the Project.
- Appendix 7.2-D includes a table summarizing instantaneous peak annual flows (1999–2023) for inflow, the bypass reach, and the diversion conduit associated with the Project.
- Appendix 7.2-E includes two figures showing example operations of the Project in 2013 and 2020.

Summary of 2024 AQ 1 – Hydrology Study

SCE completed the AQ 1 – Hydrology Study (AQ 1 Study) in 2024 as required by FERC's study plan determination. Results of the study were compiled in the AQ 1 TM, which was filed with the Initial Study Report in March 2025 and is provided in Appendix E.2. As described in AQ 1 TM, the objectives of the study were as follows:

- Develop a model of Project operations with and without the Project diversion and refine the analysis of hydrology presented in the Pre-Application Document.

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- Perform a hydrologic alteration analysis of flows related to Project diversions.

The study provided calibration and validation information on the Project Operations model, information about the development of Project hydrology, the existing condition flow statistics, and results of the hydrologic alteration analysis (e.g., Figure 7.2-7). The results of the AQ 1 Study were used specifically to provide flow data to inform the statistics, tables, and figures shown in this analysis.

7.2.2 Proposed Environmental Measures

Under the Proposed Action, SCE proposes to implement PM&E measures associated with ongoing Project operation and maintenance activities. PM&E measures are designed to protect, maintain, or enhance environmental and cultural resources over the term of the new license. SCE proposes implementing the following PM&E measures related to water use and hydrology:

- Minimum Instream Flow Measure
- Stream Gaging Plan

Appendix E.1 provides complete descriptions of measures SCE is proposing as part of the license application and to include in any new license issued for the Project.

7.2.3 Potential Project Effects

This section describes the potential effects to water use and hydrology that could occur because of continued operation and maintenance activities to be implemented under the Proposed Action. Potential effects are determined by analyzing the changes in water use and hydrology that may result from activities implemented under the Proposed Action (Section 5.2) compared to the No-Action Alternative (existing condition) (Section 5.1). Final effects determinations consider PM&E measures to be included under the Proposed Action (refer to Appendix E.1).

Under the Proposed Action, SCE would continue to operate and maintain the Project as described in Section 5.1, *No-Action Alternative*, with minor adjustments to Project operation and maintenance activities in response to implementing proposed PM&E measures. No new or upgraded facilities, structural changes, or operational changes to the Project are proposed.

Consistent with FERC's Scoping Document 2 (FERC 2023), this section evaluates potential effects of continued Project operation on the following:

- Hydrology and water availability in the bypass reach.
- Hydrology and water availability of the lower Kern River downstream of the Kern River No. 1 powerhouse.

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7.2.3.1 Hydrology and Water Availability in the Project Bypass Reach

SCE's existing license for the Project includes minimum instream flow requirements in the bypass reach. The minimum instream flow requirement is 50 cfs or inflow, whichever is less, from June 1 through September 30, and 15 cfs or inflow, whichever is less, from October 1 through May 31 of each year. As described in the Proposed Action and the Minimum Instream Flow Measure, SCE is proposing to provide and maintain the same minimum flows as currently licensed. As such, the Proposed Action would have no effect on hydrology, water quantity, water availability, or water use in the bypass reach as compared to the No-Action Alternative. SCE's proposed Stream Gaging Plan describes compliance gage operation and maintenance, dissemination of real-time flow information, and annual reporting.

7.2.3.2 Hydrology and Water Availability Downstream of the Kern River No. 1 Powerhouse

As described above, flows in the lower Kern River are heavily influenced by USACE's operations and maintenance of the Isabella Dam. Flows released at Lake Isabella are either diverted to the Project powerhouse or pass over the Democrat Dam spillway to downstream reaches of the river and are then used for hydropower generation or irrigation at facilities downstream of the Project. SCE is proposing no changes to project operations or diversions to the powerhouse. The Proposed Action would divert up to 412 cfs into the flowline and conveyance system for hydropower generation. Water diverted from the Kern River at Democrat Dam would be returned to the Kern River below the powerhouse. As such, the Proposed Action would have no effect on hydrology, water quantity, water availability, or water use in the Kern River downstream of the Project.

7.2.3.3 Unavoidable Adverse Effects

There are no unavoidable adverse effects to water use and hydrology from continued operation and maintenance of the Project under the Proposed Action.

7.2.4 References

CRWQCB (California Regional Water Quality Control Board). 2018. Water Quality Control Plan for the Tulare Lake Basin. Central Valley Region. Third Edition. Revised May 2018.

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USACE (United States Army Corps of Engineers). 2012. *Isabella Dam Safety Modification Project Environmental Impact Statement, Final*. Available online:

https://www.spk.usace.army.mil/Portals/12/documents/usace_project_public_notices/Isabella%20Lake%20Dam%20Safety%20Modification%20Project%20Final%20EIS.pdf. Accessed August 2025.

USGS (United States Geological Survey). 2024a. USGS 11192000 Kern River No 1 Conduit NR Democrat Springs CA. Available online: http://waterdata.usgs.gov/nwis/dv/?site_no=11192000.

_____. 2024b. USGS 11192500 Kern River NR Democrat Springs (River Only) CA. Available online: http://waterdata.usgs.gov/nwis/dv/?site_no=11192500.

_____. 2024c. USGS 11192501 Kern River NR Democrat Springs (Total Flow) CA. Available online: http://waterdata.usgs.gov/nwis/dv/?site_no=11192501.

TABLES

Table 7.2-1. Minimum Instream Flow Requirements below Democrat Dam

Month	Flow Requirement in Kern River below Democrat Dam[1] (cfs)
October	15
November	15
December	15
January	15
February	15
March	15
April	15
May	15
June	50
July	50
August	50
September	50

Notes: [1]Minimum instream flow requirement is the lesser of inflow to Democrat Dam or the value listed in the table.
cfs = cubic feet per second

Table 7.2-2. Project Flow Gages

Gage Name	SCE Gage Number	USGS Station Number	Data Obtained	Period of Record	Lat, Long
Kern River near Democrat Springs	409	11192500	Measures flow in the Kern River below Democrat Dam (flow in the bypass reach)	7/26/1950 – present (missing water year 2004)	35°31’15”, 118°40’34”
Kern River No. 1 Conduit near Democrat Springs	410	11192000	Measures flow present in the water conveyance system (near Cow Flat Creek)	10/1/1975 – present	35°29’50”, 118°41’30”
Kern River near Democrat Springs + Conduit	N/A	11192501	Represents inflow into the project (Democrat Dam Impoundment) and is computed by combining the data collected in the bypass reach below the dam (Gage 11192500) and the water conveyance system (Gage 11192000)	7/26/1950 – present	Computed Gage

Notes: SCE = Southern California Edison
USGS = United States Geological Survey

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Table 7.2-3. Monthly Flow Statistics for Democrat Dam Bypass Reach, USGS Gage 11192500, SCE Gage 409, 1999–2023[a]

Month	Mean of Monthly Daily Flow (cfs)	Minimum of Monthly Daily Flow (cfs)	Maximum of Monthly Daily Flow (cfs)
October	257	15	1,478
November	133	15	1,430
December	115	16	3,417
January	224	18	2,763
February	288	17	4,347
March	447	15	4,290
April	743	15	6,083
May	1,212	16	7,231
June	1,530	53	7,026
July	1,182	56	5,150
August	721	54	3,358
September	413	51	3,661

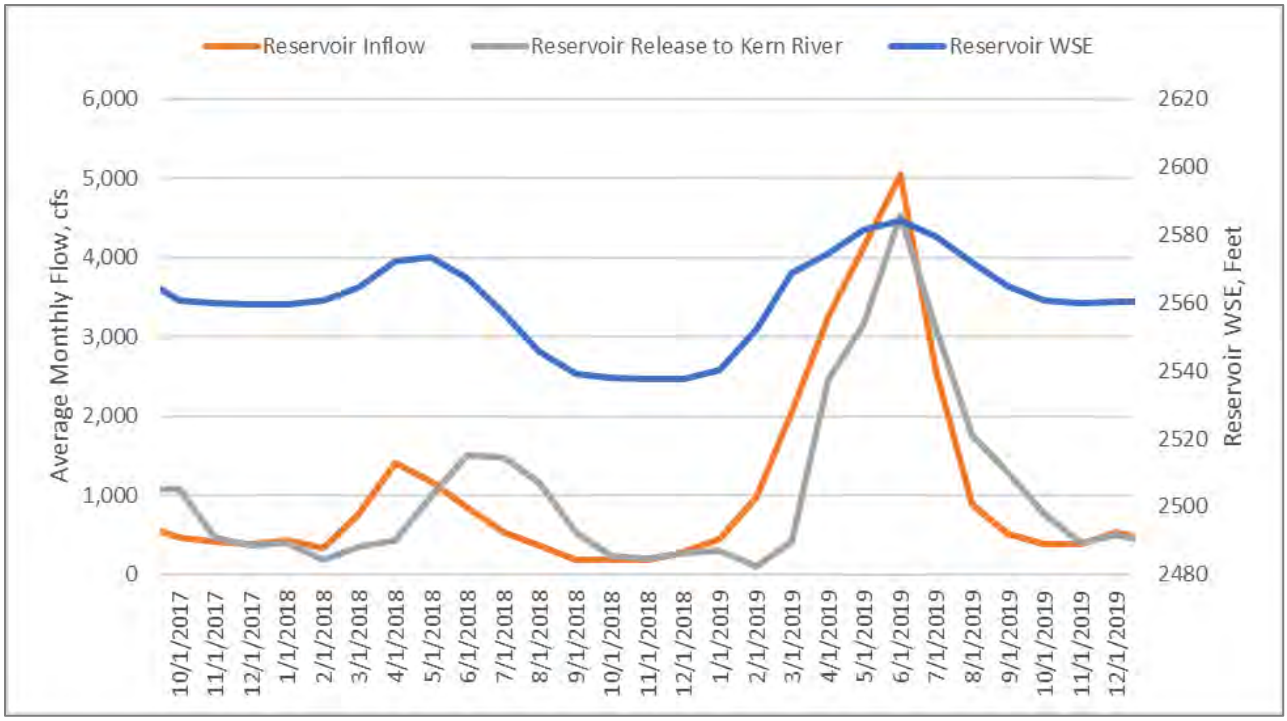
Notes: [a] Includes months and years when the Project was off-line (not generating) or had reduced generation capacity (only utilizing one unit) due to extended maintenance outages.
Key: cfs = cubic feet per second

Table 7.2-4. Monthly Flow Statistics for Kern River No 1 Conduit, USGS Gage 11192000, SCE Gage 410, 1999–2021[a]

Month	Mean of Monthly Daily Flow (cfs)	Minimum of Monthly Daily Flow (cfs)	Maximum of Monthly Daily Flow (cfs)
October	185	0	396
November	169	0	384
December	174	0	382
January	174	0	395
February	163	0	390
March	231	0	421[b]
April	289	0	421[b]
May	318	0	421[b]
June	345	0	418[b]
July	328	1	407
August	292	0	400
September	212	0	396

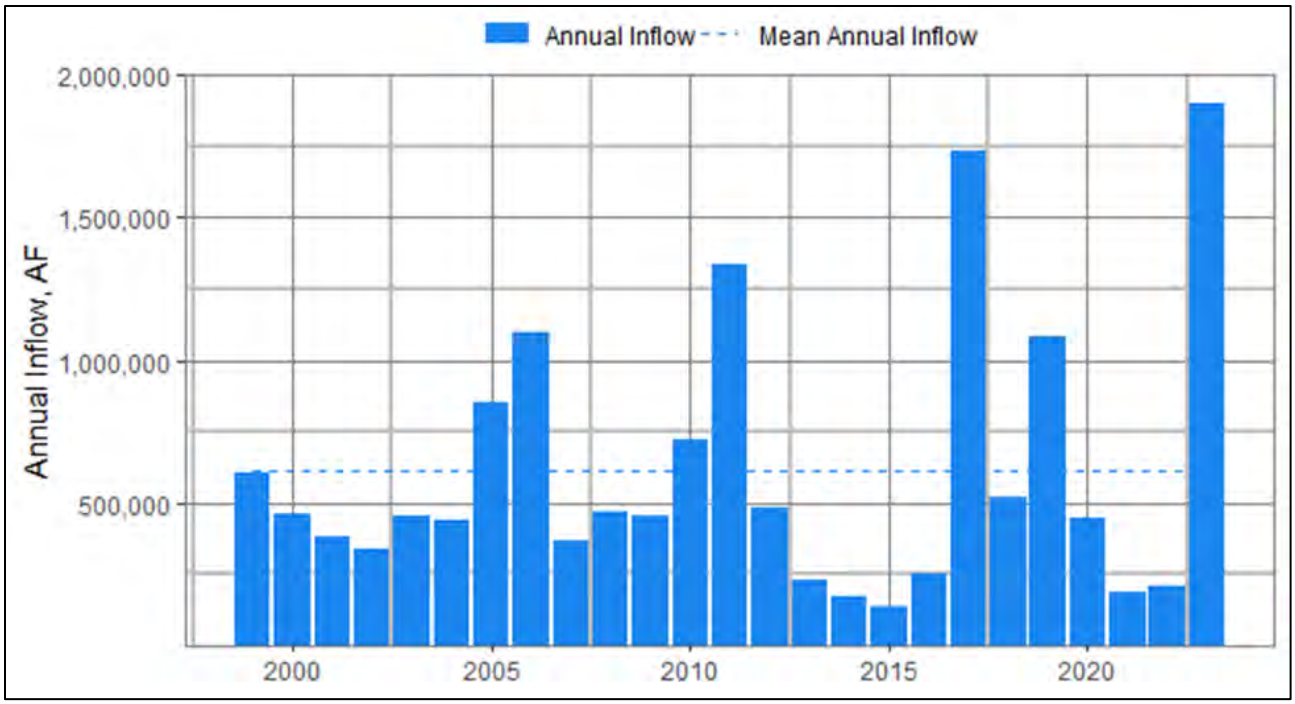
Notes: [a] Includes months and years when the Project was off-line (not generating) or had reduced generation capacity (only utilizing one unit) due to extended maintenance outages.
[b] Values above 412 cfs are likely due to gaging inaccuracy.
Key: cfs = cubic feet per second

FIGURES



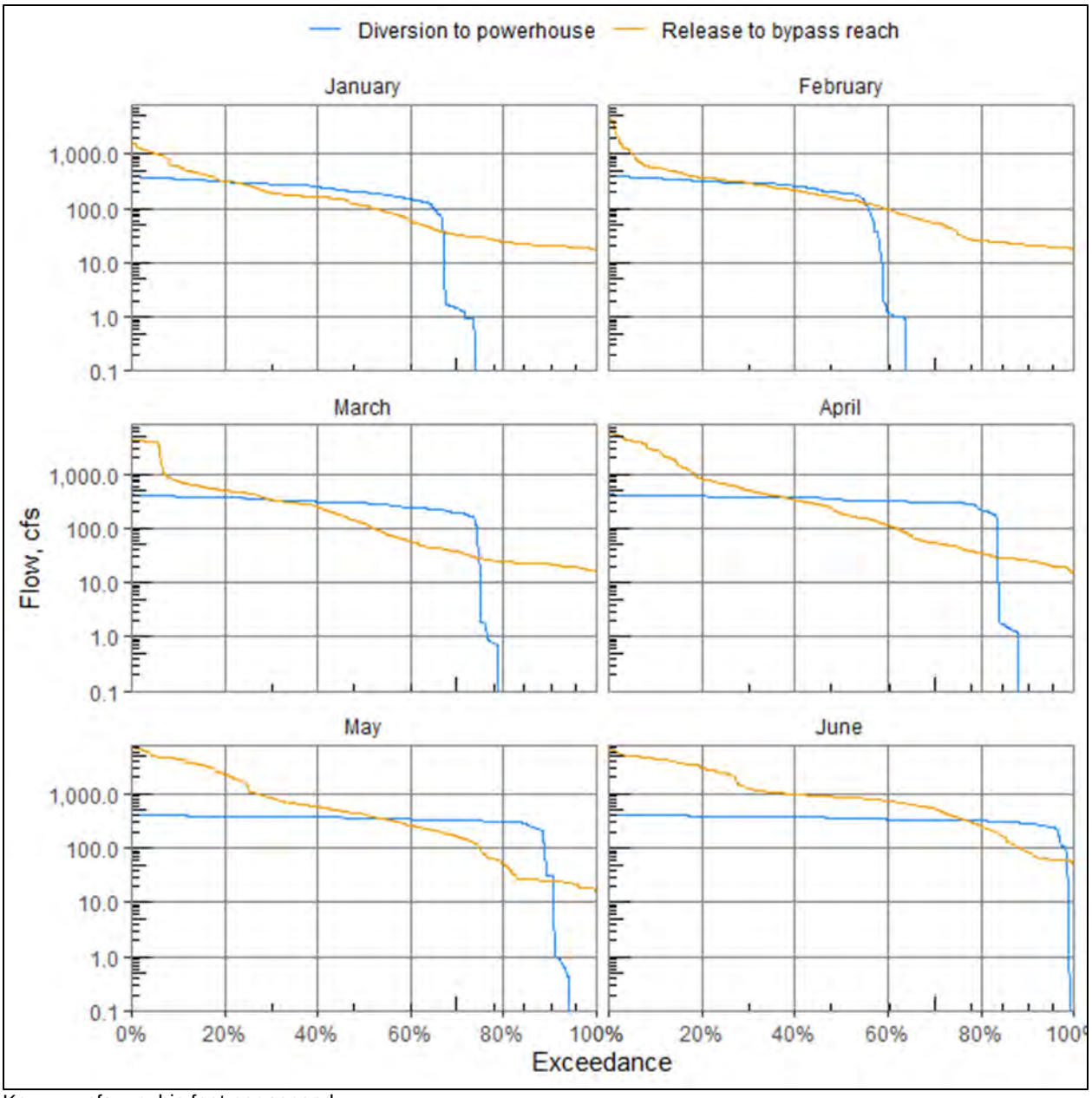
Key: cfs = cubic feet per second
WSE = water surface elevation

Figure 7.2-1. Monthly Inflows and Outflows at Lake Isabella (2017–2019).



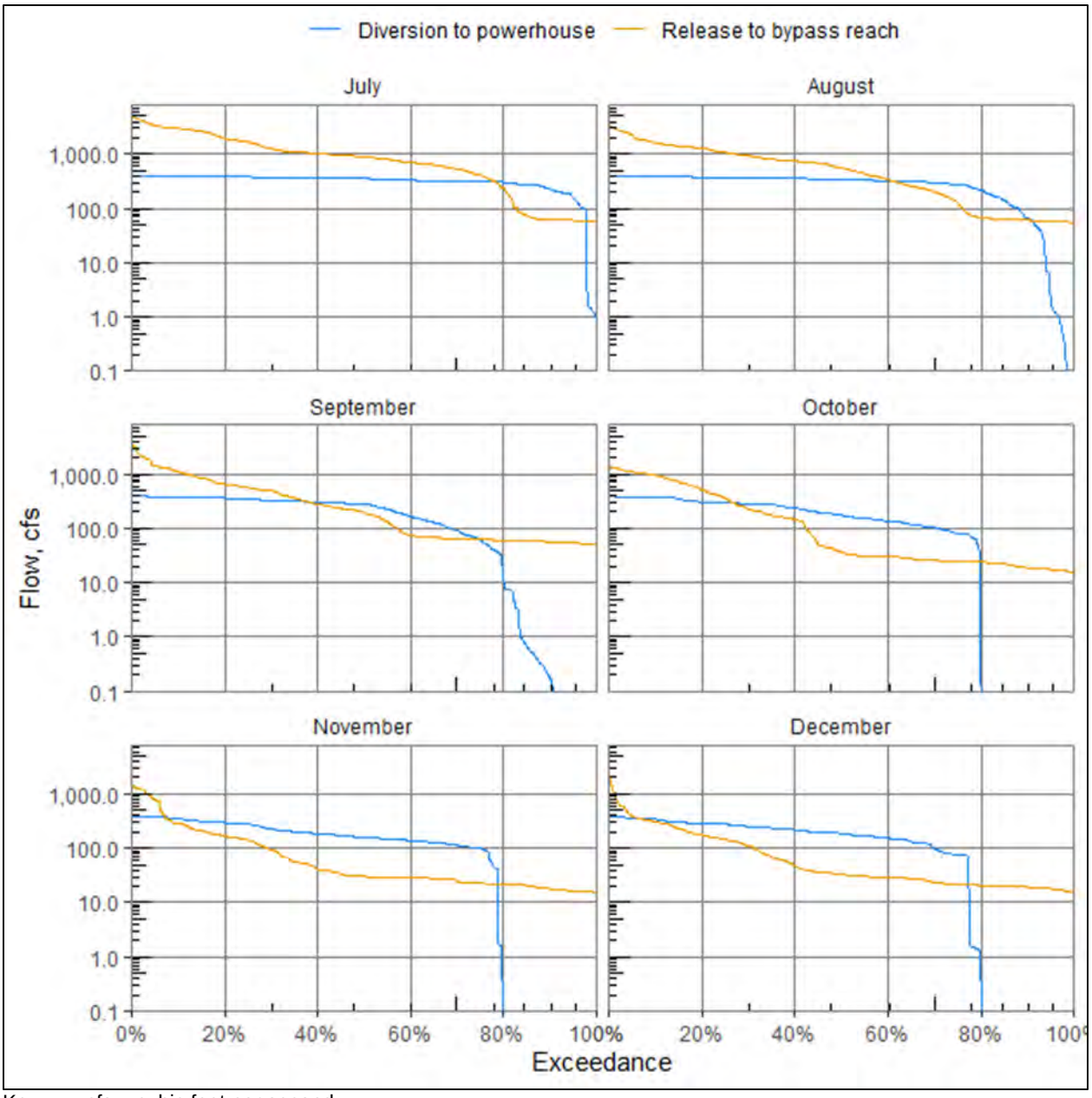
Key: AF = acre-feet

Figure 7.2-2. Annual Inflow (acre-feet) to the Project, Water Years 1999–2023.



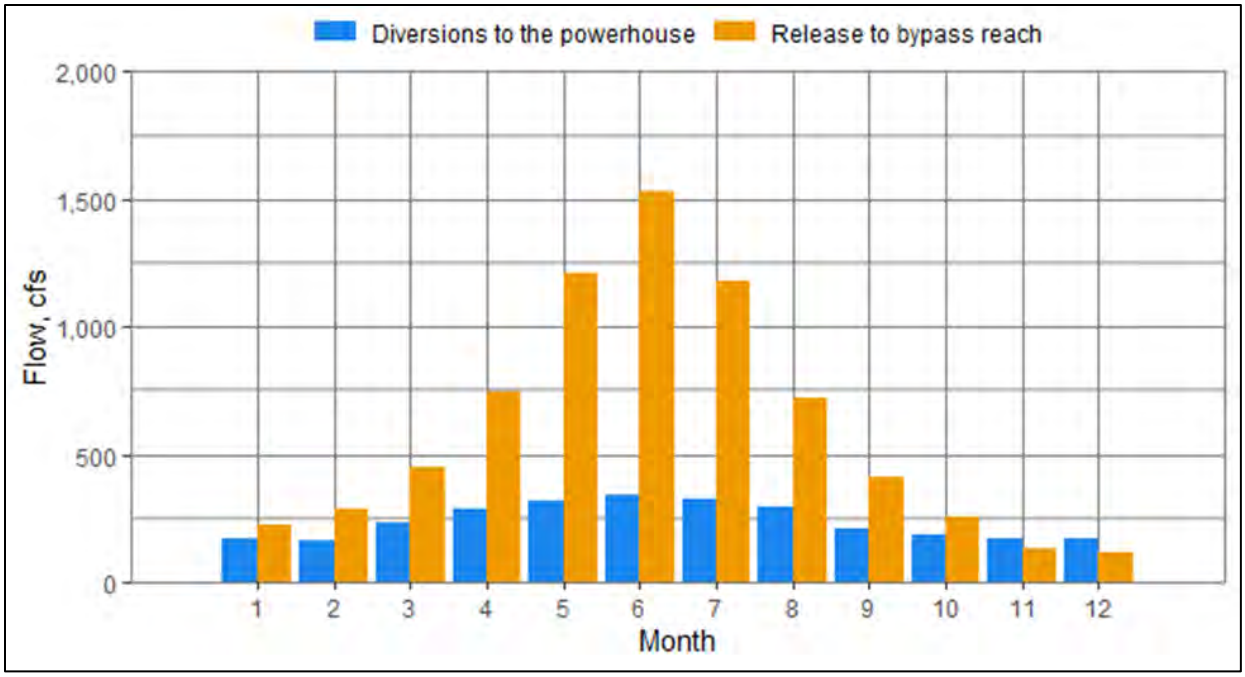
Key: cfs = cubic feet per second

Figure 7.2-3. Monthly flow exceedances (January–June) for releases to the bypass reach and diversions to the powerhouse (water years 1999–2023).



Key: cfs = cubic feet per second

Figure 7.2-4. Monthly flow exceedances (July through December) for releases to the bypass reach and diversions to the powerhouse (water years 1999–2023).



Key: cfs = cubic feet per second

Figure 7.2-5. Mean monthly flow releases to the bypass reach and diversions to the powerhouse (water years 1999–2023).

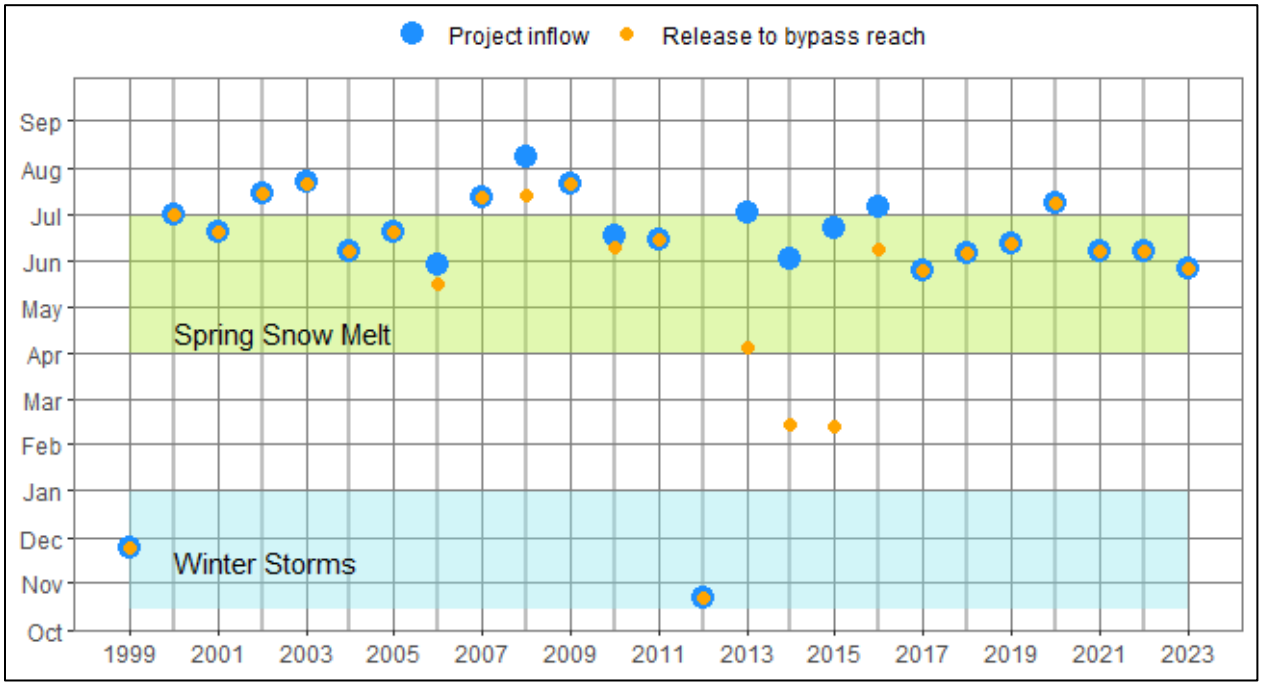
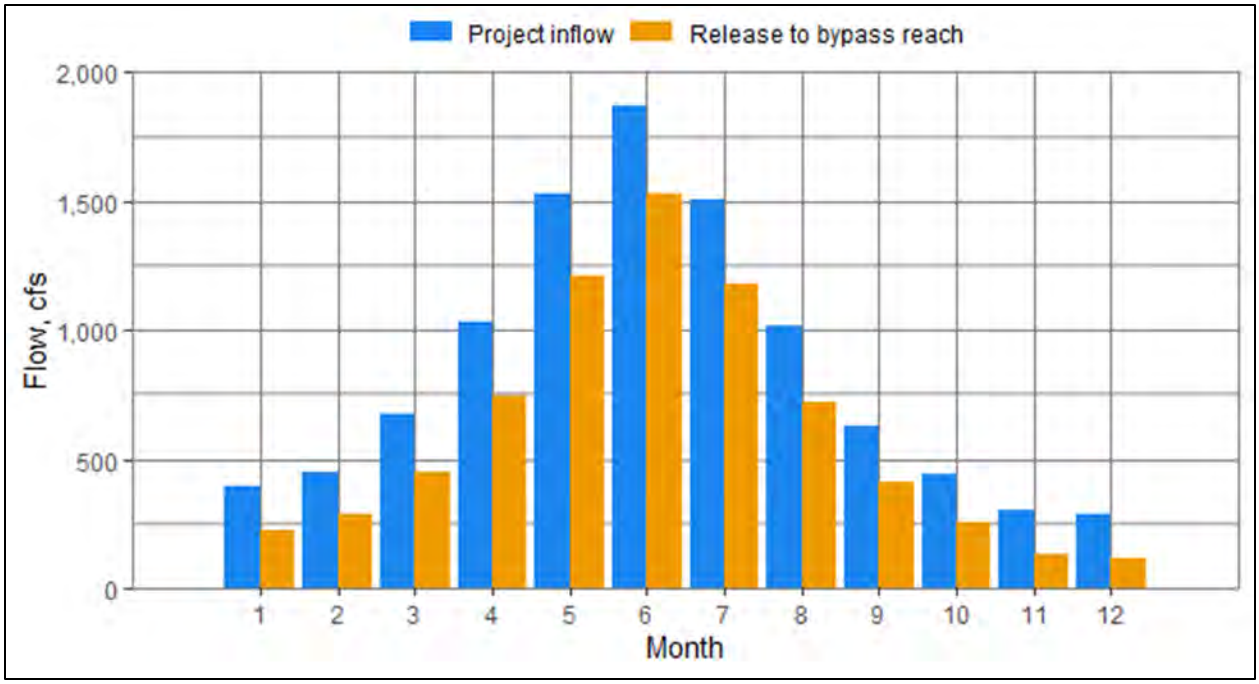


Figure 7.2-6. Date of annual maximum flow for the Kern River in the bypass reach below Democrat Dam (water years 1999–2023).



Key: cfs = cubic feet per second

Figure 7.2-7. Mean monthly Project inflow above Democrat Dam and releases to the bypass reach below Democrat Dam, water years 1999–2023.

APPENDIX 7.2-A

Mean Daily Flow (1999–2023) – Inflow, Bypass Reach, and Diversion Conduit Associated with the Kern River No. 1 Hydroelectric Project

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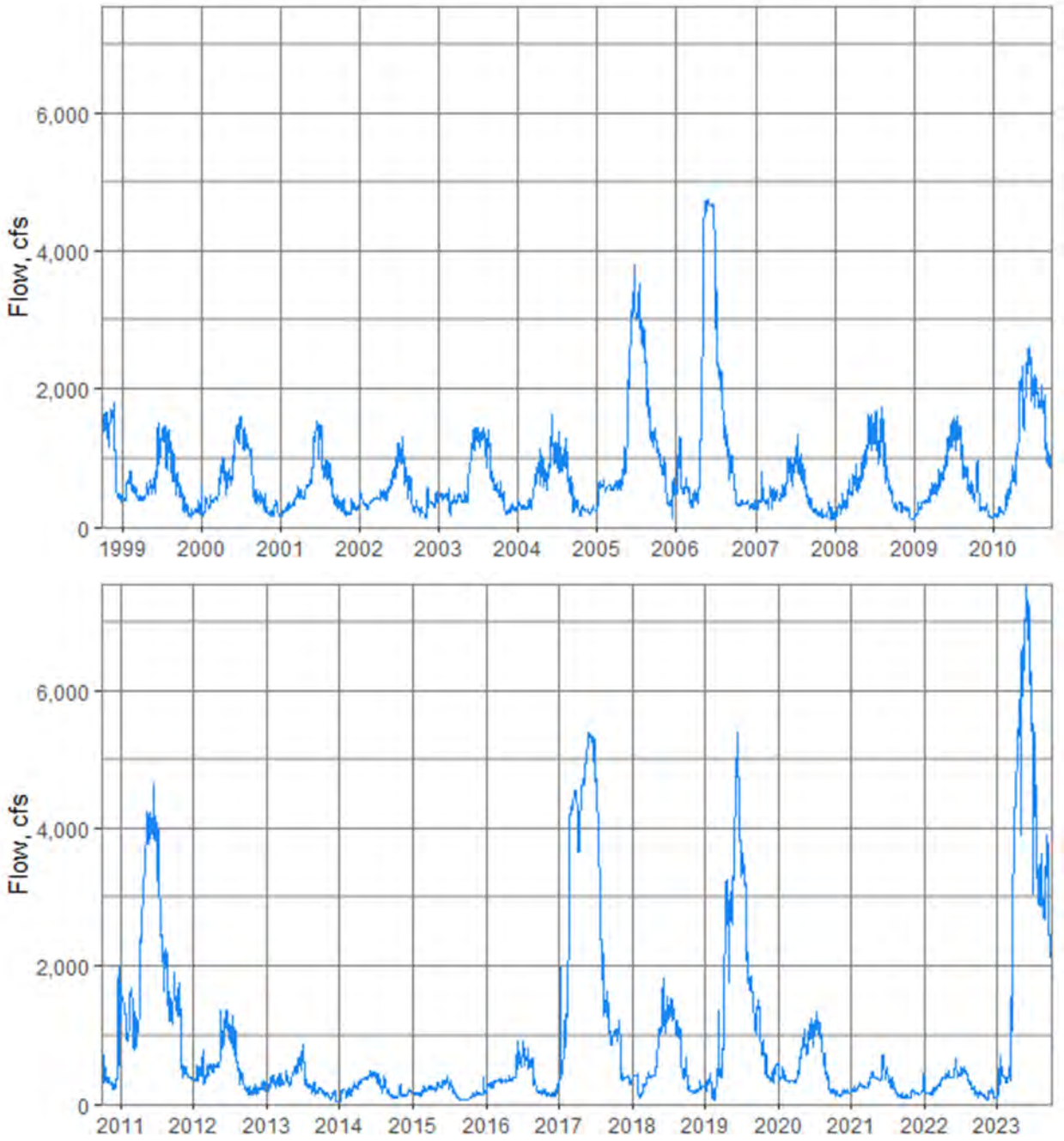

Figure 7.2-A-1. Mean daily Project inflow, water years 1999–2023.

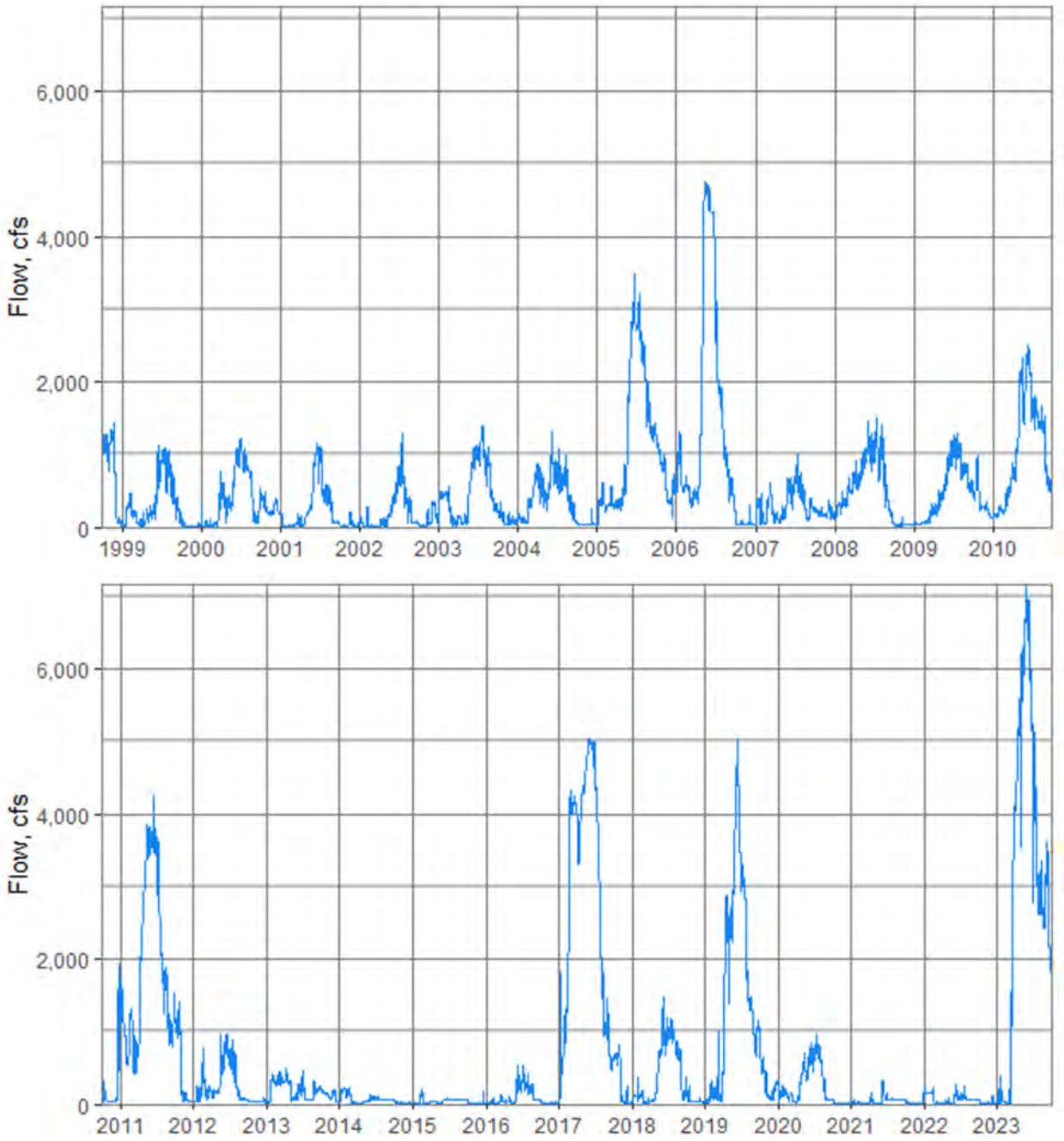

Figure 7.2-A-2. Mean daily release to the bypass reach, water years 1999–2023.

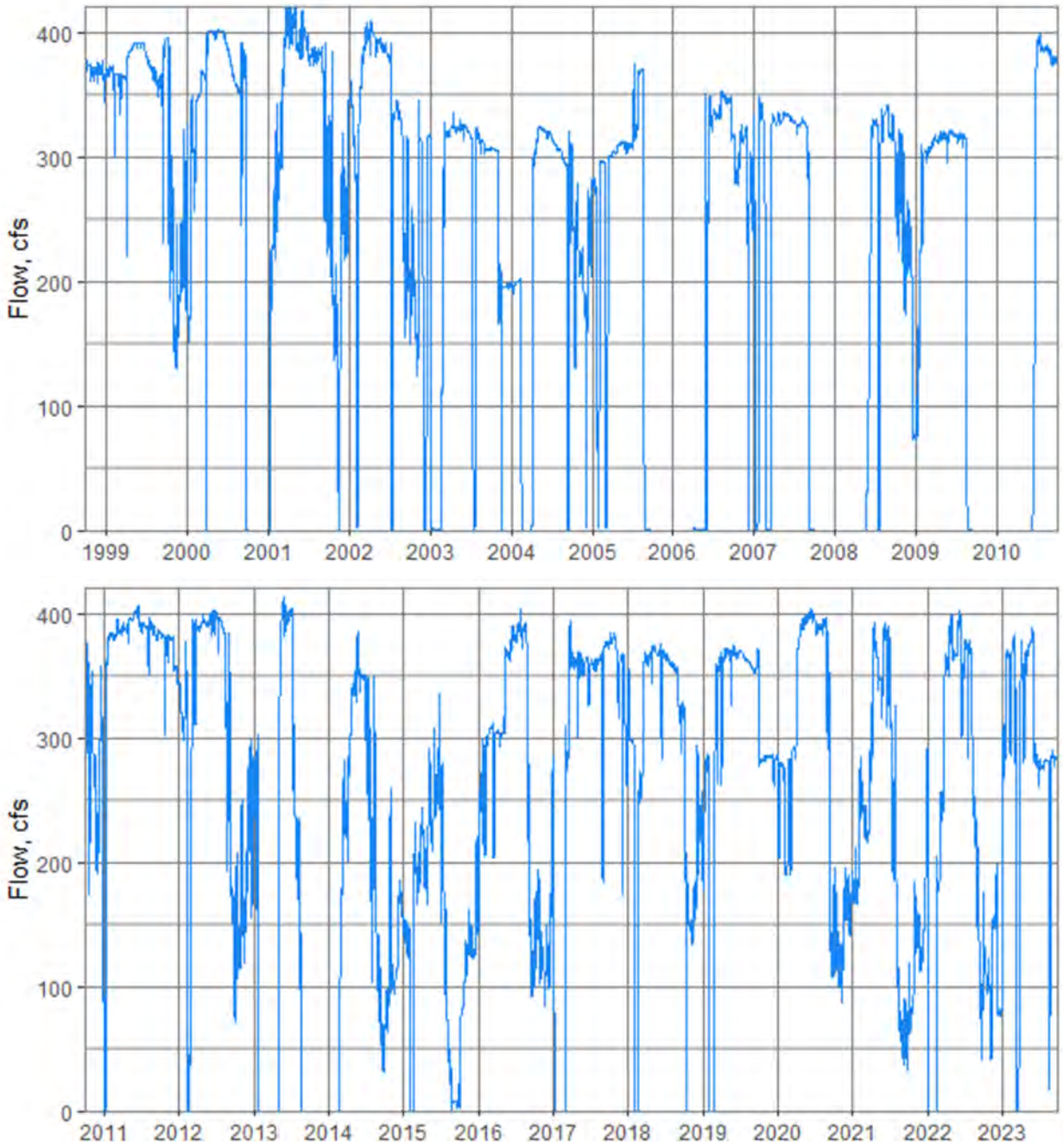

Figure 7.2-A-3. Mean daily diversion to the Project powerhouse, water years 1999–2023.

APPENDIX 7.2-B

Table of Monthly Summary Statistics (maximum, minimum, mean discharge) and Exceedances for Gaging Stations (1999–2023) – Inflow, Bypass Reach, and Diversion Conduit Associated with the Kern River No. 1 Hydroelectric Project

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Table 7.2-B-1. Table of monthly summary statistics and exceedances, Project inflow, cfs, water years 1999–2023.

Month	Mean	Min	Max	90% Exd	50% Exd	10% Exd
January	398	159	1,403	180	316	664
February	453	146	2,277	176	344	626
March	678	219	4,412	278	442	861
April	1,032	231	5,414	349	537	2,486
May	1,530	276	6,868	384	802	4,257
June	1,875	325	5,962	500	1,283	4,421
July	1,510	238	3,891	357	1,257	3,057
August	1,013	94	3,099	249	952	1,828
September	625	68	2,674	147	466	1,296
October	441	105	1,499	147	270	1,034
November	302	117	1,515	134	224	459
December	289	72	749	166	258	483

Notes: Exd = exceedance

Table 7.2-B-2. Table of monthly summary statistics and exceedances, flow in the bypass reach, cfs, water years 1999–2023.

Month	Mean	Min	Max	90% Exd	50% Exd	10% Exd
January	224	20	1,152	31	126	589
February	289	22	2,276	26	134	482
March	447	19	4,095	23	153	621
April	743	25	5,076	32	207	2,116
May	1,212	23	6,492	32	433	4,069
June	1,530	63	5,666	132	904	4,085
July	1,182	59	3,612	86	883	2,689
August	721	59	2,836	62	611	1,449
September	413	54	2,391	58	192	1,011
October	257	17	1,127	21	51	868
November	133	16	1,146	19	42	242
December	115	17	530	22	45	245

Notes: Exd = exceedance

Table 7.2-B-3. Table of monthly summary statistics and exceedances, diversion to powerhouse, cfs, water years 1999–2023.

Month	Mean	Min	Max	90% Exd	50% Exd	10% Exd
January	174	0	369	0	190	317
February	163	0	381	0	155	337
March	231	0	390	0	282	371
April	289	0	404	2	337	395
May	318	0	401	129	359	395
June	345	187	399	286	362	398
July	328	173	394	256	335	389
August	292	33	388	117	332	381
September	212	0	384	3	234	371
October	185	0	380	0	161	355
November	169	0	379	0	157	338
December	174	0	367	0	178	301

Notes: Exd = exceedance

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APPENDIX 7.2-C

Monthly Mean Flows (cfs) by Year (1999–2023) – Inflow, Bypass Reach and Diversion Conduit Associated with the Kern River No. 1 Hydroelectric Project

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Table 7.2-C-1. Mean monthly flow (cfs) by year (1999–2023), Project inflow.

WY	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
1999	1,462	1,515	469	496	659	442	461	605	1,065	1,257	1,028	620
2000	339	188	253	306	359	515	782	796	1,329	1,337	964	466
2001	335	200	258	220	306	431	478	697	1,302	1,007	703	374
2002	270	224	295	382	334	410	458	544	897	951	595	282
2003	219	321	376	442	358	376	409	668	1,289	1,329	1,099	629
2004	484	225	278	316	303	552	841	802	1,205	1,026	808	426
2005	246	235	258	532	577	573	632	1,369	3,150	3,028	2,193	1,318
2006	991	611	492	872	574	388	808	4,451	4,331	2,474	1,369	777
2007	360	359	308	368	402	442	442	606	851	981	618	297
2008	213	162	207	234	344	556	677	962	1,389	1,311	1,156	506
2009	312	274	165	226	363	465	614	806	1,283	1,389	952	611
2010	608	269	184	187	253	547	919	1,897	2,358	2,011	1,722	978
2011	467	292	749	1,403	1,255	1,053	2,471	3,966	4,075	3,068	1,898	1,466
2012	1,499	476	394	401	487	498	537	826	1,152	968	506	246
2013	178	204	265	307	325	311	360	446	596	406	241	197
2014	160	117	72	175	154	248	327	388	429	324	262	131
2015	156	128	182	159	178	219	231	276	325	238	94	68
2016	105	151	168	276	313	343	341	381	684	698	527	208
2017	176	144	196	752	2,277	4,412	4,291	5,026	5,216	3,705	1,589	1,047
2018	1,062	433	350	395	174	345	426	969	1,435	1,385	1,080	508
2019	212	186	265	301	146	545	2,496	3,242	4,481	3,039	1,720	1,264
2020	761	391	508	413	344	330	584	885	1,067	1,130	646	257
2021	161	154	183	202	273	261	399	370	527	313	154	116
2022	117	164	224	172	191	304	405	409	482	475	308	172
2023	142	125	125	408	370	2,378	5,414	6,868	5,962	3,891	3,099	2,674

Notes: WY = water year

Table 7.2-C-2. Mean monthly flow (cfs) by year (1999–2023), release to bypass reach.

WY	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
1999	1,089	1,146	101	126	300	80	85	215	675	883	665	249
2000	31	23	24	48	32	188	382	396	931	961	611	166
2001	335	200	258	74	22	55	74	302	905	626	321	58
2002	25	82	29	54	75	20	60	152	511	659	264	54
2003	23	63	217	408	323	67	85	345	967	1,115	784	322
2004	178	50	81	119	197	552	582	479	886	715	507	192
2005	30	29	60	329	292	384	327	1,059	2,841	2,696	1,952	1,318
2006	991	611	492	872	574	388	806	4,403	4,044	2,139	1,021	443
2007	64	42	69	178	189	303	112	274	520	655	292	253
2008	213	162	207	234	344	556	677	937	1,104	1,029	824	191
2009	29	38	32	42	59	153	299	490	965	1,074	816	611
2010	608	269	184	187	253	547	919	1,897	2,171	1,621	1,338	601
2011	136	29	530	1,152	873	664	2,082	3,569	3,678	2,679	1,509	1,082
2012	1,127	97	36	78	332	153	146	433	756	575	157	68
2013	33	31	35	147	325	311	357	75	198	116	137	197
2014	160	117	72	175	134	25	25	37	83	67	65	64
2015	25	22	21	20	101	24	28	25	63	64	61	60
2016	18	17	25	23	27	53	37	30	305	310	162	62
2017	26	22	20	711	2,276	4,095	3,931	4,666	4,862	3,345	1,247	675
2018	682	80	36	112	105	33	61	599	1,073	1,021	724	186
2019	51	29	30	78	120	191	2,138	2,875	4,112	2,672	1,359	905
2020	478	106	226	144	121	73	207	491	668	741	265	61
2021	17	16	17	23	25	19	44	23	154	59	59	58
2022	20	17	45	159	111	21	29	35	117	114	60	57
2023	25	23	32	98	25	2,214	5,076	6,492	5,666	3,612	2,836	2,391

Notes: WY = water year

Table 7.2-C-3. Mean monthly flow (cfs) by year (1999–2023), diversion to powerhouse.

WY	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
1999	374	369	367	369	359	362	376	391	389	375	364	371
2000	307	166	229	257	327	327	400	401	398	376	353	300
2001	0	0	0	146	284	377	404	396	397	380	381	316
2002	245	142	265	329	259	390	398	392	385	291	331	228
2003	196	258	159	35	35	309	324	323	322	214	315	306
2004	306	176	196	197	107	0	259	323	319	310	302	234
2005	216	206	197	202	284	189	305	310	308	332	241	0
2006	0	0	0	0	0	0	1	48	287	335	347	334
2007	295	317	239	190	213	139	331	333	331	326	326	45
2008	0	0	0	0	0	0	0	25	285	282	332	315
2009	283	236	133	184	304	312	315	316	318	316	136	0
2010	0	0	0	0	0	0	0	0	187	390	385	377
2011	331	263	219	251	381	389	389	397	397	390	388	384
2012	372	379	358	322	155	344	391	393	396	394	349	177
2013	145	173	231	161	0	0	3	371	398	290	104	0
2014	0	0	0	0	20	223	302	351	346	258	197	67
2015	130	106	161	138	78	195	203	251	261	173	33	8
2016	87	135	143	253	285	290	304	351	379	388	365	146
2017	150	122	176	42	1	317	360	359	354	360	342	371
2018	380	353	314	284	69	311	365	371	362	364	356	322
2019	161	157	235	223	25	354	358	367	368	367	360	359
2020	283	285	282	269	223	257	377	395	399	389	381	196
2021	144	137	167	180	248	242	355	348	373	255	96	58
2022	96	147	178	13	80	282	376	374	365	361	248	115
2023	116	102	93	310	344	164	337	376	296	279	263	284

Notes: WY = water year

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APPENDIX 7.2-D

Annual Maximum Peak Flows (cfs) (1999–2023) – Inflow, Bypass Reach, and Diversion Conduit Associated with the Kern River No. 1 Hydroelectric Project

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Table 7.2-D-1. Peak annual flow (cfs) by water year (1999–2023).

Water Year	Project inflow	Release to bypass reach	Diversion to powerhouse
1999	1,806	1,430	396
2000	1,616	1,230	403
2001	1,544	1,150	421
2002	1,301	1,300	410
2003	1,444	1,390	345
2004	1,631	1,311	325
2005	3,842	3,531	385
2006	4,852	4,852	364
2007	1,335	1,010	352
2008	2,227	2,197	345
2009	1,659	1,343	333
2010	2,620	2,510	400
2011	4,714	4,308	410
2012	1,783	1,478	404
2013	881	538	414
2014	483	230	393
2015	434	203	354
2016	937	555	406
2017	5,427	5,067	406
2018	1,858	1,486	389
2019	5,437	5,068	381
2020	1,383	997	404
2021	731	341	395
2022	674	393	404
2023	7,620	7,231	393

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APPENDIX 7.2-E

Example Operations Associated with the Kern River No. 1 Hydroelectric Project

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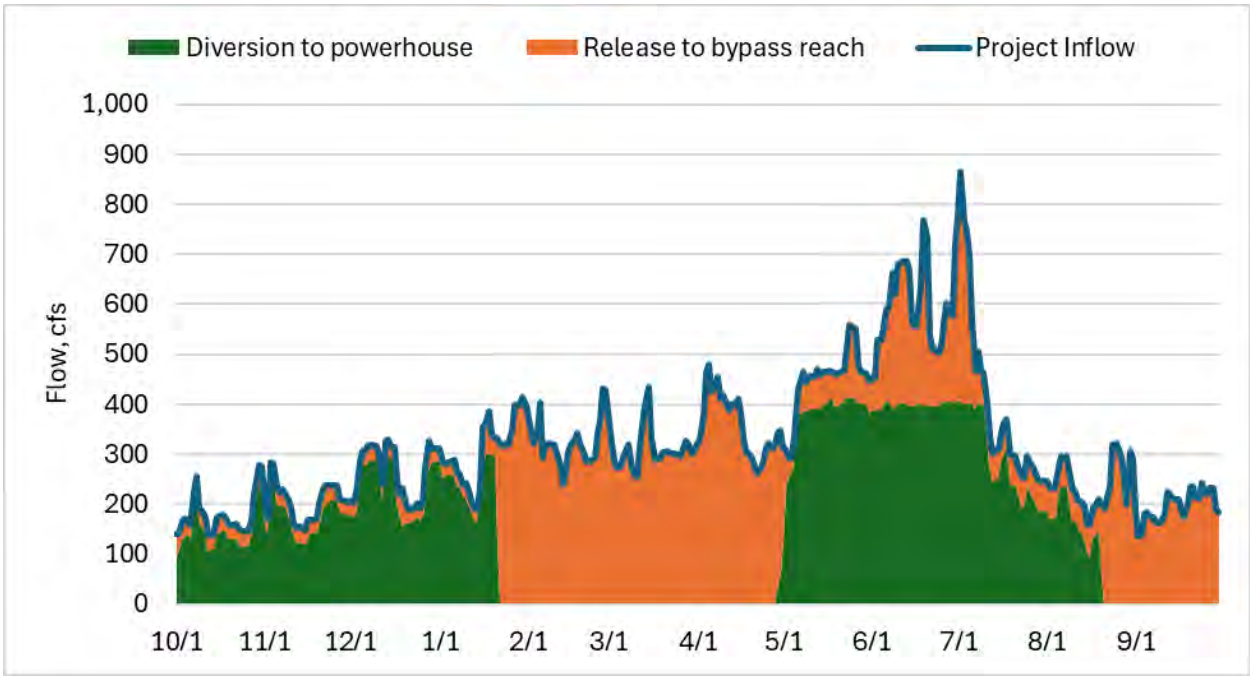
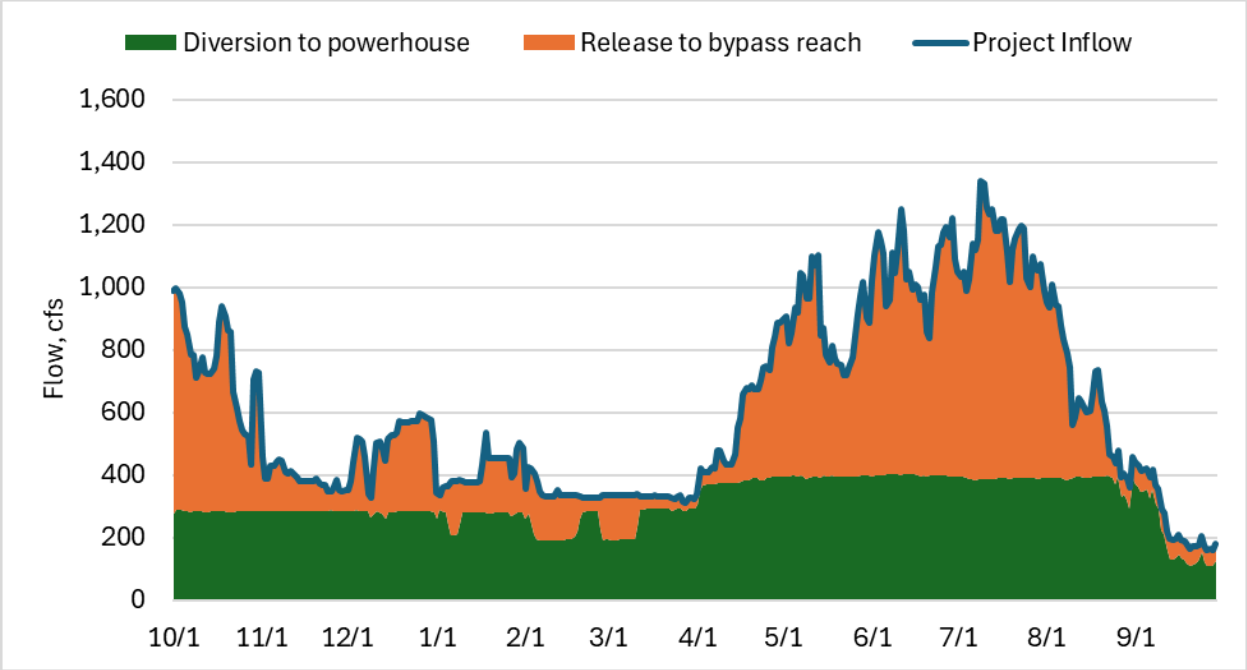


Figure 7.2-E-1. Project operations in water year 2013.



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Appendix 7.3-B 1992 Water Quality Sampling Results in the Project Area

Appendix 7.3-C Summary of 2024 Water Quality Sampling Results in the Project Area (In-Situ and Grab Sampling)

LIST OF ACRONYMS

°C	degrees Celsius
°F	degrees Fahrenheit
µS/cm	microsiemens per centimeter
AWQC	Ambient Water Quality Criteria

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Basin Plan	Water Quality Control Plan for the Tulare Lake Basin
BP	Basin Plan
$CaCO_3$	calcium carbonate
CC	chemical constituent
CCC	Criterion Continuous Concentration
CCR	California Code of Regulations
CDFW	California Department of Fish and Wildlife
CEDEN	California Environmental Data Exchange Network
cfs	cubic feet per second
cfu	colony forming units
CTR	California Toxics Rule
CRWQCB	California Regional Water Control Board
CWA	Clean Water Act
DLA	Draft License Application
DLR	detection limit for reporting purposes
DO	dissolved oxygen
DOC	dissolved organic carbon
EPA	United States Environmental Protection Agency
FERC	Federal Energy Regulatory Commission
FLA	Final License Application
IRIS	Integrated Risk Information System
ISR	Initial Study Report
MCL	maximum contaminant levels
mg/kg	milligrams per kilogram
mg/L	milligrams per liter
mL	milliliters
mm	millimeters
MPN	Most Probable Number of bacterial colonies per 100 mL of water
MtBE	Methyl-tertiary-butyl Ether
N	nitrogen
NO_3	Nitrate
NS	no standard available

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NTR	National Toxics Rule
NTU	Nephelometric Turbidity Units
NWIS	National Water Information System
OEHHA	Office of Environmental Health Hazard Assessment
o-PO_4-P	Ortho-phosphate
pH	potential of hydrogen
PM&E	protection, mitigation, and enhancement measures
ppt	parts per thousand
Project	Kern River No. 1 Hydroelectric Project
RfD	reference dose
RM	River Mile
RSP	Revised Study Plan
SCE	Southern California Edison
SO_4	Sulfate
SPD	Study Plan Determination
STORET	storage and retrieval
SWRCB	State Water Resources Control Board
TKN	Total Kjeldahl Nitrogen
TMDL	Total Maximum Daily Load
USACE	United States Army Corps of Engineers
USGS	United States Geological Survey
USR	Updated Study Report

7.3 WATER QUALITY

This section describes water quality in the Kern River, as it relates to Southern California Edison's (SCE) Kern River No. 1 Hydroelectric Project (Project). The Federal Energy Regulatory Commission (FERC) regulations require information on water quantity (water use and hydrology) and water quality (chemical/physical parameters) for waters affected by the Project. This section presents information on water quality. Information on water use and hydrology is addressed in Section 7.2, *Water Use and Hydrology*.

Section 7.3.1 describes the affected environment and water quality conditions under current Project operation and maintenance (i.e., baseline condition). Section 7.3.2 identifies proposed environmental measures, management, and monitoring plans (collectively referred to as protection, mitigation, and enhancement measures [PM&E measures]) to be implemented under the Proposed Action (see Appendix E.1 for a full description of proposed PM&E measures). Section 7.3.3 includes an analysis of the potential environmental effects of the Proposed Action, including potential beneficial effects of proposed PM&E measures, on water quality. Section 7.3.4 describes unavoidable adverse effects of the Proposed Action on water quality.

7.3.1 Affected Environment

7.3.1.1 Information Sources

This section was developed using existing, relevant, and reasonably information available in the following primary sources. Additional references are cited in the text, as appropriate.

- Water quality standards:
  - Water Quality Control Plan for the Tulare Lake Basin (Basin Plan) (California Regional Water Quality Control Board [CRWQCB] 2018)
  - California Toxics Rule (CTR) "Water Quality Standards: Establishment of Numeric Criteria for Priority Toxic Pollutants for the State of California" (Federal Register, 65 FR 31682; United States Environmental Protection Agency [EPA] 2000)
  - National Toxics Rule (NTR) Water Quality Standards: Establishment of Numeric Criteria for Priority Toxic Pollutants" (Federal Register, 57 FR 60848, EPA 1992)
- Published study reports, documents, and data:
  - Application for New License for the Kern River No. 1 Hydroelectric Project (SCE 1994)
  - Kern River No. 1 Hydroelectric Project (FERC No. 1930) Temperature Monitoring Summary Report (SCE 2008)

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- United States Geological Survey (USGS) National Water Information System (NWIS) (USGS 2015) and EPA storage and retrieval (STORET) (EPA 2015) online databases provided water quality information that was collected by the USGS and other agencies (California Environmental Data Exchange Network [CEDEN])

- SCE Technical Memoranda developed for the relicensing that are provided in Appendix E.2, including:

  - SCE AQ 2 – Water Quality/Water Temperature Interim Technical Memorandum (SCE 2025a)

  - SCE LAND 2 – Erosion and Sedimentation Technical Memorandum (SCE 2025b)

The AQ 2 – Water Quality/Water Temperature study is ongoing as of filing the Draft License Application (DLA). The information and analysis presented in this section includes Year 1 (2024) study results. The Water Quality/Water Temperature Technical Memorandum provided in Appendix E.2 will be updated to include Year 2 (2025) study results and will be filed with the Updated Study Report (USR) in March 2026. The Final License Application (FLA) will include an updated analysis to include the Year 1 and Year 2 study results.

7.3.1.2 Applicable State and Federally Approved Water Quality Standards and Objectives

The Basin Plan identifies the following beneficial uses from Lake Isabella to the Kern River No. 1 Powerhouse:

- **Hydropower Generation (POW)**: Beneficial uses of waters for hydroelectric power generation.

- **Water Contact Recreation (REC-1)**: Beneficial uses of waters used 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, and use of natural hot springs.

- **Non-Contact Water Recreation (REC-2)**: Beneficial uses of waters used for recreational activities involving proximity to water, but not normally involving body contact with water where ingestion of water is reasonably possible. These uses include, but are not limited to, picnicking, sunbathing, hiking, beachcombing, camping, boating, tidepool and marine life study, hunting, sightseeing, and aesthetic enjoyment in conjunction with the above activities.

- **Warm Freshwater Habitat (WARM)**: Beneficial 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.

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- **Cold Freshwater Habitat (COLD)**: Beneficial uses of waters that support cold-water ecosystems including, but not limited to, preservation and enhancement of aquatic habitats, vegetation, fish, and wildlife, including invertebrates.

- **Wildlife Habitat (WILD)**: Beneficial uses of waters that support wildlife habitats including, but not limited to, the preservation and enhancement of vegetation and prey species used by wildlife such as waterfowl.

- **Rare, Threatened, or Endangered Species (RARE)**: Beneficial uses of water that support habitats necessary, at least in part, for the survival and successful maintenance of plant or animal species established under state or federal law as rare, threatened or endangered.

The state of California is responsible for maintaining water quality through implementation of the Clean Water Act (CWA). State and federal water quality objectives include numeric and narrative standards for surface water that are based on criteria that protect human health and aquatic life. If water quality is maintained at levels consistent with these objectives, beneficial uses are protected. Applicable water quality objectives and standards from the Basin Plan for the Kern River in the Project area are provided in Table 7.3-1.

The Basin Plan provides numeric water quality objectives for chemical constituents that are derived from various sources. These objectives include references to maximum contaminant levels (MCL) that are provided in Title 22 of the California Code of Regulations, which sets standards for waters designated for domestic or municipal use. Additional, and often more stringent, criteria are provided by the CTR and NTR to protect aquatic life and human health. Pertinent toxicity standards from the CTR and NTR are provided in Appendix 7.3-A. According to the Basin Plan (CRWQCB 2018), the Kern River is one of many rivers in the region that is of excellent quality: “The Kings, Kaweah, Tule, and Kern rivers, which drain the west face of the Sierra Nevada Mountains, are of excellent quality and provide the bulk of the surface water supply native to the Basin.”

Most of the Kern River is not classified as an impaired waterbody under Section 303(d) of the CWA (State Water Resources Control Board [SWRCB] 2024); however, Lake Isabella is listed as impaired for mercury, dissolved oxygen (DO), and pH (SWRCB 2024). The United States Army Corps of Engineers (USACE) developed a total maximum daily load (TMDL)[1] for pH in 2021 and expects to complete TMDLs for mercury and DO by 2027 (SWRCB 2024). These TMDLs are expected to reduce daily loading of mercury, minimize low DO conditions, and maintain pH.

[1] A calculation of the maximum amount of a pollutant allowed to enter a waterbody so that the waterbody will meet and continue to meet water quality standards for a particular pollutant.

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7.3.1.3 Water Quality

Previous Water Quality Data

As described in the Pre-Application Document, SCE collected water quality data at six sites in the Project area in 1992 as part of the previous relicensing, including within the impoundment, immediately downstream of Democrat Dam, in the bypass reach, and upstream and downstream of the powerhouse (SCE 1994). Summary data from 1992 is provided in Table 7.3.2 and Appendix 7.3-B. Additional water quality data from 2005 and 2016 in the Project area published by CEDEN is provided in Table 7.3-3 and 7.3-4 (CEDEN 2025). Data from 1992, 2005, and 2016 indicate that water quality in the Project area (tailrace area, bypass reach, and impoundment) is of high quality and generally conforms to regulatory water quality objectives and standards. No persistent, widespread water quality issues were found. Slightly elevated concentrations of pH, arsenic, and ammonia were documented in the Project area in 1992 (Table 7.3.2 and Appendix 7.3-B). In 2005, ammonium levels were slightly higher than the Basin Plan criteria (Table 7.3.3) and in 2016 isolated high pH values were documented in the Project area (Table 7.3.4). All other variables met water quality standards at the time of sampling (Appendix 7.3-B, Table 7.3-2, Table 7.3-3, and Table 7.3-4). There are no agriculture or water treatment plants that discharge into the impoundment or bypass reach.

2024 Water Quality Sampling

SCE monitored water quality in 2024 pursuant to the Revised Study Plan (RSP) and FERC's Study Plan Determination (SPD). Water quality data were collected in the spring and fall of 2024. Data collection included:

- In-situ (i.e., spot measurements) of water temperature (degrees Celsius [°C]), DO (milligrams per liter [mg/L] and percent saturation), specific conductance / conductivity (microsiemens per centimeter [µS/cm]), potential of hydrogen (pH), alkalinity (mg/L), and salinity in parts per thousand (ppt) in June and October

- Water-quality grab sampling for lab analysis of dissolved metals, nutrients, suspended sediment, and other general water quality constituents

- Bacteriological sampling (July and August) for total coliform and fecal coliform[2]

Water quality sampling locations are identified in Table 7.3-5 and Map 7.3-1. Results of the 2024 water quality sampling are described below. Water temperature data collected during 2024 in-situ monitoring is described below in Section 7.3.1.4, *Water Temperature*. Pursuant to the SPD, SCE completed a second year of water quality sampling in 2025 and will provide those results in the USR, which is due to FERC in March of 2026.

As noted during the Initial Study Report (ISR) meeting, turbidity data were not collected during 2024 water quality sampling. Turbidity data were collected in May 2025 during

[2] *E. coli* data were not required by the SPD and therefore were not collected in 2024; however, as noted during the Initial Study Report meeting, SCE collected supplemental *E. coli* data in 2025

temperature data logger installation, in June 2025 during in-situ water quality sampling, and in August 2025 during a temperature data download. Additional turbidity data were collected during water quality sampling in the fall of 2025. Preliminary 2025 turbidity results from the spring and summer 2025 are provided below and results from fall 2025 sampling will be provided in the USR.

2024 In-Situ Water Quality Sampling

In-situ water quality sampling was completed at 11 sites in the Project area in the spring and fall of 2024 (Table 7.3-5). In-situ water quality sampling was completed upstream of Democrat Dam, within the Democrat Dam Impoundment, in the bypass reach (eight sites), and in the tailrace. In-situ water quality sampling results are presented in Appendix 7.3-C for the spring runoff sampling period (June 26 through June 27, 2024) and the early fall base flow period (October 9 through October 10, 2024). Each parameter is discussed below.

Dissolved Oxygen

The Basin Plan water quality objectives for DO are a minimum of 5.0 milligrams per liter (mg/L) for water designated WARM and a minimum of 7.0 mg/L for water designated COLD (CRWQCB 2018). The specific DO water quality objective for the Kern River from Lake Isabella to the Kern River No. 1 Powerhouse is a minimum of 8.0 mg/L, which is consistent with the EPA criterion (CRWQCB 2018; EPA 1986a). DO concentrations ranged from 8.58 to 9.12 mg/L during 2024 spring and fall in-situ sampling periods (June 26–27 and October 9–10), which is consistent with Basin Plan criteria (Appendix 7.3-C). Percent saturation exceeded 90 percent across all measurements, indicating well-oxygenated conditions capable of supporting COLD and WARM beneficial uses for aquatic species.

Specific Conductance (Conductivity)

The Basin Plan establishes a maximum conductivity objective of 300 µS/cm for the Kern River from Lake Isabella to the Kern River No. 1 Powerhouse (CRWQCB 2018). During 2024 in-situ sampling, conductivity ranged from 92 to 93 µS/cm in the spring and 140 to 143 µS/cm in the fall (Appendix 7.3-C). These values are well below the Basin Plan criterion, indicating compliance with regional water quality standards.

pH

The Basin Plan water quality objective for pH states that “the pH of water shall not be depressed below 6.5, raised above 8.3, or changed at any time more than 0.3 units from normal ambient pH” (CRWQCB 2018). The EPA’s national chronic criterion for pH in freshwater ranges from 6.5 to 9.0 (EPA 2025). During 2024 in-situ sampling periods (spring and fall), pH ranged from 7.96 to 8.17(Appendix 7.3-C), remaining well within the limits established by the Basin Plan and EPA guidelines.

Alkalinity

While the Basin Plan does not specify a water quality objective for alkalinity, the NTR identifies a continuous minimum concentration of 20 mg/L, except in cases where natural

background levels are lower. In such cases, the criterion must not fall below 25 percent of the natural level (EPA 2024). Alkalinity levels during the 2024 in-situ sampling ranged from 40 to 44 mg/L (Appendix 7.3-C), exceeding the minimum threshold and indicating stable buffering capacity in the sampled waters.

Salinity

Salinity is typically estimated indirectly through measurements of specific conductivity (see *Specific Conductance* above). Although the Basin Plan does not establish salinity criteria, salinity values were calculated from electrical conductivity using the equation:

Salinity (ppt) = 0.4665 x (conductivity µS/cm)^1.0878 (Dohrman 2023).

During the 2024 spring runoff and fall sampling periods, salinity ranged from 0.003 to 0.05 ppt (Appendix 7.3-C), well within the freshwater range, which is generally defined as <0.5 ppt (Wetzel 2001).

2024 Water Quality Grab Sampling

Water quality grab sampling was completed at eight sites in the Project area in 2024, concurrent with in-situ sampling (Appendix 7.3-C). Sampling was completed upstream of the Democrat Dam Impoundment, in the impoundment, in the bypass reach, and in the tailrace area.[3] Sampling included nutrients (e.g., nitrogen, phosphorous); dissolved and suspended solids; total alkalinity; dissolved arsenic, cadmium, copper, iron, lead, manganese, and nickel; and total mercury.[4] Water quality samples were processed by certified laboratories approved by the SWRCB for chemical and bacterial analysis.[5]

Results from 2024 spring and fall grab samples and lab analyses are presented in Appendix 7.3-C. All water quality parameters met the applicable objectives outlined in the Basin Plan, as well as criteria established by the CTR and the EPA. The seasonal data collected in 2024 indicates excellent water quality conditions throughout the Project area, with no exceedances of regulatory thresholds and generally consistent values across sites and sampling periods. A second year of grab sampling was completed in 2025; those results will be included in the USR and incorporated into the water quality analysis in the FLA.

2024 Bacterial Sampling

The Basin Plan water quality objective for bacteria states that, “in water designated REC 1, the fecal coliform concentration based on a minimum of not less than five samples

[3] During the spring seasonal water quality sampling, a grab sample was collected at KR 55.6 as specified in the AQ 2 Technical Study Plan. In the fall sampling, grab samples were collected at KR 55.2. These sites are very near each other and water quality results were similar; in 2025, grab samples were collected from both sites.
[4] Water grab samples in 2025 were also analyzed for methylmercury.
[5] Zalco Laboratories, BSK Associates, and Pace Analytical Labs (bacteria).

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for any 30-day period shall not exceed a geometric mean of 200 MPN/100 milliliters (mL), nor shall more than ten percent of the total number of samples taken during any 30-day period exceed 400 MPN/100 mL" (CRWQCB 2018). Bacterial sampling occurred in July and August 2024 over a 42-day period. Due to the Borel Fire precluded the final sampling in July. The final sampling was delayed until August 13, when the area was safe for access, which exceeded the 30-day sampling window.

The geometric mean of fecal coliform concentrations ranged from 3.7 to 27.7 MPN/100 mL, while total coliform ranged from 6.8 to 32.5 MPN/mL (Table 7.3-6). Fecal coliform levels remained below the applicable threshold throughout the sampling period. Although total coliform was analyzed, neither the Basin Plan nor the EPA currently specify numeric criteria for total coliform in freshwater designated for recreational use.

Recently, the SWRCB's Water Quality Control Plan for Inland Surface Waters, Enclosed Bays, and Estuaries of California (SWRCB 2019) established *E. coli* as the primary bacterial indicator for recreational water quality. The bacteria water quality objective for fresh waters is: a six-week rolling geometric mean of *E. coli* not to exceed 100 colony forming units (cfu) per 100 mL, calculated weekly, and a statistical threshold value of 320 cfu/100 mL not to be exceeded by more than 10 percent of the samples collected in a calendar month, calculated in a static manner. The recommended analysis method is EPA Method 1603 or other equivalent method.

E. coli sampling was not required by the AQ 2 Technical Study Plan; however, SCE included *E. coli* in the 2025 water quality sampling. The results of the 2025 bacteriological sampling will be provided in the USR and included as part of the water quality analysis in the FLA.

2024 Methylmercury Fish Tissue Sampling

Methylmercury is a potent human development neurotoxin that can accumulate in sport fish. Acute exposure can cause significant health risks to humans, such as birth defects and cerebral palsy. Consumption guidelines are developed to limit exposure at or below the EPA's reference dose (RfD) (Office of Environmental Health Hazard Assessment [OEHHA] 2005). The OEHHA issues fish consumption advisories when methylmercury concentrations in fish exceed the guidance tissue level of 0.08 milligrams per kilogram (mg/kg). The maximum safe level for women of childbearing age and children to consume is up to 12 sport fish per month (Klasing et al. 2005).

As of 2025, OEHHA has not issued a site-specific sport fish consumption advisory within the Kern River. However, the Kern River is included in a statewide advisory for rivers, streams, and creeks (Table 7.3-7), and OEHHA has issued a site-specific advisory for Lake Isabella, which is approximately 20 RMs upstream of the Project area. In the absence of a site-specific advisory, OEHHA recommends following the statewide safe eating guidelines for mercury in sport fish, restricting consumption limits for high-trophic-level predatory species (e.g., black bass, catfish).

During the 2024 AQ 3 – Fish Population study, SCE collected 29 edible-sized sport fish from the Democrat Dam Impoundment for methylmercury fish tissue sampling. The catch

represented six species, including 10 largemouth bass (*Micropterus salmoides*), three black crappie (*Pomoxis nigromaculatus*), five bluegill sunfish (*Lepomis macrochirus*), one channel catfish (*Ictalurus punctatus*), one white catfish (*Ameiurus catus*), and nine brown bullhead (*Ameiurus nebulosus*). Fish ranged in size from 151 to 545 millimeters (mm) (fork length or total length).[6] Fish tissue methylmercury and total mercury levels were analyzed at the Marine Pollution Studies Laboratory in Moss Landing, California, and sampling followed the OEHHA sport fish sampling protocol (OEHHA 2005). All 29 of the fish tissue samples exceeded or were equal to the reference methylmercury concentration of 0.08 mg/kg. The highest concentrations (up to 0.57 mg/kg) were measured in largemouth bass. The lowest concentrations were measured in black crappie and bluegill sunfish (as low as 0.08 mg/kg) (Figure 7.3-1 and Figure 7.3-2). The highest mean concentration of methylmercury by species was in largemouth bass (0.29 mg/kg), followed by channel catfish (0.24 mg/kg, single sample), brown bullhead (0.20 mg/kg), and white catfish (0.19 mg/kg, single sample). Black crappie and bluegill sunfish had the lowest mean methylmercury concentration by species (0.14 mg/kg). Concentrations were positively related to fish size, with larger fish (particularly largemouth bass and catfish) exhibiting the highest methylmercury levels (Figure 7.3-1 and Figure 7.3-2). The lowest concentration was found in the smallest black crappie sampled (160 mm fork length), at 0.08 mg/kg.

Total mercury concentrations by species followed a similar pattern and were highest in largemouth bass (0.54 mg/kg), followed by channel catfish (0.51 mg/kg, single sample), white catfish (0.37 mg/kg, single sample), and brown bullhead (0.34 mg/kg). Black crappie and bluegill sunfish had the lowest mean total mercury concentration by species (0.22 mg/kg).

2025 Preliminary Turbidity Monitoring

Preliminary turbidity results from the spring and summer 2025 are presented in Table 7.3-8. Overall, the data indicated low turbidity levels throughout the Project area at the time of sampling. Turbidity values collected during the spring in-situ sampling period (June) ranged from 1.2 to 3.2 Nephelometric Turbidity Units (NTU). Supplemental turbidity sampling conducted during the water temperature logger installation period (May 2025) showed higher turbidity levels ranging from 2.4 to 8.0 NTU. Summer supplemental sampling (August 2025) yielded turbidity values between 2.4 and 2.6 NTU. Turbidity data were collected again during the fall 2025 sampling period. The complete set of turbidity monitoring data will be included in the USR and incorporated into the water quality analysis in the FLA. Basin Plan objectives for turbidity are as follows:

> *Increases in turbidity attributable to controllable water quality factors shall not exceed the following limits: where natural turbidity is between 0 and 5 NTU's, increases shall not exceed 1 NTU. Where natural turbidity is between 5 and 50 NTU's, increases shall not exceed 20 percent. Where natural turbidity is between*

[6] Fork length was measured for species with a forked caudal fin (i.e., bluegill sunfish, black crappie, and largemouth bass). Total length was measured for species without a forked caudal fin (i.e., brown bullhead, channel catfish, and white catfish).

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50 and 100 NTU's, increases shall not exceed 10 NTU's. Finally, where natural turbidity is greater than 100 NTU's, increases shall not exceed 10 percent.

Sediment Management

As described in Section 5.1.5.4, *Sediment Management*, the licensee actively manages sediment in the Democrat Dam Impoundment by implementing a Sediment Management Plan. The plan is designed to approximate the natural sediment regime of the lower Kern River (to the extent possible) by allowing naturally occurring sediment to continue downstream, past Democrat Dam, and through the lower Kern River system without building up behind Democrat Dam. Sediment management consists of Partial Sediment Bypass and Full Sediment Bypass. Each approach is described in detail below.

Partial Sediment Bypass

Two partial sediment bypass operations have been conducted historically during (1) precipitation event high flows and (2) normal high flows:

- Precipitation Event High Flows – During precipitation-driven high flows—winter storms or summer and fall thunderstorms—SCE temporarily ceases water diversion and fully opens the low-level outlet at Democrat Dam to allow naturally occurring turbid flows from upstream to pass over the dam and through the low-level outlet. During this operation, the sediment load is carried by the full river flow, mimicking the natural sediment transport regime of the river and protecting the turbine infrastructure from fine sediment abrasion. Once flood and naturally turbid flow conditions have improved and turbidity conditions subside, normal operations resume (low-level outlet is closed and diversion is opened). This procedure was formerly described as Peak Flow Sediment Bypass (ENTRIX 2005).

- Normal High Flows – Under normal high-flow conditions, when flows in the bypass exceed 600 cfs (July 1–March 14) or 1,200 cfs (March 15–June 30; smallmouth bass / hardhead minnow spawning period[7]), SCE partially or fully opens the low-level outlet to allow sediment around the low-level outlet and the diversion intake to pass downstream, as needed. Because the impoundment remains full, only sediment immediately around the low-level outlet intake and near the diversion intake is passed downstream. This procedure was formerly described as Operational Sluicing (ENTRIX 2005).

Full Sediment Bypass

- Full sediment bypass involves lowering the water level in Democrat Dam Impoundment and allowing all river flow to pass through the low-level outlet. Full sediment bypass successfully occurs when the lower drain gate is fully opened

[7] In 2005 the California Department of Fish and Wildlife (CDFW) species of management concern was the non-native game fish, smallmouth bass. CDFW has since shifted management focus to the hardhead minnow (*Mylopharodon concephalus*) a CDFW Species of Special Concern and Forest Service Sensitive species. The spawning period from March 15-June 30 remains unchanged.

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(releasing approximately 800 cfs) and inflow into Democrat Impoundment is ≤800 cfs. This allows the water level of the impoundment to be completely lowered and the full river flow (and any entrained sediment) to pass through the dam into the bypass reach. Water is not diverted to the powerhouse during full sediment bypass. This procedure was formerly referred to as Full Pond Drain (ENTRIX 2005).

- Full sediment bypass is anticipated to occur annually, when possible, to ensure that sediment does not accumulate behind the dam. However, full pond drains are not recommended during extended drought periods, when sediment transport in the lower Kern River is significantly reduced. Full sediment bypass can cause temporary sediment deposition in the river below the dam, however, because the overall sediment transport regime is supply limited, seasonal high flows will transport the sediment.

- Full sediment bypass is only implemented when anticipated flows, based on forecasted Lake Isabella water releases, are determined to be sufficient to transport the deposited sediment through the bypassed reach. SCE only implements full sediment bypass between November 15 and March 14 to (1) avoid impacts on hardhead minnow spawning and rearing (March 15–June 30), (2) avoid impacts on northwestern pond turtle juveniles and adults during the in-water rearing period (March 15–November 14), and (3) seasonally align releases to meet dissolved oxygen and temperature requirements in the Water Quality Control Plan for the Tulare Lake Basin.

INTERIM OPERATIONS

Sediment management activities are currently limited to Partial Sediment Bypass activities during either precipitation events or normal high flows (see above). Agency permits (California Department of Fish and Wildlife [CDFW] Section 1600, SWRCB Board 401, USACE 404) for Full Sediment Bypass have expired. When they are renewed, it is anticipated that Full Sediment Bypass activities will resume.

The conditions identified in the Partial Sediment Bypass and Full Sediment Bypass in the current Sediment Management Plan (ENTRIX 2005) or in SCE permits are intended to minimize the effects of sediment management activities on water quality. The Sediment Management Plan in the Proposed Action is similar to the existing Sediment Management Plan (See Appendix E.1).

Additional information about the effects of sediment management resulting from the No-Action Alternative and the Proposed Action is provided in Section 7.6, *Geology and Soils*, and Section 7.7, *Geomorphology*.

SEDIMENT SOURCES

SCE completed the LAND 2 study in 2024 (SCE 2025b) pursuant to the SPD. The study documented that while there are numerous sediment sources in the Project area, they

are naturally occurring geologic or geomorphic features. Project operations and maintenance do not directly contribute to active erosion or sedimentation (SCE 2025b).

7.3.1.4 Water Temperature

The Basin Plan objective for water temperature states that the temperature of waters designated COLD or WARM shall not increase by more than 5 degrees Fahrenheit (°F) (2.78°C) above the natural receiving water temperature (CRWQCB 2018).

Previous Water Temperature Data

SCE collected water temperature data in the bypass reach, impoundment, and tailrace in 1992, as part of the previous relicensing effort, and from 1999 to 2007 as part of post-license compliance. SCE took spot measurements of water temperature in March and September of 1992 at six locations in the Project area (see Table 7.3-2 above). Water temperature ranged from 12.6°C to 15.2°C in March at a flow of 29 cubic feet per second (cfs) and 21.5°C to 22.0°C in September at a flow of 62 cfs (see Table 7.3-2).

From 1999 through 2007, SCE implemented a temperature monitoring program, which included continuous 15-minute temperature sampling at three locations in the bypass reach: (1) immediately downstream of Democrat Dam; (2) downstream of Stark Creek;[8] and (3) upstream of the Kern River No. 1 Powerhouse. Water temperature data were collected from May through October of each year. Mean monthly water temperature ranged from 15°C in May of 2006 immediately downstream of Democrat Dam to 24.2°C in August of 2001 upstream of the Kern River No. 1 Powerhouse. The mean and maximum monthly temperatures for each year are provided in Table 7.3-9. Water temperature measurements at locations 1 and 3 indicate that the average warming that occurred in the river between these two locations (i.e., throughput the bypass reach) from May through October was 0.8°C and ranged from -0.6°C to 2.5°C depending on the month and year.

2024 Water Temperature Data

IN-SITU WATER TEMPERATURE MONITORING

As described in Section 7.3.1.3 above, in-situ water temperature sampling was completed at 11 sites in the Project area in the spring and fall of 2024 (Table 7.3-5). In-situ water sampling was completed upstream of Democrat Dam, within the Democrat Dam Impoundment, in the bypass reach (eight sites), and in the Kern River No. 1 Powerhouse Tailrace. In-situ sampling results are presented in Appendix 7.3-C for the spring runoff sampling period (June 26–27, 2024) and the early fall base flow period (October 9–10, 2024).

Water temperatures ranged from 18.9°C to 20.5°C during the spring in-situ sampling (June 26 and June 27) and from 19.8°C to 20.4°C during the fall in-situ sampling (October 9 and October 10), exhibiting very little seasonal fluctuation and little variation between inflowing water and water passing through the Project area. Inflowing water temperature

[8] Approximately RM 48.4, roughly 6.0 river miles downstream of Democrat Dam.

(i.e., the Kern River upstream of the Democrat Dam Impoundment) was 18.9°C on June 26 at 0830. The water temperature in the tailrace, which is approximately 10.2 river miles (RM) downstream was 20.5°C on June 26 at 1220, a difference of 1.6°C; that difference in water temperature was likely reflective of increases in water temperature throughout the morning of June 26 due to solar warming, not a result of Project operations. Similar patterns were observed during October sampling with little change in water temperature (i.e., less than 0.5°C) throughout the Project area. These data demonstrated very little warming of the water temperature of inflowing and outflowing water through the Project area.

CONTINUOUS WATER TEMPERATURE MONITORING

SCE collected continuous water temperature data at 15-minute intervals throughout the 2024 monitoring season (May 15 through October 15) at seven locations in the Project area. Monitoring locations included the Kern River immediately upstream of the impoundment, four sites within the bypass reach, one site near the powerhouse, and one site in the tailrace (see Table 7.3-5, Table 7.3-10, and Map 7.3.1).

Average daily water temperature ranged from 15.7°C to 24.4°C across the seven sites in 2024. The highest water temperatures were observed from late July through mid-September, coinciding with periods of hot weather. The maximum recorded instantaneous water temperature was 24.9°C, measured simultaneously at six of the seven sites, upstream of the Democrat Dam Impoundment, four sites in the bypass reach, and the tailrace, on August 6, 2024. The lowest recorded water temperature (14.4°C) occurred at site KR 55.6 (Kern River upstream of Democrat Dam Impoundment) on May 25, 2024. Overall, water temperature was generally warmest in August throughout the Project area (Table 7.3-10).[9]

The mean, maximum, and minimum monthly water temperature by location are provided in Table 7.3-10.[10] Figure 7.3-3 illustrates mean monthly water temperatures for each location during the 2024 sampling period. Mean monthly water temperature ranged from:

- 16.4°C (May) to 23.1°C (August) at site KR 55.6 (upstream of the impoundment)
- 16.5°C (May) to 23.2°C (August) at site KR 54.36 (between Democrat Dam and the instream flow release point) and at site KR 54.2 (downstream of the instream flow release point)
- 16.6°C (May) to 23.1°C (August) at site KR 53.84 (near USGS gage 11192500)

[9] The AQ 2 Technical Memorandum provides daily mean, minimum, and maximum water temperature values recorded for each site during the 2024 sampling period.

[10] Site names: Tailrace (KR 43.94); near KR 1 Powerhouse (KR 44.0); near Lucas Creek (KR 50.3); near USGS gage 11192500 (KR 53.84); downstream of instream flow release point (KR 54.2); between Democrat Dam and instream flow release point (KR 54.36); Kern River upstream of Democrat Dam (KR 55.6).

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- 17.0°C (May) to 23.3°C (August) at site KR 50.2 (near Lucas Creek)
- 17.7°C (May) to 23.6°C (August) at site KR 44.0 (KR 1 Powerhouse)
- 16.8°C (May) to 23.3°C (August) at site KR 43.94 (tailrace)

Only a small amount of warming occurred along the 10.2-mile-long bypass reach in 2024 (average 0.7°C). Water temperatures in the powerhouse tailrace were like temperatures observed at other study sites, indicating that operations (i.e., diversions to the powerhouse) do not measurably affect water temperature (Figure 7.3-3). The warmest mean monthly water temperatures were observed at KR 44 (Table 7.3-10), likely because of solar warming as water travels through the 10.2-mile-long bypass reach.

Continuous water temperature monitoring conducted from 1999 through 2007 and in 2024 indicates that the Project has minimal to no measurable warming effect on either the bypass reach or the water diverted at Democrat Dam. Observed temperature patterns are consistent with natural thermal variation attributable to solar radiation and ambient atmospheric conditions, suggesting that Project operations do not measurably contribute to additional thermal loading in these reaches.

7.3.2 Proposed Environmental Measures

Under the Proposed Action, SCE proposes to implement PM&E measures associated with ongoing Project operation and maintenance activities. PM&E measures are designed to protect, maintain, or enhance environmental and cultural resources over the term of the new license. SCE proposes implementing the following PM&E measures related to water quality and water temperature:

- Minimum Instream Flow Measure
- Stream Gaging Plan
- Sediment Management Plan
- Vegetation Management Plan

Appendix E.1 provides complete descriptions of measures SCE is proposing as part of the license application and to include in any new license issued for the Project.

7.3.3 Potential Project Effects

This section describes the potential effects to water quality that could occur because of continued operation and maintenance activities to be implemented under the Proposed Action. Potential effects are determined by analyzing the changes in water quality that may result from activities implemented under the Proposed Action (Section 5.2) compared to the No-Action Alternative (existing condition) (Section 5.1). Final effects determinations consider PM&E measures to be included under the Proposed Action (refer to Appendix E.1).

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Under the Proposed Action, SCE would continue to operate and maintain the Project as described in Section 5.1, *No-Action Alternative*, with minor adjustments to Project operation and maintenance activities in response to implementing proposed PM&E measures. No new or upgraded facilities, structural changes, or operational changes to the Project are proposed.

Consistent with FERC's Scoping Document 2 (FERC 2023), this section evaluates potential effects of continued operation and maintenance of the following:

- Water quality in the bypass reach and downstream of the powerhouse.

Refer to Section 7.6, *Geology and Soils*, and Section 7.7, *Geomorphology* for a discussion on potential effects related to sedimentation and erosion.

7.3.3.1 Effects on Water Quality and Water Temperature

Data collected by SCE in 2024 as part of the water quality and water temperature study and during previous sampling in the Project area demonstrates that existing operation and maintenance activities do not adversely affect water quality or water temperature in the Project area. Water quality in the Project area continues to be of excellent quality. All sampled water quality variables in 2024 met or exceeded current water quality objectives and standards identified in the Basin Plan and in other regulatory thresholds (i.e., EPA criteria, criteria identified in the CTR and NTR).

Given that SCE proposes no changes to operations or maintenance of the Project, the Proposed Action, in combination with PM&E measures related to water resources (i.e., Minimum Instream Flow Measure, Stream Gaging Plan, Sediment Management Plan, and Vegetation Management Plan), is not expected to adversely affect water quality or water temperature in the Project area. SCE's implementation of the Minimum Instream Flow Measure and Stream Gaging Plan would provide for stable instream flows and impoundment elevations that would help maintain water quality and water temperature in the Project area. The implementation of these proposed measures along with the Sediment Management and Vegetation Management plans would have beneficial effects on water quality and water temperature in the bypass reach by maintaining the existing quality of water, stabilizing temperature regimes, minimizing sediment inputs, and minimizing pesticide or herbicide inputs.

As noted, SCE completed the second year of required water quality sampling in 2025; the results of that sampling will be provided in the USR and included as part of the water quality analysis in the FLA. In the following sections, the anticipated effects of the Proposed Action on individual water quality variables identified in the Basin Plan are described.

Ammonia

The Proposed Action would not affect ammonia concentrations (Table 7.3-1) within the Project area as Project operations do not introduce un-ionized ammonia into receiving

waters. SCE found no ammonia in the Project area during water quality sampling in 2024 (SCE 2025a).

Bacteria

The Proposed Action and No-Action Alternative do not include recreation facilities. However, there are four non-project recreation facilities along the bypass reach that are operated and maintained by the Forest Service—Democrat Raft Take-out boating site, Upper Richbar day use area, Lower Richbar day use area, Live Oak day use area. These Forest Service recreation areas include toilet facilities. It is possible that dispersed recreation and recreation at the boating take-out or day use areas could result in contamination of the Kern River with bacteria.

In addition, there are restroom facilities at the Kern River No. 1 Powerhouse. The Proposed Action does not discharge sanitary waste or other sources of bacteria into the Kern River. Water quality sampling conducted in the bypass reach during peak recreation use in 2024 found that fecal coliform concentrations were well below the Basin Plan thresholds (Table 7.3-1; Table 7.3-6) for REC-1 designated water (SCE 2025a). *E. coli* was included in 2025 water quality sampling based on the State Water Resources Control Board updated water quality control plan for inland surface waters (SWRCB 2019). Results from *E. coli* sampling will be included in the USR and FLA. Based on the existing data, the Proposed Action would have no effect on bacteria concentrations in the Kern River.

Biostimulatory Substances

The Proposed Action would not increase the concentration of biostimulatory substances (Table 7.3-1) that promote aquatic growth or cause nuisance or adversely affect designated beneficial uses. During 2024 relicensing studies, nutrient concentrations (nitrogen and phosphorous) were low and consistent with naturally oligotrophic conditions characteristic of Sierra Nevada rivers (SCE 2025a). The Project does not release nutrients into the Kern River and there are no known instances in which concentrations of nutrients have caused aquatic growth to be a nuisance or have adversely affected beneficial uses in the Project area.

Chemical Constituents including Dissolved Metals

The Proposed Action would not affect the concentrations of chemical constituents (i.e., organic or inorganic chemicals; Table 7.3-1) or dissolved metals in Project-affected waters. The Project does not release chemical constituents into the Kern River. Water quality sampling conducted in 2024 (SCE 2025a) documented no exceedances of Title 22 MCL for chemical constituents and there are no known instances in which concentrations of chemical constituents have adversely affected beneficial uses. The source of historically elevated arsenic concentrations documented in 1992 by SCE in the Kern River is unknown but may be attributed to mining activities in the watershed; arsenic was not detected during the 2024 sampling. Like many rivers in California, the concentration of methylmercury in sampled fish tissue was higher than the OEHHA's reference concentration of 0.08 mg/kg; however, the Proposed Action is not expected to contribute to or increase background mercury levels in fish in the Project area. Existing

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levels of methylmercury in fish within the Project area are likely derived from legacy pollutants in the watershed or atmospheric deposition; operation of the Project has no control over or influence on methylmercury levels in the Kern River.

Color

The Proposed Action would not affect color (Table 7.3-1) as operations do not introduce color-producing substances (e.g., decaying materials, tannins). There are no known instances in which the color of water in the Project area has been adversely affected or affected any beneficial uses.

Dissolved Oxygen

Routine operations (minimum instream flows, flow releases through the sandbox, powerhouse diversions, general maintenance activities) as part of the Proposed Action are not expected to deplete DO concentrations that would impair beneficial uses. The Basin Plan has a minimum DO objective of 8 mg/L (Table 7.3-1) for the Kern River from Lake Isabella to the Kern River No. 1 Powerhouse to support cold, freshwater habitat (COLD) (CRWQCB 2018). SCE documented, through in-situ water quality sampling conducted in 2024 (SCE 2025a), that DO concentrations ranged from 8.58 to 9.12 mg/L at all sampling locations, consistently meeting the Basin Plan objective. No exceedances or downward deviations were observed during seasonal low-flow periods and DO percent saturation always remained above 90 percent. These results demonstrate that regular operations as part of the Proposed Action are expected to maintain conditions supportive of aquatic life and are not expected to degrade DO levels.

Partial sediment bypass operations at Democrat Dam have the potential to release anaerobic sediments, which may temporarily reduce DO concentrations downstream in the Kern River, potentially affecting beneficial uses. However, under the Sediment Management Plan, partial sediment bypasses are restricted to high-flow precipitation events or when natural flows in the bypass exceed 600 cfs between July 1 and March 14, or 1,200 cfs between March 15 and June 30 (the smallmouth bass / hardhead minnow spawning and rearing period). These operations release only a limited amount of sediment from the immediate vicinity of the drain gate. The high flow requirements are designed to minimize impacts on DO concentrations, which are expected to remain near the 8 mg/L objective; therefore, the partial sediment bypass operations would result in a negligible effect on DO.

Full sediment bypass operations at Democrat Dam also have the potential to release anaerobic sediments, which may temporarily reduce DO concentrations in the Kern River downstream of the dam, potentially affecting beneficial uses. To address this, the Sediment Management Plan includes provisions for annual bypasses, when conditions allow, to minimize sediment accumulation behind Democrat Dam and includes detailed planning and environmental monitoring protocols. Under the Sediment Management Plan, full sediment bypass would only occur between November 15 and March 14 to (1) avoid impacts on hardhead minnow spawning and rearing (March 15–June 30), (2) avoid impacts on northwestern pond turtle juveniles and adults during the in-water rearing period (March 15–November 14), and (3) seasonally align releases to meet dissolved

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oxygen and temperature requirements in the Water Quality Control Plan for the Tulare Lake Basin. With implementation of the Sediment Management Plan, the Proposed Action would have a negligible effect on DO.

Overall, the Proposed Action (i.e., routine operations and maintenance activities) are similar to the No-Action Alternative and are expected to have a negligible effect on DO concentrations in the Kern River.

Floating Material

The Proposed Action would not affect concentrations of floating material (solids, liquids, foams, and scum; Table 7.3-1) in the Kern River. There are no known instances in which floating material was a nuisance or adversely affected beneficial uses in Democrat Dam, the Kern River bypass reach, or downstream of the Kern River No. 1 Powerhouse.

Oil and Grease

SCE does not release oil and grease (Table 7.3-1) into surface waters and no reportable spills have occurred. Therefore, the Proposed Action is not expected to result in the release of oil and grease that would adversely affect water quality or the beneficial uses of water within the Project area.

Pesticides

Pesticide use, including herbicides, could affect water quality. Under the No-Action Alternative, SCE does not use pesticides as part of routine operation and maintenance but does apply herbicides around Project facilities in accordance with a Forest Service approved Pesticide Use Proposal. The Pesticide Use Proposal identifies the products to be used, application methods, treatment locations, buffer strips from water, and timing of application. In addition, a licensed vendor must apply approved herbicides in accordance with conditions in the Pesticide Use Proposal. Under the Proposed Action, SCE would continue this practice and the Vegetation Management Plan specifies that herbicide application must be consistent with the approved Pesticide Use Proposal. Therefore, under the Proposed Action, there would be no effect to water quality from herbicide application.

pH

The Proposed Action would not affect pH levels in Democrat Dam Impoundment, the Kern River bypass reach, or the Kern River downstream of the powerhouse. The Project would not release constituents that would affect pH. pH levels during the 2024 water quality study ranged from 7.96 to 8.17, which fall within the range specified in the Basin Plan’s numerical water quality objectives and the national EPA criterion.

Radioactivity

The Proposed Action would not involve any source of radioactive material and would not affect radionuclide concentrations.

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Salinity

The Proposed Action would not affect salinity / electrical conductivity levels (Table 7.3-1) in the Project area. The Project would not release constituents that would affect salinity in the Kern River and the Project does not include agricultural practices or other activities that could concentrate the salinity of the Kern River. Salinity values during the 2024 water quality study were typical of freshwater systems.

Sediment

Routine operations (minimum instream flows, flow releases through the sandbox, powerhouse diversions, general maintenance activities) as part of the Proposed Action are not expected to contribute to significant suspended sediment loading in receiving waters. The Basin Plan states that the suspended sediment load and suspended sediment discharge rate of waters shall not be altered in such a manner as to cause nuisance or adversely affect beneficial uses (Table 7.3-1). Due to the presence of Isabella Dam, sediment loads in the Kern River at the upstream boundary of the Project are likely lower than would occur under natural, unimpaired flow conditions. The 2024 relicensing studies found minimal sediment delivery to the lower Kern River and visual assessments showed that runoff features and slopes were relatively stable (SCE 2025a, 2025b). Field observations during the 2024 relicensing studies (LAND 2) did not identify Project-related erosion sites or locations where sedimentation would affect aquatic resources.

Partial sediment bypass operations at Democrat Dam may temporarily release suspended sediment into the Kern River, potentially impacting beneficial uses. However, according to the Sediment Management Plan, these bypasses are restricted to high-flow precipitation events or when natural flows exceed 600 cfs from July 1 to March 14, and 1,200 cfs from March 15 to June 30 (the smallmouth bass spawning and rearing period). Because partial bypasses release only a small amount of sediment from the immediate vicinity of the drain gate, the resulting suspended sediment levels are expected to resemble natural conditions during high-flow events.

Full sediment bypass operations at Democrat Dam have the potential to temporarily release suspended sediment into the Kern River, which could adversely affect beneficial uses. To address this, the Sediment Management Plan includes provisions for annual bypasses, when conditions allow, to minimize sediment buildup behind the dam and includes provisions for sediment bypass planning and environmental monitoring. Full sediment bypasses would not occur during extended drought periods, when sediment transport in the lower Kern River is significantly reduced due to insufficient flow.

Implementation would only proceed when anticipated flows—based on weather forecasts and expected releases from Lake Isabella—are deemed adequate to transport sediment through the bypass reach. Additionally, in consultation with CDFW, SCE would restrict full sediment bypass operations to the period between November 15 and March 14 to (1) avoid impacts on hardhead minnow spawning and rearing (March 15–June 30), (2) avoid impacts on northwestern pond turtle juveniles and adults during the in-water rearing period (March 15–November 14), and (3) seasonally align releases to meet dissolved oxygen and temperature requirements in the Water Quality Control Plan for the Tulare

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Lake Basin. This timing ensures that sediment release does not impact aquatic species, as it coincides with periods when elevated suspended sediment levels would naturally occur under unimpaired conditions.

Overall, the Proposed Action routine operations and maintenance activities (e.g., instream flows, trail maintenance) are expected to have a negligible effect on suspended sediment in the Kern River and, with implementation of the Sediment Management Plan, partial and full sediment bypass operations at Democrat Dam would also have a negligible effect on suspended sediment in the Kern River when compared to the No-Action Alternative. Additional analysis on the effects of the Proposed Action on sedimentation and erosion is provided in Section 7.6, *Geology and Soils*, and Section 7.7, *Geomorphology*.

Settleable Material

Routine operations (minimum instream flows, flow releases through the sandbox, powerhouse diversions, general maintenance activities) as part of the Proposed Action are not expected to contribute to settleable material in concentrations that exceed the Basin Plan objectives or impair beneficial uses. Field observations during the 2024 relicensing studies (LAND 2) confirmed that Project-affected channels showed no accumulation of settleable material downstream of Project infrastructure (SCE 2025a, 2025b). Routine inspections, road and trail maintenance, and continued implementation of the Sediment Management Plan would minimize erosion and soil disturbance near Project features. Additionally, channel stability in the Project area is supported by bedrock and coarse substrate. These conditions reduce the likelihood of settling solids entering surface waters under routine operations. The implementation of the Sediment Management Plan would support long-term control of settleable material by minimizing soil disturbance, stabilizing exposed surfaces, and maintaining drainage infrastructure near Project features.

Partial sediment bypass operations at Democrat Dam may release settleable material into the Kern River, which could temporarily impact beneficial uses. However, according to the Sediment Management Plan, these bypasses are restricted to high-flow precipitation events or when natural flows exceed 600 cfs from July 1 to March 14, and 1,200 cfs from March 15 to June 30 (the smallmouth bass spawning and rearing period). Because partial bypasses release only a small volume of sediment from the immediate vicinity of the drain gate, the resulting settleable material release is expected to resemble natural deposition patterns during high-flow conditions. This timing ensures that release of settleable material occurs when flows are sufficient to disperse material and avoid accumulation on spawning substrates or fish eggs, thereby minimizing potential impacts to reproductive success.

Full sediment bypass operations have a greater potential to release settleable material into the Kern River, which could temporarily impact beneficial uses. To address this, the Sediment Management Plan includes provisions for annual bypasses, when conditions allow, to reduce sediment accumulation behind the dam, along with requirements for sediment bypass planning and environmental monitoring. Full bypasses would not occur during extended drought periods, when sediment transport capacity in the lower Kern

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River is diminished due to low flows. Implementation would proceed only when forecasted flows—based on weather conditions and anticipated releases from Lake Isabella—are sufficient to mobilize and transport settleable material through the bypass reach, and when the Kern River would be likely to carry settleable material under unimpaired natural flow conditions. Additionally, in consultation with CDFW, SCE would restrict full sediment bypass operations to the period between November 15 and March 14 to (1) avoid impacts on hardhead minnow spawning and rearing (March 15–June 30), (2) avoid impacts on northwestern pond turtle juveniles and adults during the in-water rearing period (March 15–November 14), and (3) seasonally align releases to meet dissolved oxygen and temperature requirements in the Water Quality Control Plan for the Tulare Lake Basin. This timing ensures that release of settleable material occurs when flows are sufficient to disperse material and avoid accumulation on spawning substrates or fish eggs, thereby minimizing potential impacts to reproductive success.

Overall, the Proposed Action routine operations and maintenance activities (e.g., instream flows, trail maintenance, etc.) are expected to have a negligible effect on settleable material in the Kern River and with implementation of the Sediment Management Plan, both partial and full sediment bypass operations, are also expected to result in negligible deposition of settleable material compared to the No-Action Alternative.

Suspended Material

The Proposed Action is not expected to introduce significant concentrations of suspended materials into the Kern River within the Project area. A detailed analysis of suspended sediment is provided in the Sediment section above and in the related Turbidity section below. Other categories of suspended materials—including organic matter, microorganisms, chemical precipitates, and anthropogenic substances such as microplastics and urban runoff contaminants—are not generated or mobilized by the Proposed Action. Therefore, the Proposed Action would not contribute to elevated turbidity or water quality degradation associated with non-sediment suspended materials.

Tastes and Odors

The Proposed Action would not affect the taste or odor of water in Project-affected waters. The Project does not release substances into the Kern River that would affect the taste and odors of water. The 2024 water quality and water temperature study documented that compounds associated with tastes and odors (aluminum, copper, iron, silver, zinc, chloride, and specific conductance) are typically low (Table 7.3-C-2 through 7.3-C-3). There are no known instances in which tastes and odors were a nuisance or adversely affected beneficial uses.

Temperature

The Proposed Action and No-Action Alternative include diversion of water to the Kern River No. 1 Powerhouse and reduced flows in the bypass reach. The reduction in flow in the bypass reach has the potential to affect water temperature in the Kern River. The Proposed Minimum Instream Flow Measure includes minimum flows in the bypass reach of 50 cfs, June 1 through September 30 and 15 cfs, October 1 through May 31, which are

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the same as the No-Action Alternative minimum instream flows. Because inflows to the Project are high in the summer, minimum flows are only observed during the summer in the bypass reach in drought years (e.g., 2014 through 2015) (SCE 2025c).

Data collected from 1999 through 2007 and in 2024 as part of the water quality and water temperature study indicated that existing operation and maintenance activities do not adversely affect water temperature in the Project area. For example, in 2024 monthly mean water temperature in the Project area was less than or equal to 20°C in May and June, and exceeded 22°C in July, August, and September 2024; however, the similarity of water temperature entering the Project, in the bypass reach, and leaving the Project during this period indicates that there was minimal warming of the Kern River (average 0.7°C in the bypass reach).

The Kern River in the bypass reach supports designated beneficial uses such as freshwater habitat, providing suitable conditions for a fishery dominated by warm- and cool-water game and non-game fish such as hardhead minnow, smallmouth and largemouth bass, threadfin shad, and Sacramento sucker (see Section 7.4, *Fish and Aquatic Resources*).

The No-Action Alternative (existing conditions) does not impair water temperature conditions in the Kern River bypass reach or downstream of the Kern River No. 1 Powerhouse and the Proposed Action includes no changes to minimum instream flows or gaging operations (Minimum Instream Flow Measure and Stream Gaging Plan); therefore, the Proposed Action would have no effect on water temperature.

Toxicity

The Proposed Action would not contribute to toxicity in receiving waters. The Project does not directly release or mobilize toxins (e.g., trace metals, oil and grease). Toxic constituents were not identified in 2024 relicensing studies in concentrations that exceeded requirement thresholds or that would result in adverse effects on aquatic life. There are no known instances in which toxicity in the Project area has adversely affected beneficial uses.

Turbidity

Routine operations (minimum instream flows, flow releases through the sandbox, powerhouse diversions, general maintenance activities) as part of the Proposed Action are not expected to affect turbidity in Project-affected waters or cause adverse effects to beneficial uses. The Basin Plan prohibits increases in turbidity above natural background levels that result in nuisance conditions or impair designated beneficial uses. Due to the presence of Isabella Dam, turbidity at the upstream boundary of the Project is likely lower than would occur under natural, unimpaired flow conditions. Preliminary 2025 water quality sampling to date documented that turbidity remained low and within applicable thresholds upstream and downstream of the Project. General operations and maintenance activities involving water releases from the sandbox, flowline, or forebay are executed in a controlled manner and do not adversely affect turbidity. The Access Roads and Trails Management Plan includes measures to minimize erosion and soil disturbance

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during maintenance of access roads and trails, which would protect from the potential to increase turbidity in the Kern River.

Partial sediment bypass operations at Democrat Dam may temporarily increase turbidity in the Kern River, potentially impacting beneficial uses. However, according to the Sediment Management Plan, these bypasses are only permitted during high-flow precipitation events or when natural flows in the bypass reach exceed 600 cfs between July 1 to March 14, and 1,200 cfs from March 15 to June 30 (smallmouth bass spawning and rearing period). Because partial sediment bypasses release only a limited amount of sediment from the immediate vicinity of the drain gate, the resulting suspended sediment—and associated turbidity—are expected to resemble natural conditions during high-flow events.

Full sediment bypass operations at Democrat Dam have the potential to temporarily increase turbidity levels in the Kern River, which could adversely affect beneficial uses. To address this, the Sediment Management Plan includes provisions for annual bypasses, when conditions allow, to reduce sediment accumulation behind the dam and includes provisions for turbidity-related planning and environmental monitoring. Full sediment bypasses would not be conducted during extended drought periods, when reduced flows in the lower Kern River limit the ability to effectively disperse turbidity. Implementation of full sediment release operations would be timed to coincide with forecasted flow conditions—based on weather predictions and anticipated releases from Lake Isabella—that are sufficient to mobilize sediment and minimize prolonged turbidity within the bypass reach. These releases would be scheduled during periods when elevated turbidity levels would naturally occur under unimpaired flow conditions, thereby aligning with expected seasonal variability. Additionally, SCE would restrict full sediment bypass operations to the period between November 15 and March 14 to (1) avoid impacts on hardhead minnow spawning and rearing (March 15–June 30), (2) avoid impacts on northwestern pond turtle juveniles and adults during the in-water rearing period (March 15–November 14), and (3) seasonally align releases to meet dissolved oxygen and temperature requirements in the Water Quality Control Plan for the Tulare Lake Basin. This timing ensures protection of sensitive aquatic life.

Overall, the Proposed Action ongoing operations and maintenance activities are expected to have a negligible effect on turbidity levels in the Kern River and, with implementation of the Sediment Management Plan, both partial and full sediment bypass operations at Democrat Dam are also anticipated to have a negligible effect on turbidity compared to the No-Action Alternative.

7.3.4 Unavoidable Adverse Effects

There are no unavoidable adverse effects to water quality from continued operation and maintenance of the Project under the Proposed Action.

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7.3.5 References

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TABLES

Table 7.3-1. Surface Water Quality Objectives for the Tulare Basin, Including the Lower Kern River

Water Quality Parameter	Surface Water Quality Objective
Ammonia	Waters shall not contain un-ionized ammonia in amounts which adversely affect beneficial uses. In no case shall the discharge of wastes cause concentrations of un-ionized ammonia to exceed 0.025 mg/L (as N) in receiving waters.
Bacteria	In waters designated REC-1, the fecal coliform concentration based on a minimum of not less than 5 samples for any 30-day period shall not exceed a geometric mean of 200/100 mL, nor shall more than 10% of the total number of samples taken during any 30-day period exceed 400/100 mL. A 6-week rolling geometric mean of *Escherichia coli* (*E.*coli) not to exceed 100 cfu per 100 mL, and a statistical threshold value of 320 cfu/100 mL not to be exceeded by more than 10% of the samples collected in a calendar month, calculated in a static manner.[1]
Biostimulatory substances	Waters shall not contain biostimulatory substances in concentrations that promote aquatic growths to the extent that such growths cause nuisance or adversely affect beneficial uses.
Chemical constituents	Waters shall not contain chemical concentrations that adversely affect beneficial uses.
Color	Waters shall be free of discoloration that causes nuisance or adversely affects beneficial uses.
Dissolve d oxygen	Waters shall not contain less than 8 mg/L of dissolved oxygen (see Table 3-1 in the Basin Plan (CRWQCB 2018).
Floating material	Waters shall not contain floating material, including but not limited to solids, liquids, foams, and scum, in concentrations that cause nuisance or adversely affect beneficial uses.
Oil and grease	Waters shall not contain oils, greases, waxes, or other materials in concentrations that cause nuisance, result in a visible film or coating on the surface of the water or on objects in the water, or otherwise adversely affect beneficial uses.
pH	The pH of water shall not be depressed below 6.5, raised above 8.3, or changed at any time more than 0.3 units from normal ambient pH.
Pesticides	Waters shall not contain pesticides in concentrations that adversely affect beneficial uses. There shall be no increase in pesticide concentrations in bottom sediments or aquatic life 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 in the Kern River above Lake Isabella is 300 µS/cm.
Sediment	The suspended sediment load and suspended sediment discharge rate of waters shall not be altered in such a manner as to cause nuisance or adversely affect beneficial uses.
Settleable material	Waters shall not contain substances in concentrations that result in the deposition of material that causes nuisance or adversely affects beneficial uses.

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Water Quality Parameter	Surface Water Quality Objective
Suspended material	Waters shall not contain 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.
Temperature	Elevated temperature wastes shall not cause the temperature of waters designated COLD or WARM to increase by more than 5°F (2.78°C) above 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.
Turbidity	Waters shall be free of changes in turbidity that cause nuisance or adversely affect beneficial uses. Where natural NTUs are 0–5, increase cannot exceed 1 NTU. Where natural NTUs are 5–50, the increase cannot be greater than 20%. Where natural turbidity is between 50 and 100 NTUs, the increase cannot exceed 10 NTUs.

Sources: CRWQCB 2018, 2019

Notes: [1] A statewide amendment modified the indicator bacteria to use an *E. coli* pathogen indicator and water quality objectives for the REC-1 beneficial use contained in the Basin Plan after February 4, 2019 (CRWQCB 2019).

Key: °C = degrees Celsius
°F = degrees Fahrenheit
µS/cm = microsiemens per centimeter
CC = chemical constituent
cfu = colony forming unit
DO = dissolved oxygen
MCL = maximum contaminant level
mg/L = milligram per liter
mL = milliliter
N = nitrogen
NTU = nephelometric turbidity unit
pH = potential for hydrogen

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Table 7.3-2. 1992 In-Situ Water Quality Measurements in the Project Area

Station	Democrat Dam Impoundment	Kern River 200 feet downstream of Democrat Dam		Kern River downstream of Live Oak Picnic Area		Kern River 600 feet upstream of Powerhouse No. 1		Kern River just downstream of Powerhouse No. 1		Near Lucas Creek
Date Sampled	9/23/92	3/31/92	9/23/92	3/31/92	9/23/92	3/31/92	9/23/92	3/31/92	9/23/92	3/31/92
Time Sampled	1630	1055	1245	1340	1340	1450	1430	1540	1540	1255
Flow (cfs)	62	29	62	29	62	29	62	29	62	29
Air Temperature (°C)	25	10.7	30.0	11.5	26.0	14	26.5	13.0	24.0	12
Water Temperature (°C)	21.5	12.6	21.5	14.5	21.5	15.2	22	14.3	21	13.6
pH	8.4	7	7.4	8.3	8.3	8.6	8.2	8.1	8	8.5
Conductivity (µS/cm)	182	161	179	168	180	172	196	155	191	164
Total Dissolved Solids (mg/L)	97.8	79	91	83	96	85	99	78	99	82
Dissolved Oxygen (mg/L)	7.5	8.9	7.4	9.4	8.3	9.5	8.5	9.2	6.5	9.5

Notes: Values shaded in green outside of Basin Plan or Toxic Rule criteria
Key: cfs = cubic feet per second
°C = degrees Celsius
µS/cm = microsiemens per centimeter
mg/L = milligrams per liter

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Table 7.3-3. 2005 Water Quality Measurements in the Project Area from CEDEN Data Collection (shaded cells indicate values outside Basin Plan criteria)

Station	CEDEN-554KER050	CEDEN-554KER060	CEDEN-554KER070	CEDEN-558KER080	Basin or Surface Water Plan Criteria	Units
Date Sampled	**1/26/2005**	**1/26/2005**	**1/26/2005**	**1/26/2005**		
Time Sampled	**0928**	**1000**	**1028**	**1050**		
Ammonium as N	0.03	0.03–0.07	0.04	0.06	0.025[BP]	mg/L
Manganese	77	87–88	72	83	NS	µg/L
Iron	470	440–480	360	360	NS	µg/L
Phosphorus as P	0.07	0.07	0.07	0.07	NS	mg/L
Alkalinity as $CaCO_3$, total	60	59-60	60	59	NS	mg/L
Total dissolved solids	93	91–95	85–99	100	500[BP]	mg/L
Potassium	2.6	2.5–2.6	2.5	2.6	NS	mg/L
Calcium	16	16	16	16	NS	mg/L
Boron	0.12	0.12	0.12	0.13	NS	mg/L
Sodium	13	13	13	14	NS	mg/L
Magnesium	2.6	2.6	2.6	2.7	NS	mg/L

Notes: Values shaded in green outside of Basin Plan or Toxic Rule criteria
Key: BP = Basin Plan is source of most stringent criteria
$CaCO_3$ = calcium carbonate
CEDEN = California Environmental Data Exchange Network
mg/L= milligram per liter
N = nitrogen
NS = no standard available
µg/L = microgram per liter

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Table 7.3-4. 2016 Water Quality Measurements in the Project Area from CEDEN Data Collection

Station	Statistic	Democrat	Lower Richbar	Ker MM14/ MM15	Rancheria Road	Basin or Surface Water Plan Criteria	Units
Oxygen, Dissolved	Mean	9.04	8.53	9.02	8.70	5.0/7.0	mg/L
	Max	9.89	8.83	9.54	9.68		
Specific Conductance	Mean	88.2	98.0	92.9	98.2	300	µS/cm
	Max	105.8	120.8	109.0	116.0		
Temperature	Mean	20.2	21.4	21.8	22.3	NS[1]	°C
	Max	23.0	23.6	24.0	25.1		
Turbidity	Mean	6.71	7.24	5.34	6.80	Narr[2]	mg/L
	Max	11.5	12.5	12.9	25.5		
pH	Mean	7.90	7.77	8.02	8.35	6.5–8.3	unitless
	Max	8.39	8.03	8.32	9.23		

Source: CEDEN 2025;

Notes: Values shaded in green outside of Basin Plan or Toxic Rule criteria

[1] Shall not be altered unless it can be demonstrated that beneficial uses are not adversely affected. Elevated temperature wastes shall not cause the temperature to increase by more than 5 °F (~2.8 °C) above natural receiving-water temperature

[2] 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. Where natural turbidity is between 5 and 50 NTUs, increases shall not exceed 20 percent. Where natural turbidity is between 50 and 100 NTUs, increases shall not exceed 10 NTUs. Finally, where natural turbidity is greater than 100 NTUs, increases shall not exceed 10 percent

Key: °C = degrees Celsius
µS/cm = microsiemens per centimeter
mg/L = milligram per liter
NS = no standard available

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Table 7.3-5. 2024 Water Quality and Water Temperature Sampling Locations

Site Name/ID and Description	Sampling Location River Mile	Seasonal In-Situ Field Measurements	Seasonal Water Quality Grab Samples/ Continuous Water Temperature	Bacterial Sampling
KR 55.6 (Kern River above Democrat Dam)	RM 55.6	X	X	–
KR 55.2 (Kern River below rafting take-out)	RM 55.2	X	X[1]	X
KR 54.36 (Kern River between Democrat Dam and Instream Flow Release)	RM 54.36	X	X	–
KR 54.2 (Kern River below Instream Flow Release)	RM 54.2	X	X	–
KR 53.84 (Kern River near USGS gage 11192500; below Democrat Dam)	RM 53.84	X	X	–
KR 50.3 (Kern River near Lucas Creek)	RM 50.3	X	X	–
KR 48.7 (Kern River below Upper Richbar Day Use Area)	RM 48.7	X	–	X
KR 48.4 (Kern River below Lower Richbar Day Use Area)	RM 48.4	X	–	X
KR 47.78 (Kern River below Live Oak Day Use Area)	RM 47.78	X	–	X
KR 44.0 (Kern River upstream of Kern River No. 1 Powerhouse)	RM 44.0	X	X	–
KRTR 43.94 (Kern River No. 1 Powerhouse Tailrace)	RM 43.94	X	X	–

Notes: [1] During the spring seasonal water quality sampling, a grab sample was collected at KR 55.6 as specified in AQ 2 TSP Table AQ 2-1 and in the fall sampling grab samples were collected at KR 55.2 to collect surface and mid-depth as specified in AQ 2 TSP text. These sites are very near each other and the water quality is expected to be similar; however, in 2025, grab samples were collected from both sites.

Key: – = data not available
RM = river mile

Table 7.3-6. Summary of Analytical Results for Bacterial Sampling in 2024

Sample Location	Test	Sample Dates 2024					
		7/2/2024	7/9/2024	7/18/2024	7/24/2024	8/13/2024[1]	GeoMean[2]
KR 55.2	*Total Coliform (MPN/100mL)*	23.0	33.0	7.8	4.5	<1.8	8.6
	Fecal Coliform (MPN/100mL)	23.0	33.0	2.0	4.5	<1.8	6.6
KR 48.7	*Total Coliform (MPN/100mL)*	23.0	23.0	7.8	2.0	<1.8	6.8
	Fecal Coliform (MPN/100mL)	23.0	23.0	7.8	2.0	<1.8	6.8
KR 48.4	*Total Coliform (MPN/100mL)*	23.0	23.0	7.8	4.5	2.0	8.2
	Fecal Coliform (MPN/100mL)	<1.8	23.0	2.0	4.5	<1.8	3.7
KR 47.78	*Total Coliform (MPN/100mL)*	>1600	33.0	49.0	7.8	<1.8	32.5
	Fecal Coliform (MPN/100mL)	>1600	33.0	22.0	7.8	<1.8	27.7

Notes: [1] Sampling delayed until August due to the Borel Fire.
[2] Geometric mean calculated by taking the fifth root of the product of the five values multiplied by each other for each constituent [(X*X*X*X*X)^(1/5)]. Note: <1.8 value treated as 1.8 in calculations.
Key: MPN/100 mL = Most Probable Number of bacterial colonies per 100 mL of water.

Table 7.3-7. Office of Environmental Health Hazard Assessment Fish Consumption Advisories for the Kern River

Advisories	Population Group	Recommended Consumptions
Lake Isabella	Women (ages 18–49) and Children (ages 1–17)	Up to 3 servings/week of Threadfin Shad; OR up to 1 serving/week of black bass species or common carp
	Women (ages 50+) and Men (ages 18+)	Up to 7 servings/week of Threadfin Shad; OR up to 2 serving/week of black bass species or common carp
Statewide	Women (ages 18–49) and Children (ages 1–17)	Up to 1 serving/week of brown trout, bullhead species, rainbow trout, or sunfish species; up to 2 servings/week of red shiner
	Women (ages 50+) and Men (ages 18+)	1 serving/week of black bass species, catfish, common carp, goldfish, Sacramento pikeminnow, or Sacramento sucker; AND 2 servings/week of brown trout, or sunfish; 3 servings/week of bullhead species or rainbow trout; 5 servings/week of red shiner

Source: OEHHA 2005

Table 7.3-8. Preliminary 2025 Turbidity Sampling Results

Site ID	Site Description	Turbidity (NTU)[1]		
		Water Temperature Logger Installation (May 4–5, 2025)	Spring in-situ Sampling (June 3–5, 2025)	Mid-Season Sampling (August 14, 2025)
KR 55.6	Kern River above Democrat Dam	2.4	1.3	2.6
KR 55.2	Kern River below rafting take-out	–	1.5	–
KR 54.36	Kern River between Democrat Dam and Instream Flow Release	4.8	1.2	2.6
KR 54.2	Kern River below Instream Flow Release	4.5	1.3	2.4
KR 53.84	Kern River near USGS gage 1192500; below Democrat Dam	4.2	1.4	2.6
KR 50.3	Kern River near Lucas Creek	5.1	2.2	2.5
KR 48.7	Kern River below Upper Richbar Day Use Area	–	2.2	–
KR 48.4	Kern River below Lower Richbar Day Use Area	–	2.6	–
KR 47.78	Kern River below Live Oak Day Use Area	–	2.3	–
KRTR 43.94	Kern River No. 1 Powerhouse Tailrace	4.5	2.7	–
KR 44.0	Kern River upstream of Kern River No. 1 Powerhouse	8.0	3.1	2.5

Notes: [1] Turbidity sampling during the water temperature logger installation (May 4 and May 5) and in the summer (August 14) was conducted voluntarily to obtain supplemental turbidity data during temperature logger downloads. This sampling only occurred at water temperature logger sites as described in Table 7.3-4.

Key: NTU = Nephelometric Turbidity Unit
USGS = U.S. Geological Survey

Table 7.3-9. Monthly Mean and Maximum Water Temperatures (1999 to 2007) Downstream of Democrat Dam, Below Stark Creek, and Upstream of Kern River No. 1 Powerhouse

Month	Downstream of Democrat Dam		Below Stark Creek		Upstream of Kern River No. 1 Powerhouse	
	Mean (°C)	Maximum (°C)	Mean (°C)	Maximum (°C)	Mean (°C)	Maximum (°C)
1999						
May	15.1	19.1	16.7	21.6	17.6	22.1
June	18.1	21.3	18.7	21.4	19.3	22.3
July	21.0	22.9	21.4	23.4	21.6[1]	23.1[1]
August	22.2	24.6	22.5	24.6	22.8	25.0
September	21.6	23.6	21.9	23.6	22.2	24.0
October	17.1[1]	20.6[1]	17.5	21.6	18.9	21.8
2000						
May	17.0[1]	19.8	17.6	21.1	18.3	22.3
June	19.4	21.6	20.1	22.6	20.6	23.1
July	21.3	23.8	21.9	24.1	22.3	24.4
August	23.0	26.2	23.3	25.0	23.7	25.6
September	20.6[1]	24.3	21.2	23.8	21.6	24.0
October	17.6	20.8	17.5	21.8	17.8	21.3
2001						
May[1]	18.9	21.1	19.2	23.6	20.0	22.8
June	19.9	22.6	20.3	22.6	20.7	23.0
July[1]	22.5	24.1	22.7	24.6	23.2	26.1
August[1]	23.3	25.0	23.6	27.3	24.2	26.4
September[1]	21.8	24.3	21.8	26.0	22.6	25.9
October[1]	17.9	22.4	19.5	23.3	18.6	22.5
2002						
May	16.9	20.9	18.0	24.3	18.6	23.7
June	20.1	22.8	20.6	23.3	21.3	24.0
July	23.1	24.6	23.5	26.3	23.9	26.6
August	22.6	24.5	22.9	27.3	23.3	26.1
September	21.0	23.8	21.3	27.0	21.9	25.6
October	16.3	19.3	16.2	21.0	17.0	19.6
2003						
May	15.6	19.3	16.6	21.3	16.9	21.5
June	19.1	21.2	19.6	20.8	20.4	22.2
July	21.8	24.2	22.1	24.3	22.7	25.4
August	23.3	25.1	23.4	24.3	23.9	25.9

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Month	Downstream of Democrat Dam		Below Stark Creek		Upstream of Kern River No. 1 Powerhouse	
	Mean (°C)	Maximum (°C)	Mean (°C)	Maximum (°C)	Mean (°C)	Maximum (°C)
September	22.5	25.1	22.6	24.2	22.9	25.9
October	18.9	21.6	18.9	22.1	19.3	22.5
2004						
May	16.7[2]	18.0[2]	17.7	20.7	18.0	21.0
June	21.3[3]	24.1[3]	20.3	22.4	20.7	23.2
July	22.6	24.4	22.9	24.4	23.4	26.5
August	23.4	24.7	23.5	25.6	23.9	25.8
September	20.7	23.7	20.7	25.3	21.0	26.3
October	16.4	19.9	16.5	22.0	16.8	20.7
2005						
May	15.2	18.1	–[4]	–[4]	16.3	19.0
June	16.5	19.5	–[4]	–[4]	17.4	20.2
July	19.0	21.8	–[4]	–[4]	20.1	22.3
August[1]	21.0	23.1	–[4]	–[4]	21.8	23.1
September[1]	20.7	23.0	–[4]	–[4]	21.0	22.8
October[1]	17.4	20.3	–[4]	–[4]	17.9	20.6
2006						
May[1]	15.0	17.2	15.5	17.6	15.9	17.9
June	17.4	20.4	17.9	20.7	18.3	21.0
July	20.2	22.9	20.8	23.4	21.2	23.5
August	22.0	23.5	22.3	23.9	22.7	24.5
September[5]	21.2	23.8	21.1	24.8	21.6	25.0
October[5]	16.6	19.8	15.3	19.1	16.9	19.9
2007						
May	17.3	20.1	18.0	21.6	18.5	21.7
June	20.2	22.0	20.7	23.5	21.2	23.9
July	22.7	24.5	22.5	24.8	23.5	25.4
August	23.0	25.7	23.4	26.8	23.5	26.2
September[1]	21.0	25.1	21.1	27.9	21.0	25.0
October[1]	16.2	18.9	15.7	19.7	16.0	19.5

Source: SCE 2008

Notes: [1] Analysis periods for daily averages ranged from 10 to 30 days due to data loss, loss of temperature recorders and the Project being offline before the end of the analysis period.
[2] Based on 25 days of sampling
[3] Based on 4 days of sampling
[4] Stark Creek temperature recorders were buried by sediment and lost.
[5] Changing water levels during September and October may have exposed the temperature recorders at Stark Creek to warmer temperatures than are representative of the river.

Key: °C = degrees Celsius

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Table 7.3-10. Kern River Monthly Mean, Minimum, and Maximum Water Temperature (°C) By Site in 2024

Site Locations		May	June	July	August	September	October
KR 55.6 Above Democrat Dam	**Mean (°C)**	16.4	18.8	21.6	23.1	21.7	20.7
	Min	14.1	15.9	19.0	21.2	19.5	19.3
	Max	19.1	22.0	24.6	24.9	23.7	21.6
KR 54.36 Bypass Reach	**Mean (°C)**	16.5	19.0	21.7	23.2	21.7	20.7
	Min	14.6	16.1	19.0	21.2	19.8	19.2
	Max	19.1	22.0	24.6	24.9	23.7	21.7
KR 54.2[1] Bypass Reach	**Mean (°C)**	16.5	19.0	21.8	23.2	21.7	21.0
	Min	14.6	16.1	19.0	21.2	19.8	20.2
	Max	19.1	22.0	24.6	24.9	23.7	21.3
KR 53.84 Bypass Reach	**Mean (°C)**	16.6	19.0	21.8	23.1	21.6	20.9
	Min	14.6	16.1	19.0	21.2	19.5	20.2
	Max	19.0	22.0	24.5	24.8	23.6	21.6
KR 50.3* Bypass Reach	**Mean (°C)**	17.0	19.3	22.1	23.3	21.8	21.1
	Min	14.9	16.5	19.2	21.4	19.2	19.5
	Max	19.1	22.1	24.5	24.9	23.9	22.6
KR 44.0 Bypass Reach	**Mean (°C)**	17.7	20.0	22.6	23.6	22.2	21.1
	Min	16.0	17.4	19.7	22.1	19.8	19.2
	Max	19.3	22.1	24.5	24.9	24.9	22.6
KR 43.94 Powerhouse Tailrace	**Mean (°C)**	16.8	19.4	21.8	23.3	21.9	20.9
	Min	14.8	16.7	19.2	21.4	20.0	19.4
	Max	19.0	22.1	24.6	24.9	23.8	21.8

Notes: [1] The data loggers at sites KR 54.2 and KR 50.3 were dewatered from October 12 through October 15, 2024, during a flow decrease. Data from these dates were omitted from analysis.

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FIGURES

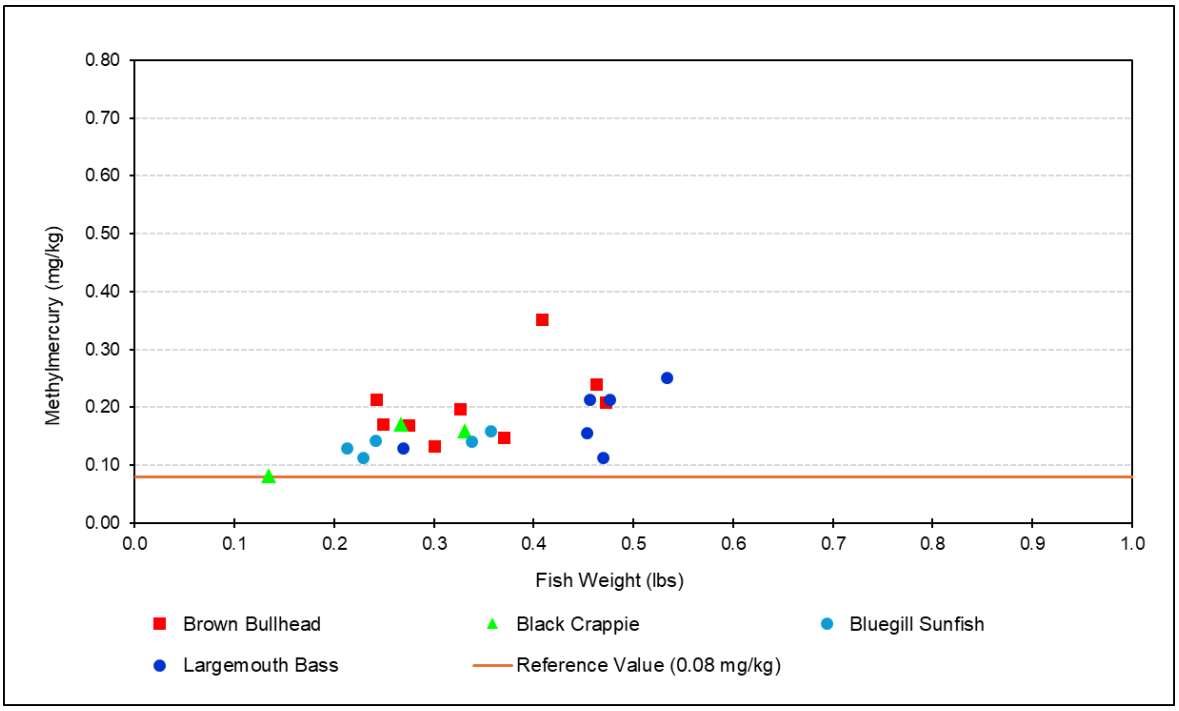


Figure 7.3-1. 2024 Methylmercury Fish Tissue Analysis Results at Democrat Dam Impoundment by Species (Fish Less than 1 Pound)

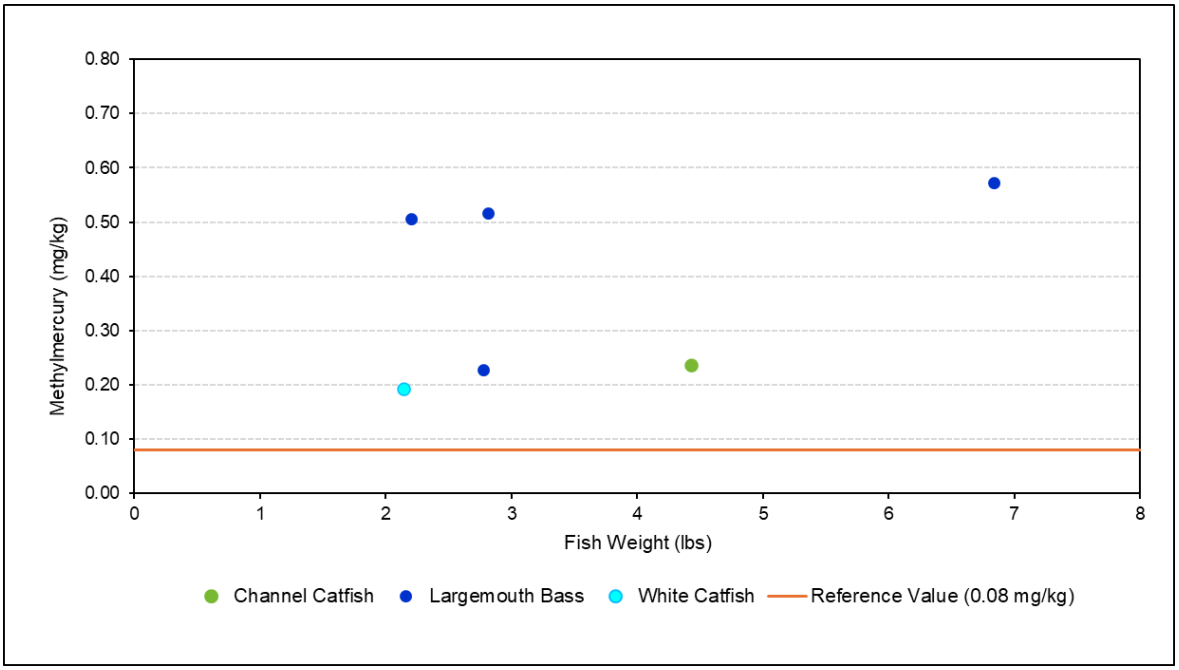


Figure 7.3-2. 2024 Methylmercury Fish Tissue Analysis Results at Democrat Dam Impoundment by Species (Fish Greater than 1 Pound)

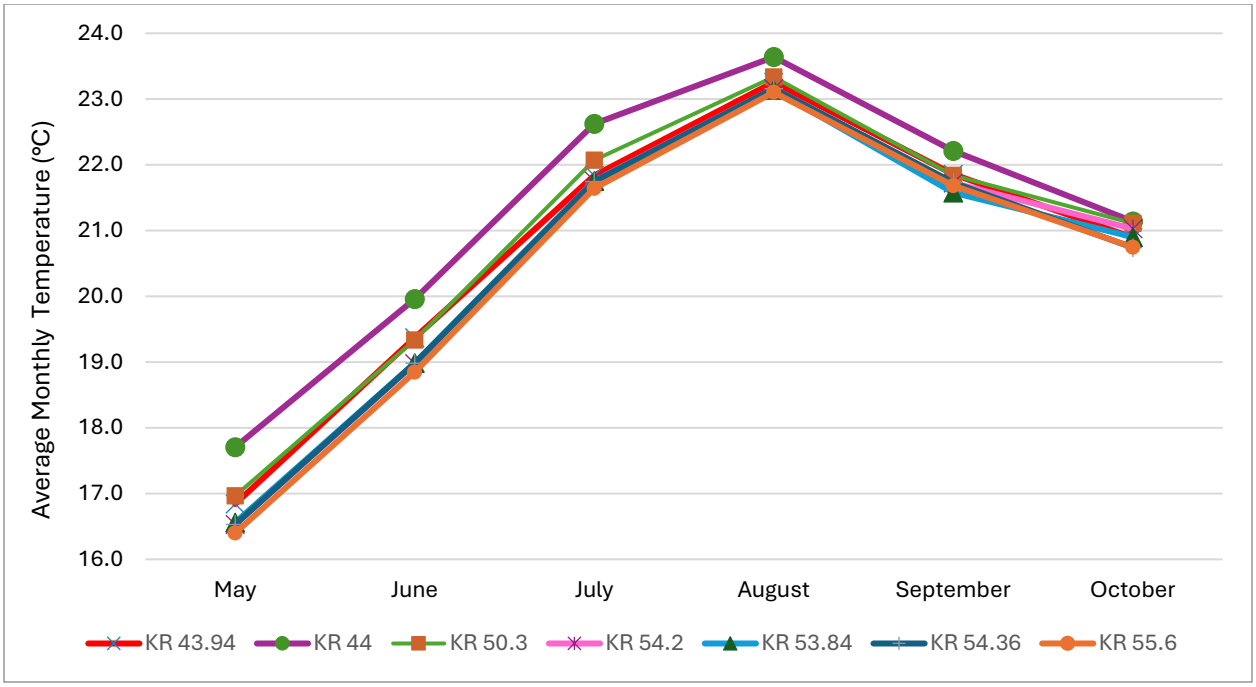
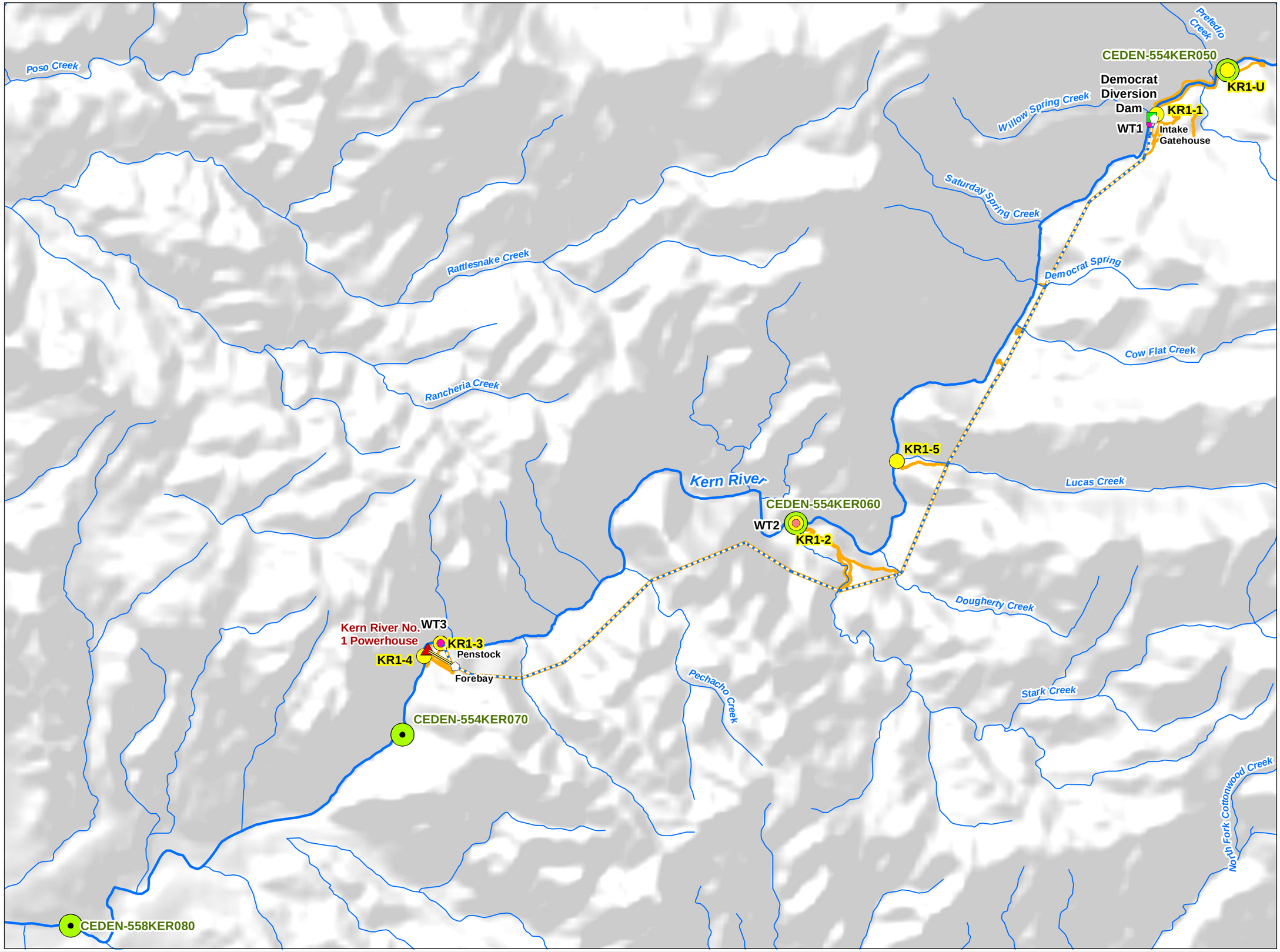


Figure 7.3-3. Kern River Monthly Average Water Temperature (May–October 2024)

MAPS



Facilities

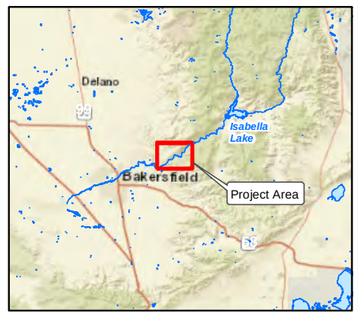
- Dam
- Powerhouse
- Water Conveyence Feature
- Flowline
- Penstock
- FERC Boundary

Other Features

- Watercourse

Water Temperature and Water Quality Measurement Sites

- Water Temperature Station
- Water Quality Station
- Water Temperature and Water Quality Station
- CEDEN Station



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Kern River No. 1 Hydroelectric Project
FERC Project No. 1930

Map 7.3-1

Water Temperature and Water Quality Measurement Sites

0 0.25 0.5 Miles

Projection: UTM Zone 11
Datum: NAD 83

Date: 8/25/2025

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APPENDIX 7.3-A

Applicable Water Quality Standards and Objectives for the Tulare Basin, including the Lower Kern River

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Table 7.3-A-1. Applicable Water Quality Standards and Objectives for the Tulare Basin, Including the Lower Kern River

Analyte	Units	State and Federal Criteria			
		Basin Plan[1]	California Toxic Rule[2]	National Toxics Rule[3]	EPA Criteria[4]
In-Situ Measurements					
Oxygen, Dissolved	mg/L	5.0/7.0[5]	NS	NS	5.0/8.0[20]
Secchi Depth	Meter	NS	NS	NS	NS
pH	unitless	6.5–8.3	NS	6.5–9.0	6.5–9.0
Water Temperature	Fahrenheit	NS[25]	NS	NS	NS
Specific Conductance	µS/cm	300	NS	NS	NS
General Parameters and Metals					
Alkalinity (as $CaCO_3$)	mg/L	NS	NS	>20[6]	NS
Aluminum	mg/L	0.2	NS	NS	Site-specific [21]
Ammonia as NH_3	mg/L	0.025[7]	NS	NS	1.9/17 [22,23]
Antimony	µg/L	6	14	14	14
Arsenic – Total	µg/L	10	150/340[8]	150/340[8]	10
Benzene	µg/L	1	1.2	1.2	5
Beryllium	µg/L	4	NS	NS	NS
Bicarbonate (as $CaCO_3$)	mg/L	NS	NS	NS	NS
Boron – Total	mg/L	NS	NS	NS	NS
Cadmium	µg/L	5	Hardness Dependent[8,9]	Hardness Dependent[8,9]	Hardness Dependent [8,9]
Calcium	mg/L	NS	NS	NS	NS
Carbonate (as $CaCO_3$)	mg/L	NS	NS	>20[6]	NS
Chemical Oxygen Demand	mg/L	NS	NS	NS	NS
Chloride	mg/L	250[10]	NS	NS	NS
Chlorophyll-a	µg/L	NS	NS	NS	NS
Chromium - Total	µg/L	50	NS	NS	NS
Cobalt	µg/L	NS	NS	NS	NS
Color	unitless	NS[10,11]	NS	NS	NS

Analyte	Units	State and Federal Criteria			
		Basin Plan[1]	California Toxic Rule[2]	National Toxics Rule[3]	EPA Criteria[4]
Copper – Total	mg/L	1[10]	1.3[12] and Hardness Dependent[8,9]	1.3[12] and Hardness Dependent[8,9]	1.3[12] and Hardness Dependent[8,9]
Cryptosporidium	organisms/L	NS	NS	NS	NS
Cyanide	µg/L	150	5.2/22[8]	5.2/22[8]	3.5/52[24]
E. coli	MPN/100 mL	100/320[19]	NS	NS	NS
Ethyl-benzene	µg/L	300	3,100	3,100	300
Fecal Coliform (3x5)	MPN/ 100 mL	200/400[13]	NS	NS	NS
Fecal Streptococci	MPN/ 100 mL	NS	NS	NS	NS
Fluoride	mg/L	2	NS	NS	4.0
Foaming Agents	mg/L	0.5[10]	NS	NS	NS
Giardia	organisms/L	NS	NS	NS	NS
Hardness (as $CaCO_3$)	mg/L	NS	NS	>20[6]	NS
Iron – Total	mg/L	0.3[10]	NS	NS	NS
Lead – Total	µg/L	15	Hardness Dependent [8,9]	Hardness Dependent [8,9]	Hardness Dependent [8,9]
Magnesium	mg/L	NS	NS	NS	NS
Manganese – Total	µg/L	50[10]	NS	NS	NS
Mercury – Total	µg/L	2	0.05	0.77/1.4[8]	0.77/1.4[8]
Methylmercury	mg/kg fish	NS	0.3[14]	0.3[14]	0.3[14]
Methyl-tertiary-butyl Ether (MtBE)	µg/L	5[10]	NS	NS	NS
Nickel	µg/L	100	610[12]; 4,600[15] and Hardness Dependent [8,9]	610[12]; 4,600[15] and Hardness Dependent [8,9]	610[12]; 4,600[15] and Hardness Dependent [8,9]
Nitrate (NO_3)	mg/L	45	NS	NS	10
Nitrite (as nitrogen)	mg/L	1	NS	NS	1
Nitrogen – Total Kjeldahl (TKN)	mg/L	NS	NS	NS	NS
Odor	unitless	NS[10,11]	NS	NS	NS
Organic Carbon	mg/L	NS	NS	NS	NS

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Analyte	Units	State and Federal Criteria			
		Basin Plan[1]	California Toxic Rule[2]	National Toxics Rule[3]	EPA Criteria[4]
Ortho-phosphate ($o\text{-}PO_4\text{-}P$)	mg/L	NS	NS	NS	NS
Phosphorus	mg/L	NS	NS	NS	NS
Potassium	mg/L	NS	NS	NS	NS
Selenium	µg/L	50	5[8]	5[8]	5[8]
Silica	mg/L	NS	NS	NS	NS
Silver	µg/L	100[10]	Hardness Dependent [8,9]	Hardness Dependent [8,9]	Hardness Dependent [8,9]
Sodium	mg/L	NS	NS	NS	NS
SO_4	mg/L	250[10]	NS	NS	NS
Thallium	µg/L	2	1.7[12], 6.3[15]	1.7[12], 6.3[15]	1.7[12], 6.3[15]
Toluene	µg/L	150	6800[12], 200000[15]	6800[12], 200000[15]	6800[12], 200000[15]
Total Coliform [18] (3x5, 6 hr hold)	MPN/ 100 ml	NS	NS	NS	NS
Total Dissolved Solids	mg/L	500[10]	NS	250000[12]	NS
Total Petroleum Hydrocarbons (as gasoline and as diesel)	µg/L	NS	NS	Narr[16]	NS
Total Suspended Solids	mg/L	NS	NS	NS	NS
Turbidity	NTU	Narr[17]	Narr[17]	NS	NS
Xylenes – Total	µg/L	1750	NS	NS	NS
Zinc – Total	mg/L	5[10]	Hardness Dependent[11]	Hardness Dependent[11]	Hardness Dependent[11]

Source: EPA 1976, 1980, 1986a, 1986b,1992, 1996, 2000, 2001, 2002, 2007, 2011, 2013, 2018a, and 2024.

Notes:
[1] The Basin Plan for the Tulare Lake Basin – Third Edition (May 2018)
[2] California Toxics Rules are based primarily on EPA standards developed under the Clean Water Act for human consumption of water and aquatic organisms with an adult risk for carcinogens estimated to be one in one million as contained in the Integrated Risk Information System (IRIS) as of October 1, 1996.
[3] The National Toxics Rules are based on EPA standards developed under the CWA for human consumption of water and aquatic organisms with an adult risk for carcinogens estimated to be one in one million as contained in the IRIS as of October 1, 1996. These criteria are to be applied to all states not complying with the CWA section 303(c)(2)(B).
[4] EPA Criteria are nationally recommended water quality criteria developed under Section 304(a) of the Clean Water Act for the protection of aquatic life and human health, based on the best available science and risk thresholds (e.g., one-in-one-million cancer risk for carcinogens per IRIS, where applicable).
[5] For water designated as WARM (5.0 mg/L) and COLD or SPWN (7.0 mg/L).
[6] 20 mg/L or more as CaCO3 for freshwater aquatic life except where natural concentrations are less (EPA's 1976 'Red Book'). The 'Red Book' also recommends that natural alkalinity not be reduced by more than 25 percent.

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[7] Taste and odor threshold.
[8] Freshwater Aquatic Life Protection, continuous concentration (4-day average)/maximum concentration (1-hour average).
[9] Criteria is expressed as a function of hardness and decreases as hardness decreases. The actual criteria are calculated based on the hardness (as $CaCO_3$) of the sample water.
[10] The criteria listed are secondary Maximum Concentration Levels for California drinking water quality objectives that do not necessarily indicate a toxic amount of contaminate. Rather these standards dictate water quality objectives designed to preserve taste, odor, or appearance of drinking water. 20 mg/L or more as $CaCO_3$ for freshwater aquatic life except where natural concentrations are less (EPA's 1976 'Red Book). The 'Red Book' also recommends that natural alkalinity not be reduced by more than 25 percent.
[11] Water shall be free of discoloration that causes nuisance or adversely affects beneficial uses. Water shall not contain taste- or odor-producing substances in concentrations that impart undesirable tastes or odors to domestic or municipal water supplies or to fish flesh or other edible products of aquatic origin, or that cause nuisance, or otherwise adversely affect beneficial uses. (Sacramento and San Joaquin River Basin Plan, Chapter III: Water Quality Objectives, pgs. 5 and 7, 6 September 2002).
[12] CTR, NTR, and EPA human health (30-day average); Drinking Water Sources (consumption of water an aquatic organisms).
[13] In all waters designated for REC-1, fecal coliform concentrations, based on a minimum of not less than 5 samples equally spaced over a 30-day period, shall not exceed a geometric mean of 200/100 ml and 10 percent of total samples shall not exceed 400/100 ml. This objective was superseded in 2019 by statewide *E. coli* criteria for inland surface waters.
[14] This value is an Ambient Water Quality Criteria (AWQC) for methylmercury and was published by the EPA in a document titled Water Quality Criterion for the Protection of Human Health: Methylmercury – Final (EPA – 823-R-01-001, January 2001). This AWQC replaces the AWQC for total mercury published in 1980 and partially updated in 1997.
[15] CTR human health (30-day average); Other Waters (aquatic organism consumption only).
[16] From Compilation of Water Quality Goals – TPH-diesel: taste and odor threshold and EPA SNARL = 100 µg/L. TPH-gasoline: taste and odor threshold and proposed EPA SNARL = 5 mg/L.
[17] Increases in turbidity attributable to controllable water quality factors shall not exceed the following limits: where natural turbidity is between 0 and 5 NTU's, increases shall not exceed 1 NTU. Where natural turbidity is between 5 and 50 NTU's, increases shall not exceed 20 percent. Where natural turbidity is between 50 and 100 NTU's, increases shall not exceed 10 NTU's. Finally, where natural turbidity is greater than 100 NTU's, increases shall not exceed 10 percent.
[18] No criteria applicable for REC-1 inland surface waters; *E. coli* is the designated bacterial indicator under the Water Quality Control Plan for Inland Surface Waters, Enclosed Bays, and Estuaries of California (SWRCB 2019) Bacteria Provision.
[19] For *Escherichia coli* (*E. coli*), the geometric mean shall not exceed 100 colony forming units (cfu) per 100 milliliters (mL), and the statistical threshold value shall not exceed 320 cfu per 100 mL, in no more than 10 percent of samples collected in a calendar month." (SWRCB 2019)
[20] For water designated as WARM (5.0 mg/L) and COLD (8.0 mg/L).
[21] Criteria are dependent on a site's pH, total hardness, and dissolved organic carbon (DOC), per EPA 2018a. Calculations would be developed using the *Aluminum Criteria Calculation V.2.0.xlsm* (EPA 2018b).
[22] Criteria are expressed as expressed as total ammonia nitrogen (mg TAN/L) at pH 7 and 20°C. The actual criteria is calculated based on pH and temperature of the sample water.
[23] Freshwater Aquatic Life Protection, continuous concentration (30-day average)/maximum concentration (1-hour average).
[24] Freshwater Aquatic Life Protection, continuous concentration (24-hour average)/maximum concentration (1-hour average).
[25] Shall not be altered unless it can be demonstrated that beneficial uses are not adversely affected. Elevated temperature wastes shall not cause the temperature to increase by more than 5 °F (~2.8 °C) above natural receiving-water temperature.

Key: µg/L = micrograms per liter
µS/cm = microsiemens per centimeter
EPA = Environmental Protection Agency
mg/kg = milligrams per kilogram
mg/L = milligrams per liter
MPN/100 mL = Most Probable Number of bacterial colonies per 100 mL of water
NS = no standard available
NTU = Nephelometric Turbidity Units
o-PO_4-P = Ortho-phosphate
s/L = symptoms and lifecycle
SO_4 = sulfate

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APPENDIX 7.3-B

1992 Water Quality Sampling Results in the Project Area

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Table 7.3-B-1. 1992 Water Quality Sampling Results in the Project Area

Station	KR1-U	KR1-1		KR1-2		KR1-3			KR1-4	DLR	Basin Plan or Toxic Rule Criteria	Units
Date Sampled	**9/23/92**	**3/31/92**	**9/23/92**	**3/31/92**	**9/23/92**	**3/31/92**	**9/23/92**	**3/31/92**	**9/23/92**			
Time Sampled	**1040**	**1100**	**1220**	**1345**	**1330**	**1455**	**1430**	**1545**	**1525**			
pH	8	7.6	7.6	8.0	8.0	8.1	8.0	7.9	8.0	0.1	6.5–8.3[BP]	pH Units
Elec. Cond. @ 25°C	–	160	200	170	200	180	200	180	200	1	300[BP]	µmhos/cm
Total Dissolved Solids @ 180°C	–	115	105	115	105	120	110	115	100	10	500(1)[BP]	mg/L
Total Suspended Solids	–	9.3	13.7	0.9	5.9	0.8	1.1	12.4	13.2	0.5	NS	mg/kg
Hardness as $CaCO_3$	–	39.3	52	48.5	53.4	57.7	53.6	47.2	52.2	0.3	>20[NTR]	mg/L
Turbidity	–	–	2.6	–	1.9	–	0.45	–	2.5	0.05	FT	NT units
Calcium	–	11.6	16.2	14.8	16.6	18	16.5	14.6	16.3	0.1	*NS	mg/L
Magnesium	–	2.5	2.8	2.8	2.9	3.1	3	2.5	2.8	0.01	NS	mg/L
Sodium	–	14.0	18.1	13.3	18.2	11.4	19.5	13.9	18.3	0.1	NS	mg/L
Potassium	–	1.6	2	1.8	2	1.8	2.1	1.7	2	0.1	NS	mg/L
Carbonate	–	nd	nd	nd	nd	nd	nd	Nd	nd	2.6	NS	mg/L
Bicarbonate	–	68.7	84.3	73.0	84.3	77.4	84.3	71.3	86.9	2.6	NS	mg/L
Chloride	–	5.2	6.9	5.5	6.8	6.2	7.7	5.4	6.7	1.8	250(1)[BP]	mg/L
Fluoride	–	0.21	0.36	0.21	0.38	0.22	0.36	0.21	0.35	0.05	2[BP]	mg/L
Ortho-phosphate	–	0.12	nd	0.12	nd	nd	nd	0.12	nd	0.1	NS	mg/L
Total Kjeldahl Nitrogen	–	nd	0.9	nd	0.4	nd	0.3	nd	0.6	0.2	NS	mg/L
Nitrate as NO_3	–	nd	0.4	nd	nd	nd	nd	nd	nd	0.4	45(2)[BP]	mg/L
Ammonia as NH_3	–	nd	0.45	nd	nd	nd	0.04	nd	nd	0.02	0.025[BP]	mg/L

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Station	KR1-U	KR1-1		KR1-2		KR1-3			KR1-4	DLR	Basin Plan or Toxic Rule Criteria	Units
Date Sampled	**9/23/92**	**3/31/92**	**9/23/92**	**3/31/92**	**9/23/92**	**3/31/92**	**9/23/92**	**3/31/92**	**9/23/92**			
Time Sampled	**1040**	**1100**	**1220**	**1345**	**1330**	**1455**	**1430**	**1545**	**1525**			
Nitrite Nitrogen	–	nd	nd	nd	nd	nd	nd	nd	nd	0.1	1.0(3)[BP]	mg/L
Oil and Grease	–	nd	16	nd	nd	nd	nd	nd	nd	2	NS	mg/L
Biochemical Oxygen Demand	–	1.8	1.5	1.22	3.3	0.6	0.9	1.22	0.9	0.3	NS	mg/L
Chlorophyll A	–	nd	nd	nd	nd	nd	nd	nd	28	5	*	mg/m^3
Total Coliform	> 1600	300	> 1600	500	> 1600	300	500	500	>1600	2	NS	MPN/100 mL
Fecal Coliform	23	240	50	50	nd	14	13	nd	50	2.2	200/400(4) [BP]	MPN/100 mL
Dissolved Arsenic	9.9	5.7	10	5.9	9.5	5.9	9.9	5.5	10	2	**	µg/L
Total Arsenic	11	6.4	11	6.0	11	5.8	11	6.3	11	2	10 [BP]	µg/L
Dissolved Copper	–	nd	nd	nd	nd	nd	nd	nd	nd	10	**	µg/L
Total Copper	–	nd	nd	nd	nd	nd	nd	nd	nd	10	1000(1) [BP]	µg/L
Dissolved Lead	–	nd	nd	nd	nd	nd	nd	nd	nd	5	**	µg/L
Total Lead	–	nd	nd	nd	5	nd	nd	nd	nd	5	15 [BP]	µg/L
Dissolved Molybdenum	–	nd	nd	nd	11	nd	nd	nd	nd	10	NS	µg/L
Total Molybdenum	–	nd	nd	nd	nd	nd	nd	nd	nd	10	NS	µg/L
Dissolved Zinc	–	nd	nd	nd	nd	nd	nd	nd	nd	10	**	µg/L
Total Zinc	–	21	18	31	22	24	17	19	22	10	5000(6)[BP]	µg/L
Dissolved Mercury	–	nd	nd	nd	nd	nd	nd	nd	nd	0.2	**	µg/L
Total Mercury	–	nd	nd	nd	nd	nd	nd	nd	nd	0.2	2/5/.012(5)	µg/L
Total Tungsten	–	–	nd	–	nd	–	nd	–	nd	1	NS	µg/L

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Station	KR1-U	KR1-1		KR1-2		KR1-3			KR1-4	DLR	Basin Plan or Toxic Rule Criteria	Units
Date Sampled	**9/23/92**	**3/31/92**	**9/23/92**	**3/31/92**	**9/23/92**	**3/31/92**	**9/23/92**	**3/31/92**	**9/23/92**			
Time Sampled	**1040**	**1100**	**1220**	**1345**	**1330**	**1455**	**1430**	**1545**	**1525**			
Dissolved Tungsten	–	nd	nd	nd	nd	nd	nd	nd	nd	2	NS	µg/L
Total Alpha Particle	–	2	nd	3	nd	3	nd	2	nd	2	15(2)	pCi/L
Total Beta Particle	–	nd	nd	nd	nd	4	nd	nd	nd	3	50(2)	pCi/L

Notes: Values shaded in green outside of Basin Plan or Toxic Rule criteria

Key:
(1) = Secondary MCL as per Title 22 of the California Code of Regulations (CCR), Division 4
(2) = Primary MCL as per Title 22 of CCR, Division 4, Chapter 15.
(3) = Primary MCL set by EPA pursuant to the Safe Drinking Water Act
(4) = In waters designated as REC-1, fecal coliform concentration based on a minimum of not less than five samples for any 30 day period, shall not exceed a geometric mean of 200 MPN, nor shall more than ten percent of total samples during any 30 day period exceed 400 MPN."
(5) = Primary MCL as per Title 22/Basin Plan Criteria/Surface Water Plan Criteria
(6) = Secondary MCL as per Title 22 and Surface Water Plan Criteria
- = not sampled
** = Numerical standards based on total concentrations
°C = degrees Celsius
µmhos/cm = micromhos per centimeter
BP = Basin Plan is source of most stringent criteria
CTR = CA Toxic Rule is source of most stringent criteria
DLR = detection limit for reporting purposes
FT = See Table 7.3-1 Footnote 16
KR1 = Kern River No. 1 Hydroelectric Project
mg/L = milligrams per liter
mg/m^3 = milligrams per cubic meter
MPN/100 mL = Most Probable Number of bacterial colonies per 100 mL of water
nd = not detected
NS = no standard available
NT units = nephelometric turbidity units
NTR = National Toxics Rule is source of most stringent criteria
pCi/L = picocuries per liter

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APPENDIX 7.3-C

Summary of 2024 Water Quality Sampling Results in the Project Area (In-Situ and Grab Sampling)

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Table 7.3-C-1. Summary of 2024 In-Situ Sample Results in the Project Area

Site ID	Site Description	Date	Time of Day	Water Temperature (°C)	Dissolved Oxygen (mg/L)	Dissolved Oxygen (% saturation)	Specific Conductance (µS/cm at 25°C)	pH	Alkalinity (mg/L)	Salinity (PPT)[1]
Spring Runoff										
KR 55.6	Kern River above Democrat Dam	6/27/2024	0830	18.9	8.68	94	92	7.97	40	0.0348
KR 55.2	Kern River below rafting take-out	6/27/2024	0845	19.0	8.73	94	92	7.97	40	0.0348
KR 54.36	Kern River between Democrat Dam and Instream Flow Release	6/27/2024	940	19.0	9.10	98	92	7.96	40	0.0348
KR 54.2	Kern River below Instream Flow Release	6/27/2024	1000	19.1	9.06	98	92	8.01	40	0.0348
KR 53.84	Kern River near USGS gage 11192500; below Democrat Dam	6/27/2024	1030	19.2	8.99	92	93	8.00	40	0.0352
KR 50.3	Kern River near Lucas Creek	6/27/2024	1110	19.5	8.93	97	92	8.04	40	0.0348
KR 48.7	Kern River below Upper Richbar Day Use Area	6/27/2024	1130	19.6	8.94	98	92	8.12	40	0.0348
KR 48.4	Kern River below Lower Richbar Day Use Area	6/27/2024	1145	19.6	8.96	98	92	8.14	40	0.0348
KR 47.78	Kern River below Live Oak Day Use Area	6/27/2024	1200	19.7	8.93	98	92	8.12	40	0.0348
KR 44.0	Kern River upstream of Kern River No. 1 Powerhouse	6/26/2024	1300	19.3	8.84	97	93	8.00	40	0.0352
KRTR 43.94	Kern River No. 1 Powerhouse Tailrace	6/26/2024	1220	20.5	9.06	100	93	8.17	40	0.0352
Late Summer/Early Fall Base-Flow Period										
KR 55.6	Kern River above Democrat Dam	10/10/2024	1030	20.0	8.72	95	143	7.95	43	0.0562
KR 55.2	Kern River below rafting take-out	10/10/2024	1110	20.1	8.89	98	142	7.99	43	0.0558
KR 54.36	Kern River between Democrat Dam and Instream Flow Release	10/9/2024	1200	20.1	8.63	95	141	7.95	43	0.0554
KR 54.2	Kern River below Instream Flow Release	10/9/2024	1215	20.2	8.58	95	141	7.95	44	0.0554
KR 53.84	Kern River near USGS gage 11192500; below Democrat Dam	10/9/2024	1300	20.3	8.67	96	142	7.99	44	0.0558
KR 50.3	Kern River near Lucas Creek	10/10/2024	0935	19.8	8.90	97	141	7.97	43	0.0554
KR 48.7	Kern River below Upper Richbar Day Use Area	10/10/2024	1150	20.2	8.79	97	140	7.98	44	0.0550
KR 48.4	Kern River below Lower Richbar Day Use Area	10/10/2024	1200	20.4	8.95	99	142	8.00	44	0.0558
KR 47.78	Kern River below Live Oak Day Use Area	10/10/2024	1215	20.4	8.89	99	142	8.10	43	0.0558
KR 44.0	Kern River upstream of Kern River No. 1 Powerhouse	10/9/2024	1015	20.1	9.12	100	140	8.00	43	0.0550
KRTR 43.94	Kern River No. 1 Powerhouse Tailrace	10/9/2024	1030	20.3	8.95	99	142	7.89	43	0.0558

Notes: [1] Salinity was calculated by converting specific conductance measurements (Dohrman 2023)
Key °C
µS/cm = microsiemens per centimeter
mg/L = milligrams per liter
PPT = parts per thousand
USGS = U.S. Geological Survey

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Table 7.3-C-2. Summary of 2024 (Spring) Seasonal Grab Sample Results

Water Quality Parameters	Units	MDL	RL	Water Quality Criteria	Site ID, Lab Sample ID, Date, Time and Analytical Results							
					KR 55.6 Kern River above Democrat Dam (surface)	KR 55.2 Kern River above Democrat Dam (mid-column)[1]	KR 54.36 Kern River between Democrat Dam and Instream Flow Release	KR 54.2 Kern River below Instream Flow Release	KR 53.84 Kern River near USGS Gage 1192500	KR 50.3 Kern River near Lucas Creek	KRTR 43.94 Kern River No. 1 Powerhouse Tailrace	KR 44.0 Kern River upstream of Kern No. 1 Powerhouse
					2406585-02	–	2406585-01	2406585-05	2406585-03	2406585-04	2406558-01	2406558-02
					6/27/2024	–	6/27/2024	6/27/2024	6/27/2024	6/27/2024	6/26/2024	6/26/2024
					0830	–	0940	1000	1030	1110	1220	1300
General Parameters												
Nitrate as N	mg/L	0.01	0.10	10[2]	0.35	–	0.15	0.30	0.46	0.28	0.15	0.40
Nitrite as N	mg/L	6.7	150	1[2]	ND	–	ND	ND	ND	ND	ND	ND
Ammonia as N	mg/L	0.33	0.80	0.025[3]	ND	–	ND	ND	ND	ND	ND	ND
TKN	mg/L	0.30	0.80	NS	0.39	–	ND	ND	ND	0.35	0.32	0.61
Total Phosphorus	µg/L	0.0022	0.10	NS	ND	–	ND	ND	ND	ND	ND	ND
Ortho-phosphate	mg/L	0.016	0.30	NS	ND	–	ND	ND	ND	ND	ND	ND
Total Dissolved Solids	mg/L	5.0	10.0	500[2]	94.0	–	80.0	69.0	89.0	86.0	ND	49.0
Total Suspended Solids	mg/L	2.0	2.5	NS	56.0	–	6.7	6.2	7.9	8.7	9.1	7.4
Total Alkalinity (as CaCO3)	mg/L	10.0	10.0	>20[4]	38.0	–	38.0	38.0	37.0	38.0	36.0	36.0
Metals - Dissolved												
Arsenic	µg/L	0.005	0.020	10[2]	ND	–	ND	ND	ND	ND	ND	ND
Cadmium	µg/L	7.0	10.0	Hardness dependent[5]	ND	–	ND	ND	ND	ND	ND	ND
Copper	µg/L	16	50.0	Hardness dependent[5]	ND	–	ND	ND	ND	ND	ND	ND
Iron	µg/L	0.031	0.10	300[2]	0.10	–	0.10	ND	0.10	ND	ND	0.10
Lead	µg/L	0.01	0.05	Hardness dependent[5]	ND	–	ND	ND	ND	ND	ND	ND
Manganese	µg/L	0.0030	0.030	50[2]	0.056	–	0.056	0.055	0.054	0.057	0.061	0.069
Nickel	µg/L	0.0010	0.010	Hardness dependent[5]	ND	–	ND	ND	ND	ND	ND	ND
Chromium-Total	µg/L	2.00	10.0	50[2]	ND	–	ND	ND	ND	ND	ND	ND
Metals-Total												
Total Mercury	ng/L	0.08	0.20	1,400[6]	ND	–	ND	ND	ND	ND	ND	ND

Notes:
[1] KR 55.2 was not sampled in the spring; KR 55.6 was not sampled in the fall; both sites were sampled in 2025, and those results will be provided in the USR.
[2] Water quality objective from the 2015 Water Quality Control Plan for the Tulare Lake Basin Second Edition.
[3] Basin Plan water quality objective is 0.025 mg/L. EPA criterion is pH, temperature, and life cycle dependent. See Table AQ 6-9 for EPA criteria and results.
[4] EPA criterion. The CCC of 20 mg/L is a minimum value except where alkalinity is naturally lower, in which case the criterion cannot be lower than 25 percent of the natural level.
[5] Criterion is hardness dependent which is expressed as a function of hardness and decreases as hardness decreases. Actual criterion is calculated based on the hardness (as $CaCO_3$) of the sample water. Hardness was not directly analyzed but all values were ND.
[6] EPA maximum concentration (1-hour average) criterion for freshwater aquatic life protection. Basin Plan water quality objective is less stringent (2,000 ng/L).

Key:
µg/L = micrograms per liter
CCC = Criterion Continuous Concentration
mg/L = milligrams per liter
MDL = Method Detection Limit
ng/L = nanograms per liter
ND = Analyte was not detected above the method detection limit and is therefore considered a non-detect.
NS = No standard
PQL = Practical Quantitation Limit: The concentration that can be reliably measured within specified limits and accuracy during routine laboratory operating conditions.
RL = Reporting Limit: The lowest concentration of a substance that can be reliably reported under current laboratory operating conditions.
TKN = Total Kjeldahl Nitrogen

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Table 7.3-C-3. Summary of 2024 (Fall) Seasonal Grab Sample Results

Water Quality Parameters	Units	MDL	RL	Water Quality Criteria	Site ID, Lab Sample ID, Date, Time and Analytical Results							
					KR 55.2 Kern River above Democrat Dam (surface)	KR 55.2 Kern River above Democrat Dam (mid-column)	KR 54.36 Kern River between Democrat Dam and Instream Flow Release	KR 54.2 Kern River below Instream Flow Release	KR 53.84 Kern River near USGS Gage 1192500	KR 50.3 Kern River near Lucas Creek	KRTR 43.94 Kern River No. 1 Powerhouse Tailrace	KR 44.0 Kern River upstream of Kern No. 1 Powerhouse
					2410283-02 AHJ3577	2410283-03 AHJ3577	2410259-03 AHJ3600	2410259-02 AHJ3600	2410259-05 AHJ3600	2410283-01 AHJ3577	2410259-01 AHJ3600	2410259-04 AHJ3600
					10/10/2024	10/10/2024	10/9/2024	10/9/2024	10/9/2024	10/10/2024	10/9/2024	10/9/2024
					1035	1100	1200	1215	1300	1000	1030	1015
General Parameters												
Nitrate as N	mg/L	0.01	0.10	10[1]	0.15	0.18	0.13	0.26	0.22	0.15	0.12	0.20
Nitrite as N	mg/L	6.7	150	1[1]	ND	ND	ND	ND	ND	ND	ND	ND
Ammonia as N	mg/L	0.33	0.80	0.025[2]	ND	ND	ND	ND	ND	ND	ND	ND
TKN	mg/L	0.30	0.10	NS	ND	ND	ND	ND	ND	ND	1.4	ND
Total Phosphorus	ug/L	0.0022	0.10	NS	ND	ND	ND	ND	ND	ND	ND	ND
Ortho-phosphate	mg/L	0.016	0.30	NS	ND	ND	ND	ND	ND	ND	ND	ND
Total Dissolved Solids	mg/L	5.0	10.0	500[1]	88.0	79.0	65.0	70.0	100.0	86.0	74.0	68.0
Total Suspended Solids	mg/L	2.0	2.5	NS	2.8	ND	2.9	2.8	2.8	ND	3.6	2.7
Total Alkalinity	mg/L	10.0	10.0	>20[3]	59.0	56.0	56.0	56.0	54.0	60.0	58.0	57.0
Metals - Dissolved												
Arsenic	µg/L	0.005	0.020	10[1]	ND	ND	ND	ND	ND	ND	ND	ND
Cadmium	µg/L	7.0	10.0	Hardness dependent[4]	ND	ND	ND	ND	ND	ND	ND	ND
Copper	µg/L	16	50.0	Hardness dependent[4]	ND	ND	ND	ND	ND	ND	ND	ND
Iron	µg/L	0.031	0.10	300[1]	ND	ND	ND	ND	ND	ND	0.48	ND
Lead	µg/L	0.01	0.05	Hardness dependent[4]	ND	ND	ND	ND	ND	ND	ND	ND
Manganese	µg/L	0.0030	0.030	50[1]	0.069	0.068	0.078	0.075	0.060	0.047	0.080	0.073
Nickel	µg/L	0.0010	0.010	Hardness dependent[4]	ND	ND	ND	ND	ND	ND	ND	ND
Chromium-Total	µg/L	2.00	10.0	50[1]	ND	ND	ND	ND	ND	ND	ND	ND
Metals-Total												
Total Mercury	ng/L	0.08	0.20	1,400[5]	ND	ND	ND	ND	ND	ND	ND	ND

Notes: [1] Water quality objective from the 2015 Water Quality Control Plan for the Tulare Lake Basin Second Edition.
[2] Basin Plan water quality objective is 0.025 mg/L. EPA criterion is pH, temperature, and life cycle dependent. See Table AQ 6-9 for EPA criteria and results.
[3] EPA criterion. The CCC of 20 mg/L is a minimum value except where alkalinity is naturally lower, in which case the criterion cannot be lower than 25 percent of the natural level.
[4] Criterion is hardness dependent which is expressed as a function of hardness and decreases as hardness decreases. Actual criterion is calculated based on the hardness (as $CaCO_3$) of the sample water. Hardness was not directly analyzed but all values were ND.
[5] EPA maximum concentration (1-hour average) criterion for freshwater aquatic life protection. Basin Plan water quality objective is less stringent (2,000 ng/L).

Key: µg/L = micrograms per liter
CCC = Criterion Continuous Concentration
mg/L = milligrams per liter
MDL = Method Detection Limit
ng/L = nanograms per liter
ND = Analyte was not detected above the method detection limit and is therefore considered a non-detect.
NS = No standard
PQL = Practical Quantitation Limit: The concentration that can be reliably measured within specified limits and accuracy during routine laboratory operating conditions.
RL = Reporting Limit: The lowest concentration of a substance that can be reliably reported under current laboratory operating conditions.
TKN = Total Kjeldahl Nitrogen

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LIST OF ACRONYMS

°C	degrees Celsius
AIS	aquatic invasive species
cm	centimeter
cfs	cubic feet per second
CDFW	California Department of Fish and Wildlife
CNDDB	California Natural Diversity Database
CRLF	California red-legged frog
CRWQCB	Central Valley Regional Water Quality Control Board
CSC	California Species of Special Concern
DO	dissolved oxygen
EPA	Environmental Protection Agency

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ESA	Endangered Species Act
ETP	Environmental Training Program
FERC	Federal Energy Regulatory Commission
fish/mi	fish per mile
FL	fork length
FLA	Final License Application
fps	feet per second
Forest Service	United States Forest Service
FPT	Federal Proposed Threatened
FSS	Forest Service Sensitive
FYLF	foothill yellow-legged frog
mg/kg	milligrams per kilogram
mg/L	milligrams per liter
mm	millimeter
NMFS	National Marine Fisheries Service
OEHHA	Office of Environmental Health Hazard Assessment
PHABSIM	Physical Habitat Simulation
PM&E	Protection, Mitigation, and Enhancement
Project	Kern River No. 1 Hydroelectric Project
PUP	pesticide use proposal
RM	river mile
SCE	Southern California Edison
SERA	Syracuse Environmental Research Associates
USACE	United States Army Corps of Engineers
USFWS	United States Fish and Wildlife Service
USGS	United States Geological Survey
USR	Updated Study Report
VMP	Vegetation Management Plan
WEAP	Worker Environmental Awareness Program
WRMP	Wildlife Resources Management Plan
WUA	weighted usable area
YOY	young-of-year

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7.4 FISH AND AQUATIC RESOURCES

This section describes fish and aquatic resources and aquatic habitat in the vicinity of Southern California Edison's (SCE) Kern River No. 1 Hydroelectric Project (Project). Some other resource information pertinent to the discussion of fish and aquatic resources (e.g., hydrology, sediment, and water quality/water temperature) is also summarized in this section. Detailed information on hydrology (Section 7.2), water quality (Section 7.3), and geomorphology (Section 7.7) can be found in the respective sections for each of these topics. In addition, this section describes rare, threatened, and endangered aquatic species in the vicinity of the Project.

Section 7.4.1 describes the affected environment and resource conditions under current Project operation and maintenance (i.e., baseline condition). Section 7.4.2 identifies proposed environmental measures, management plans, and monitoring plans (collectively referred to as protection, mitigation, and enhancement measures [PM&E measures]) to be implemented under the Proposed Action (see Appendix E.1 for a full description of proposed PM&E measures). Section 7.4.3 includes an analysis of the potential environmental effects of the Proposed Action, including potential beneficial effects of proposed PM&E measures. Section 7.4.4 describes unavoidable adverse effects of the Proposed Action on fish and aquatic resources.

The AQ 3 – Fish Population study is ongoing as of filing the Draft License Application. The information and analysis presented in this section includes Year 1 (2024) study results. The Fish Population Technical Memorandum provided in Appendix E.2 will be updated to include Year 2 (2025) study results and will be filed with the Updated Study Report (USR) in March 2026. The Final License Application (FLA) will include the Year 1 and Year 2 study results.

7.4.1 Affected Environment

7.4.1.1 Information Sources

This section was developed using existing, relevant, and reasonably available information in the following primary sources. Additional references are cited in the text, as appropriate.

- The Federal Energy Regulatory Commission's (FERC) Final Environmental Assessment for Hydropower License, Kern River No. 1 Hydroelectric Project, FERC Project No. 1930-014 (FERC 1998)
- SCE's Application for New License for the Kern River No. 1 Hydroelectric Project (SCE 1994)
- Inland Fishes of California (Moyle 1976 and 2002)
- SCE's Final Report Kern River No. 1 Hydroelectric Project Smallmouth Bass Study (SCE 2009)

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- California Department of Fish and Wildlife's (CDFW) California Natural Diversity Database (CNDDB) (2025)
- Nonindigenous Aquatic Species Database (United States Geological Survey [USGS] 2025)
- Sensitive Freshwater Mussel Surveys in the Pacific Southwest Region: Assessment of Conservation Status (Howard 2010)
- CDFW Fish Stocking Records
- SCE Technical Memoranda developed for the relicensing that are provided in Appendix E.2, including:
  - AQ 1 – Hydrology Technical Memorandum (SCE 2025a)
  - AQ 2 – Water Quality/Water Temperature (SCE 2025b)
  - AQ 3 – Fish Population (SCE 2025c)
  - LAND 2 – Erosion and Sedimentation (SCE 2025d)

7.4.1.2 Fisheries Management and Recreational Angling

CDFW manages the Project area for its self-sustaining smallmouth bass (*Micropterus dolomieu*) fishery and for stocked, catchable-sized rainbow trout (*Oncorhynchus mykiss*). Angling opportunities and access to the river are provided by the United States Forest Service (Forest Service) at several locations throughout the Project area, including the Democrat Raft Take-Out Boating Site, Upper Richbar Day Use Area, Lower Richbar Day Use Area, and the Live Oak Day Use Area. Additional information about recreational angling in the Project area is provided in Section 7.10, *Recreation Resources.* As described below, the Project area also supports a foothill transitional zone fish assemblage, including native Sacramento sucker (*Catostomus occidentalis*), hardhead (*Mylopharodon conocephalus*), Sacramento pikeminnow (*Ptychocheilus grandis*), and other less common centrarchids (bass and sunfish), ictalurids (catfish), and non-native cyprinids (minnows).

CDFW currently stocks rainbow trout at three locations within the Kern River, including the bypass reach between Democrat Dam and the Live Oak Day Use Area (Table 7.4-1). CDFW stocks rainbow trout two times a year during the spring when lower water temperatures are conducive to stocking. Trout stocking in the Project area supports a put-and-take fishery, with no known natural recruitment. CDFW stocks around 600 pounds of rainbow trout annually in the bypass reach (Table 7.4-1). According to CDFW, the target stocking rate is two rainbow trout per pound, which equated to approximately 1,200 stocked trout in 2024 and 2025 in the Project area (personal communication, Abi Leon, Senior Environmental Scientist, CDFW, with Chris Hogle, Aquatic Biologist, Stantec, August 26, 2025).

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7.4.1.3 Hydrology

Historically, the Kern River was in an isolated watershed with limited connectivity to other larger rivers and the ocean. The Kern River flowed into the San Joaquin Valley and into Kern Lake and Buena Vista Lake, both now dry, and occasionally connected to the San Joaquin River during exceptionally wet years when Buena Vista and Tulare lakes flooded into one another and connected to the San Joaquin River via the Fresno Slough (Moyle 2002). After the United States Army Corps of Engineers (USACE) constructed Isabella Dam in 1953, the winter floods connecting Buena Vista and Tulare lakes ceased as did the occasional connection of the Kern River to the San Joaquin River (Audubon Society 2020).

The Kern River is a highly regulated river, with numerous diversions and impoundments upstream and downstream of the Project. Inflow to the Project is primarily dependent on flow releases from Isabella Dam, located approximately 20 river miles (RM) upstream. Flow releases from Isabella Dam are managed by the Kern River watermaster. SCE diverts up to 412 cubic feet per second (cfs) through the flowline to generate hydropower at the powerhouse. Flows above the combined diversion (up to 412 cfs) and the minimum instream flow release (50 cfs from June 1 through September 30; 15 cfs from October 1 through May 31) from the sand box below Democrat Dam, spill over the dam into the bypass reach. Generally, releases from Isabella Dam (inflow to the Project) peak during the spring and summer coinciding with irrigation demand and water releases. Average monthly inflow into the Project ranges from approximately 290 cfs in December to 1,875 cfs in June. Average monthly flows in the bypass reach range from approximately 115 cfs in December to 1,530 cfs in June.[1] Additional information on hydrology in the Project area is provided in Section 7.2, *Water Use and Hydrology.*

7.4.1.4 Aquatic Habitat

Bypass Reach

The bypass reach between the Kern River between Democrat Dam and the powerhouse tailrace is approximately 10.2-miles-long, moderately steep, and dominated by boulders and bedrock (Figure 7.4-1). The bypass reach is characterized by steep slopes and deeply incised, armored channels within rugged canyons. As a result, limited geomorphic landform processes occur because the channel is confined by narrow V-shaped valley bottoms and steep-sided slopes. Substrates are dominated by bedrock and coarse sediment (boulders, cobbles, gravels) (Figure 7.4-1) but also includes pools with sand substrate. Habitat within the bypass reach is dominated by runs (44.2 percent) and pool habitat (40.8 percent). Riffles (5 percent), cascades (7.5 percent), and braided channels (2.5 percent) make up a relatively small proportion of the bypass reach (SCE 1999). The channel slope from Democrat Dam to the confluence with Peachacho Creek (about 8 miles downstream) is on average 1.5 percent and then steepens to approximately 3 percent from Peachacho Creek to the Kern Canyon mouth. Localized gradients in the Project area are as high as 3.5 percent (see Table 7.7-1 and Figure 7.7-1 in Section 7.7

[1] Period of record: October 1, 1998, through September 30, 2023.

Geomorphology). The largest tributaries in the Project area are Lucas and Stark creeks, each with drainage areas of approximately 35 to 40 square miles each.

The existing minimum instream flow requirements for the bypass reach (50 cfs from June 1 through September 30 and 15 cfs from October 1 through May 31, or inflow, whichever is less) were developed based on an instream flow and aquatic habitat modeling study that was completed in 1986 to assess the availability of suitable habitat across a range of flows for target fish species of management interest (i.e., smallmouth bass and rainbow trout) (EA 1986, FERC 1998). The study demonstrated that 50 cfs provided 83 percent of the maximum available weighted usable area (WUA) for adult rainbow trout, and 15 cfs provided 94 percent of the maximum available WUA for adult, juvenile, and fry life stages of smallmouth bass (FERC 1998). CDFW, in a letter to SCE on October 5, 1990, stated that 50 cfs from June through September would maintain adequate spatial habitat for adult trout and that 15 cfs during October through May would maintain adequate habitat for all life stages of smallmouth bass (FERC 1998).

Article 403 of the existing Project license required SCE to develop and implement a multi-year study to assess the adequacy of the minimum flows on fish populations, with an emphasis on smallmouth bass. SCE implemented the study from 1999 through 2008,[2] using electrofishing, sediment sampling, water temperature monitoring, and aquatic habitat modeling (i.e., Physical Habitat Simulation [PHABSIM]).

SCE (2009) confirmed the results of the 1986 study, demonstrating that the greatest amount of suitable habitat (i.e., WUA) for adult, juvenile, and fry stages of smallmouth bass occurs at flows of 40 cfs or less. The study also confirmed that high irrigation releases from Lake Isabella reduced the availability of suitable habitat in the bypass reach for smallmouth bass. The percentage of available WUA for adult smallmouth bass during irrigation flow releases from Lake Isabella ranged from 13 to 56 percent depending upon the year (average of 33 percent) (SCE 2009). For juvenile smallmouth bass, the percentage of available WUA during irrigation flow releases ranged from 8 to 79 percent (average of 20 percent) (SCE 2009). For smallmouth bass fry, the percentage of available WUA during irrigation flow releases ranged from 3 to 42 percent (average of 21 percent) (SCE 2009). Relatively high percentages of maximum WUA for smallmouth bass only occurred in months when flows were close to minimum instream flow levels.

As part of the study, SCE also evaluated habitat suitability in the bypass reach for adult and juvenile hardhead, documenting that WUA reaches its maximum at 150 cfs for adults and 15 cfs for juveniles (SCE 2009). As noted above and discussed in Section 7.2, *Water Use and Hydrology*, these flow thresholds are often exceeded in the bypass reach due to high irrigation releases from Lake Isabella throughout the spring, summer, and fall, limiting the availability of suitable habitat (SCE 2009). However, irrigation flow releases at Lake Isabella produced generally higher percentages of maximum WUA for hardhead as compared to smallmouth bass. The percentage of available WUA for adult hardhead

[2] SCE was unable to sample in 2005 and 2007 because of high flows or Project maintenance (see SCE 2009 for additional details on study methods).

ranged from 44 to 84 percent during irrigation flow releases, depending upon the year (average of 67 percent). For juvenile hardhead, the percentage of maximum WUA for irrigation flow releases ranged from 29 to 72 percent (average of 54 percent).

Overall, the study found existing minimum instream flows were suitable for smallmouth bass but that high irrigation flows released from Lake Isabella in the spring and summer, unrelated to Project operations, decrease available smallmouth bass habitat and may have a negative effect on recruitment (SCE 2009). High summer flows related to irrigation releases from Lake Isabella also decreased habitat for hardhead, but to a lesser extent (SCE 2009). As noted above, average monthly flows in the bypass reach range from approximately 115 cfs in December to 1,530 cfs in June,[3] which are well above the existing minimum instream flow requirements.

Impoundment

The Democrat Dam Impoundment is small, shallow, and narrow, with low velocities, small substrate sizes (e.g., sand, mud), aquatic vegetation, and variable water depths (Figure 7.4-2). The impoundment has a surface area of approximately 27 acres at a normal water surface elevation of 1,913 feet. SCE operates the Project in a run-of-river mode, which helps maintain water surface elevation and minimizes fluctuations, providing stable lentic habitat for reservoir fish and other aquatic organisms. Increased flows from Lake Isabella on a seasonal basis often result in spill over the dam. At the normal pond elevation of 1,913 feet, the impoundment is approximately 170 feet wide near the dam and the impoundment has a maximum width of approximately 280 feet. Lentic habitat in the impoundment extends approximately 1.1 miles upstream from Democrat Dam. As described below in Section 7.2.1.6, *Fish Populations*, the impoundment provides habitat for several species of native and non-native game and non-game fish such as rainbow trout, largemouth bass (*Micropterus salmoides*), hardhead, Sacramento sucker, black crappie (*Pomoxis nigromaculatus*), and bluegill (*Lepomis macrochirus*) (SCE 2024).

Sediment

Lake Isabella generally traps sediment from the upper Kern River Watershed; however, there are several tributaries between Lake Isabella and Democrat Dam that can introduce sediment into the Project area. Geology and soils data show that the study area is a steep, deeply incised, V-shaped canyon mostly dominated by bedrock and boulders. Periodic hillslope erosion and mass wasting processes do occur but are a relatively low contributor of sediment into the mainstem Kern River channel (SCE 2025d). Significant storm events can trigger sediment or mud flows at the Project area (SCE 2025d). In 2024, SCE identified 19 sites in the Project area with significant potential for erosion or sedimentation; none of these sites were related to Project operations or maintenance (SCE 2025d). A review of historical aerial imagery and field observations indicated that potential erosion and sedimentation related to Project features was small scale and remained stable from 2002 to 2023 (availability of imagery). The only Project-related features that were identified as locations of potential ongoing erosion and sedimentation

[3] Period of record: October 1, 1998, through September 30, 2023.

were the legacy spoil piles from drilling the conveyance flowline. These spoil piles were visible in all photo sets and appear stable, largely unchanged between 2002 and 2023 (SCE 2025d).

Excessive inputs of sediment can adversely affect fish, aquatic organisms, aquatic habitats, and water quality. As described in Section 5.1.5.4, *Sediment Management*, the licensee actively manages sediment in the Democrat Dam Impoundment by implementing a Sediment Management Plan. The plan is designed to approximate the natural sediment regime of the lower Kern River (to the extent possible) by allowing naturally occurring sediment to continue downstream, past Democrat Dam, and through the lower Kern River system without building up behind Democrat Dam.

SEDIMENT MANAGEMENT

Sediment is managed at the diversion sandbox and at Democrat Dam.

Sandbox

During normal operations, water from the Kern River is diverted through a concrete sandbox, where sediment settles out of the water column and is released back into the Kern River before entering the Project's conveyance system. The sandbox contains two slide-gate valves, and one valve remains open year-round to maintain minimum instream flow releases and allow the sediment to be continuously transported back into the bypass reach.

Democrat Dam

SCE manages sediment at the Democrat Dam Impoundment by implementing two types of managed sediment bypasses: (1) Partial Sediment Bypass, which includes sediment management operations during precipitation event high flows and normal high flows, and (2) Full Sediment Bypass. Each approach is described below.

Partial Sediment Bypass

- Precipitation Event High Flows – During precipitation-driven high flows—winter storms or summer and fall thunderstorms—SCE temporarily ceases water diversion and fully opens the low-level outlet at Democrat Dam to allow naturally occurring turbid flows from upstream to pass over the dam and through the low-level outlet. During this operation, the sediment load is carried by the full river flow, mimicking the natural sediment transport regime of the river and protecting the turbine infrastructure from fine sediment abrasion. Once flood and naturally turbid flow conditions have improved and turbidity conditions subside, normal operations resume (low-level outlet is closed and diversion is opened). This procedure was formerly described as Peak Flow Sediment Bypass.

- Normal High Flows – Under normal high-flow conditions, when flows in the bypass exceed 600 cfs (July 1–March 14) or 1,200 cfs (March 15–June 30; smallmouth

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bass / hardhead minnow spawning period[4]), SCE partially or fully opens the low-level outlet to allow sediment around the low-level outlet and the diversion intake to pass downstream, as needed. Because the impoundment remains full, only sediment immediately around the low-level outlet intake and near the diversion intake is passed downstream. This procedure was formerly described as Operational Sluicing.

Full Sediment Bypass

- Full sediment bypass involves lowering the water level in Democrat Dam Impoundment and allowing the river and sediment to pass through the low-level outlet. During this operation, the low-level outlet is opened, and water is not diverted to the powerhouse. This procedure was formerly described as Operational Sluicing.

- Full sediment bypass is anticipated to occur annually when the following conditions are met:

  – Inflows to the Democrat Dam Impoundment are less than 800 cfs.

  – Forecasted flows from Lake Isabella are deemed to be sufficient to transport the deposited sediment through the bypass reach in the same water year.

  – The date is between November 15 and March 14 to (1) avoid impacts on hardhead minnow spawning and rearing (March 15–June 30), (2) avoid impacts on northwestern pond turtle juveniles and adults during the in-water rearing period (March 15–November 14), and (3) seasonally align releases to meet dissolved oxygen and temperature requirements in the Water Quality Control Plan for the Tulare Lake Basin.

Implementation

Democrat Dam sediment management activities currently are limited to Partial Sediment Bypass activities during either precipitation events or normal high flows (see above). When the agency permits (USACE 404, State Water Board 401, and CDFW Section 1600) are renewed, it is anticipated that Full Sediment Bypass activities will resume.

SCE's Proposed Action includes continuing to implement a Sediment Management Plan. SCE's proposed Sediment Management Plan is provided in Appendix E-1. Additional information about sedimentation and erosion in the Project area is described in Section 7.7, *Geomorphology*.

[4] In 2005 the CDFW species of management concern was the non-native game fish, smallmouth bass. CDFW has since shifted management focus to the hardhead minnow (*Mylopharodon concephalus*) a CDFW Species of Special Concern and Forest Service Sensitive species. The spawning period from March 15-June 30 remains unchanged.

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Riparian Habitat

Riparian habitat is limited to a narrow band along the banks of the Kern River. During the previous relicensing, SCE estimated that there were approximately 58 acres of riparian vegetation in the bypass reach (SCE 1994). More recently, SCE conducted a spatial analysis that quantified the amount of riparian habitat in the bypass reach at 58 acres, adjacent to the Democrat Dam Impoundment at 32 acres, and in the vicinity of Project flumes, conduits, and adits at 11 acres. The riparian area along the bypass reach is limited by several factors, including a narrow and incised floodplain, steep canyon slopes, low rainfall, high stream gradient, high flows, and large boulder and bedrock substrate (limited gravel or fine sediment). Typical riparian species found along the bypass reach included Fremont Cottonwood, interior live oak, sycamore, willows, digger pine, mugwort, horsetails, nettle, buttonbush and Mexican rush (SCE 1994).

7.4.1.5 Water Quality

Contaminants

As described in Section 7.3, *Water Quality*, data from 1992, 2005, and 2024 indicate that water quality in the Project area (tailwater area, bypass reach, and impoundment) was of high quality and generally conformed to regulatory water quality objectives and standards. No persistent, widespread water quality issues that would affect fish and aquatic communities in the Project area were found. SCE completed a second year of water quality monitoring in 2025; results from the 2025 monitoring will be included in the USR and FLA, which are due to FERC in 2026.

Bioaccumulation of mercury in fish tissue in California rivers, especially in the Sierra Nevada region, is a persistent issue. In the Kern River, the California Office of Environmental Health Hazard Assessment (OEHHA) determined that mercury bioaccumulation in fish is elevated relative to criteria for human consumption and issued guidelines for eating fish from Lake Isabella (OEHHA 2022). OEHHA issues fish consumption advisories when methylmercury concentrations in fish exceed the Guidance Tissue Level of 0.08 milligrams/kilogram (mg/kg). The maximum safe consumption level for women of childbearing age and children to consume is 12 sport fish per month (Klasing et al. 2005).

As part of the AQ 2 – Water Quality/Water Temperature study, SCE collected 29 edible-sized fish from the Democrat Dam Impoundment in 2024 for methylmercury fish tissue sampling. The catch included nine brown bullhead (*Ameiurus nebulosus*), three black crappie, five bluegill sunfish, one channel catfish (*Ictalurus punctatus*), 10 largemouth bass, and one white catfish (*Ameiurus catus*). Fish ranged in size from 151 to 545 millimeters (mm) (fork length or total length).[5] Laboratory analysis of methylmercury tissue concentrations was completed by the Moss Landing Marine Lab in June of 2025. All 29 of the fish tissue samples exceeded or were equal to the reference methylmercury

[5] Fork length (tip of snout to fork of tail) was measured for species with a forked caudal fin (i.e., bluegill sunfish, black crappie, and largemouth bass). Total length was measured for species without a forked caudal fin (i.e., brown bullhead, channel catfish, and white catfish).

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concentration of 0.08 mg/kg. Methylmercury tissue concentrations ranged from 0.08 mg/kg to 0.57 mg/kg and were positively correlated with fish size and trophic level. The highest mean concentration of methylmercury by species was in largemouth bass (0.29 mg/kg), followed by channel catfish (0.24 mg/kg, single sample), brown bullhead (0.20 mg/kg), and white catfish (0.19 mg/kg, single sample). Black crappie and bluegill sunfish had the lowest mean methylmercury concentration by species (0.14 mg/kg). The lowest concentration was found in the smallest black crappie sampled (160 mm fork length), at 0.08 mg/kg. Concentrations were positively related to fish size, with larger fish (particularly largemouth bass and catfish) exhibiting the highest methylmercury levels. Results were consistent with, although generally lower than, those seen in similar fish assemblages in other west slope Sierra Nevada rivers (USGS 2000). Additional information on the fish tissue mercury analysis is provided in Section 7.3, *Water Quality*.

Water Temperature and Dissolved Oxygen

The Kern River between the USACE's Isabella Dam and the Project powerhouse is classified as warm- and cold-water habitat; however, water released into this reach from Lake Isabella is approximately 23°C (warm) during the summer/fall months (Figure 7.4-3). Monitoring by SCE in the Project area (Democrat Dam to the powerhouse) May 15, 2024, through October 15, 2024, (SCE 2025b), showed that average daily water temperature was 23°C to 24°C during the summer/fall months (Figure 7.4-3). The maximum instantaneous water temperature in the Project area was 24.9°C, observed simultaneously at six sites upstream and downstream of Democrat Dam on August 6, 2024. Similar water temperatures were observed between 1999 and 2007 (SCE 2009). The 2024 monitoring showed that there was minimal longitudinal warming (i.e., from upstream to downstream) as water traveled from Democrat Dam downstream to the Project tailrace (generally less than a 1°C change).

The summer/early fall water temperature regime is generally too warm for cold-water fish such as rainbow trout. Water temperatures above 23°C are potentially lethal (Moyle 2002) to rainbow trout and more suitable for warm- or cool-water fish species such as smallmouth bass, hardhead, Sacramento pikeminnow, and suckers, which have a higher suitable temperature range. Based on literature reviews, SCE (2009) found that water temperature in the bypass reach was generally within the preferred range for all life stages of smallmouth bass (Table 7.4-2). SCE also investigated water temperature preferences for hardhead, documenting that warmer water temperature in the summer months in the bypass reach was within the preferred temperature range of hardhead (Table 7.4-3). For example, Moyle (2002), stated that "most streams in which they occur have summer temperatures in excess of 20°C" and optimal water temperature for hardhead juveniles (as determined by laboratory experiments) appear to be 24°C to 28°C (Knight 1985).

SCE's measurements of dissolved oxygen (DO) in the Project area in 2024 ranged from 8.58 to 9.12 milligrams per liter (mg/L). All measurements of DO in 2024 exceeded the reach specific objective for the Kern River from Lake Isabella to the Project powerhouse of 8.0 mg/L (Central Valley Regional Water Quality Control Board [CRWQCB] 2018, Environmental Protection Agency [EPA] 1986). Percent saturation was greater than 90 percent for all measurements, indicating that waters are well oxygenated, able to support

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COLD and WARM beneficial uses for aquatic species, and exceed the minimum requirements of all native and introduced fish species that are found in the Project area. Additional information on DO is provided in Section 7.3, *Water Quality*.

7.4.1.6 Fish Populations

Composition and Distribution

BYPASS REACH

The bypass reach is composed of a foothill transitional zone fish assemblage with native and non-native cold-, cool-, and warm-water species. The reach is characterized by native Sacramento sucker, hardhead, and Sacramento pikeminnow, non-native smallmouth bass, hatchery-origin rainbow trout, and other less common centrarchids (bass and sunfish), ictalurids (catfish) and non-native cyprinids (minnows). During 1999–2008 fisheries monitoring in the bypass reach required by Article 403 of the existing license, SCE collected Sacramento sucker, Sacramento pikeminnow, yellow bullhead (*Ameiurus natalis*), hardhead, rainbow trout, white catfish, smallmouth bass, largemouth bass, mosquitofish (*Gambusia affinis*), channel catfish, goldfish (*Carassius auratus*), threadfin shad (*Dorosoma petenense*), common carp (*Cyprinus carpio*), and white crappie (*Pomoxis annularis*). Sacramento sucker, Sacramento pikeminnow, smallmouth bass, and threadfin shad[6] were the most abundant species with relative abundances fluctuating between the four species during any given year (SCE 2009).

SCE planned to conduct fish population monitoring in the bypass reach in 2024 pursuant to FERC's Study Plan Determination; however, due to high flows and unsafe sampling conditions, the monitoring was postponed until the fall of 2025; the results of the 2025 sampling will be included in the USR and FLA.

IMPOUNDMENT

As part of the AQ 3 – Fish Population study, SCE sampled approximately 4.65 miles of shoreline habitat in the Democrat Dam Impoundment between October 15 and 17, 2024, using an E-Cat electrofishing unit. SCE collected 329 fish representing 10 species: brown bullhead, channel catfish, white catfish, common carp, hardhead, black crappie, bluegill sunfish, largemouth bass, Sacramento sucker, and threadfin shad. The number of each species captured and their length ranges are shown in Table 7.4-4. Native species included hardhead and Sacramento sucker. Introduced species included brown bullhead, channel catfish, white catfish, common carp, black crappie, bluegill sunfish, largemouth bass, and threadfin shad. These species are not currently stocked and are part of self-sustaining, naturalized populations.

Largemouth bass (39.8 percent), threadfin shad (29.2 percent), and Sacramento sucker (15.2 percent) were the most abundant species collected during 2024 sampling in the Democrat Dam Impoundment (Figure 7.4-4, top chart). By weight, Sacramento sucker (49.7 percent) and common carp (34.2 percent) made up most of the biomass, followed

[6] Threadfin shad are not a riverine species and were likely introduced into the bypass reach from Lake Isabella during a spill event.

by largemouth bass (10.4 percent) (Figure 7.4-4, bottom chart). Total catch rates (for all species combined) ranged from 31 to 125 fish per mile (fish/mi) per pass. The lowest catch rates were for channel catfish (0.2 fish/mi), hardhead (0.4 fish/mi), and white catfish (0.5 fish/mi). The highest catch rates were for largemouth bass (28.2 fish/mi) and Sacramento sucker (10.8 fish/mi).

Fish between 50- and 150-mm fork length (FL) were the most frequently collected, consisting primarily of threadfin shad and largemouth bass (Figure 7.4-5). Low to moderate numbers of fish between 150- and 400-mm FL were observed, consisting of largemouth bass, bluegill sunfish, black crappie, brown bullhead, white catfish, and hardhead (Figure 7.4-5). Most large fish (400- to over 600-mm FL) were Sacramento sucker and common carp (Figure 7.4-5).

The average condition factor[7] for all species observed in the Democrat Dam Impoundment ranged from 1.10 to 2.35, representing fish in good condition (Table 7.4-5). Diseases and parasites were encountered incidentally in some fish but were not widespread.

SCE collected a low number of fish in 1994; however, high flows (400 cfs) and cold water likely resulted in reduced fish activity and low catch numbers (ENTRIX 1995) (Figure 7.4-6). In 1995, 13 species were captured, and the assemblage was dominated by white crappie (43.6 percent), brown bullhead (32.1 percent), and largemouth bass (11.1 percent); fewer (10 or less) bluegill sunfish, common carp, hitch, hardhead, mosquitofish, rainbow trout (stocked), Sacramento pikeminnow, Sacramento sucker, smallmouth bass, and white catfish made up the rest of the catch. The species composition was generally similar in 1995 and 2024 with the fish community mostly comprised of non-native, warm water fish species. In 2024, more bluegill sunfish, common carp, hardhead, largemouth bass, and white catfish were observed than in 1995. Hitch (*Lavinia exilicauda*), mosquitofish, rainbow trout, Sacramento pikeminnow, smallmouth bass, and white crappie were collected in 1994 and/or 1995 but were not observed in 2024. Conversely, black crappie and threadfin shad were observed in 2024 but not in 1994 or 1995 (Figure 7.4-6).

SCE conducted fish population monitoring immediately upstream of the Project in the reach contiguous with the Democrat Dam Impoundment in 2020 as a requirement of the Borel Project license. SCE conducted electrofishing surveys at two locations between Isabella Dam and the Democrat Dam Impoundment. The sampling in this reach illustrated a fishery dominated by Sacramento sucker, with lesser numbers of smallmouth bass, and Sacramento pikeminnow. The 2020 surveys for the Borel Project also documented white catfish, channel catfish, white crappie, brown bullhead, channel catfish, green sunfish,

[7] Fulton's condition factor (Ricker 1975), which is based on the ratio between fish length and fish weight, was calculated for sampled fish. Fulton's condition factor provides a relative index of the nutritional state (e.g., storage of muscle and lipids) of individual fish but varies by size and species. Typically values between and 1.0 and 2.0 are representative of robust and healthy fish.

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hardhead, largemouth bass, and rainbow trout in small numbers (Cardno 2021; FERC 2024).

Fish Passage

There are no anadromous fish (i.e., steelhead, Chinook salmon) in the Project area. The southern limit of the Central Valley steelhead distribution is considered the Kings River, which is north of the Kern River (National Marine Fisheries Service [NMFS] 2014). Upstream passage barriers for resident fish species occur at the Kern Canyon Project (FERC Project No. 178) diversion structure immediately downstream of the Kern River No. 1 Powerhouse Tailrace and at Democrat Dam. Due to low head and discharge directly to the Kern River channel, both structures provide downstream fish passage.

Entrainment and Impingement

Fish passing in front of the diversion intake structures near Democrat Dam could be involuntarily entrained or impinged if intake water velocities exceed fish swimming ability. There are two large trash racks at the intake. One is oriented perpendicular to the flow (upstream intake) and the other is oriented parallel to the flow (downstream intake). The intake racks are constructed of steel bars on 2-inch centers resulting in clear spacing between the bars of less than 2.0 inches, with sizes of 30 feet wide by 19 feet high (stream intake) and 36 feet wide and 19 feet high (downstream intake). The Project intake screens are large and specifically designed to produce low-approach velocities reducing impingement and entrainment potential (SCE 1994).[8]

During the previous relicensing, SCE evaluated the potential for entrainment of fish at the diversion intake near Democrat Dam by comparing intake velocities in front of the screens to swimming performance data for largemouth bass, smallmouth bass, white crappie, mosquitofish, Sacramento hitch (*L. exilicauda exilicauda*), common carp, channel catfish (*Ictalurus punctatus*), and brown bullhead (SCE 1994). SCE also measured water velocity immediately upstream of the two intake screens. At a diversion flow of 397 cfs (96.4 percent of maximum capacity), the average approach velocity[9] was 0.25 feet per second (fps) (range of 0.13–0.41 fps) at the upstream intake screen and 0.86 fps (0.74–1.09 fps) at the downstream intake screen. In addition, SCE measured average bypass velocities[10] of 0.44 and 0.41 fps for each screen (SCE 1994).

SCE concluded that the only species with the potential to be entrained at the intakes was juvenile largemouth bass (SCE 1994). This conclusion was reached because data in the literature demonstrated that juvenile largemouth bass (average length of 82 mm) had swim speeds of 0.5 fps but larger bass (81 mm to 224 mm) had swim speeds of 1.1 fps to 1.9 fps (Dahlberg et al. 1968, Farlinger and Beamish 1978). While larger bass could swim away from the intakes to avoid entrainment or impingement, juvenile largemouth

[8] The size of an intake screen is directly related to approach velocity; intakes with more surface area create lower approach velocities by increasing the ratio between rack area and the amount of water diverted for generation.

[9] The component of measured velocity that carries fish toward the intake.

[10] The component of measured velocity that carries fish past the screens (i.e., the sweeping velocity).

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bass near the intakes could be entrained. FERC determined that all other gamefish sampled from the impoundment had swimming speeds greater than documented approach velocities in front of the intakes (FERC 1998).

Since the last relicensing, additional swimming performance estimates were completed for native fish that occur in the Project area, including hardhead, Sacramento pikeminnow, and Sacramento sucker. Specifically, Myrick and Cech (2000) measured swimming performance of 19.1-to-28.5-centimeter (cm) (total length) fish at water temperatures between 10–20°C. Critical swimming velocities for all sizes and temperatures ranged between 1.28 and 1.87 fps. Myrick and Cech recommended that water diversion approach velocities should not exceed 0.98–3.28 fps for Sacramento hitch in the 20–30 cm total length range or 1.31–3.28 fps for hardhead, Sacramento pikeminnow, and Sacramento sucker in the 20–30 cm total length range. These recommended velocities are higher than the average approach and bypass velocities documented at the intakes, and do not exceed the swimming capabilities of these Kern River native minnows and suckers.

Fish Species Temporal/Life History Information

Most fish species in Project area spawn in the spring concurrently with rising water temperatures (Table 7.4-6). Spawning extends into early summer for some species. Rainbow trout are stocked in the Project area each spring but there are no known naturally reproducing populations. Fish found in the Democrat Dam Impoundment likely spawn upstream of the Project. Fish found below Democrat Dam may move downstream throughout the bypass reach and tailwater area and move farther downstream.

7.4.1.7 Special-Status Aquatic Species

Special-status aquatic species in the Project area include hardhead (California Species of Special Concern [CSC] and Forest Service Sensitive Species [FSS]) and northwestern pond turtle (*Actinemys marmorata*) (Federally Proposed Threatened [FPT] under the Endangered Species Act [ESA]; FSS; CSC). There are no state or federally listed threatened or endangered aquatic species in the Project area or designated critical habitat for aquatic species. Other special-status species that are known from the region, but do not occur in the Project area, include Kern River rainbow trout (*O. mykiss gilberti*), foothill yellow-legged frog (FYLF), California red-legged frog (CRLF), western pearlshell mussel (*Margaritifera falcata*), and western ridged mussel (*Gonidea angulata)*.

Hardhead

Hardhead (CSC, FSS) were found consistently in the bypass reach during the 1999–2008 fishery monitoring efforts. SCE captured two hardhead in the Democrat Dam Impoundment by boat electrofishing in 2024.

Northwestern Pond Turtle

One juvenile northwestern pond turtle (FPT, FSS, CSC) estimated to be 2–3 years old was observed by SCE along the northern shoreline of the Democrat Dam Impoundment during fish sampling on October 16, 2024. The turtle appeared to be in good condition.

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Additionally, one adult male northwestern pond turtle was observed basking in the northeast portion of the impoundment on October 16, 2024. No other incidental observations of this species occurred in 2024. Additional incidental observations for northwestern pond turtles by SCE occurred in 2025 during the AQ 2 – Water Quality/Temperature and AQ 3 – Fish Population studies; results will be provided in the USR and FLA.

Kern River Rainbow Trout

Kern River rainbow trout, a sub-species of golden trout, is a candidate species for federal listing under the ESA and a CDFW SSC. Kern River rainbow trout are endemic to the Kern River and tributaries, from Lake Isabella upstream to the headwaters (CDFW 2025, Moyle 2002) but are not present in the Project area.

Foothill Yellow-Legged Frog

FYLF (*Rana boyii*) in the southern Sierra Nevada distinct population segment is federally listed as endangered. Populations of FYLF on the Kern River south of Johnsondale, California (Tulare County) were extirpated during the 1970s or earlier (United States Fish and Wildlife Service [USFWS] 2021). The last recorded occurrence of FYLF near the Kern River was in 2018 in the upper North Fork Kern River, above Lake Isabella (CNDDB 2025).

California Red-Legged Frog

CRLF (*Rana draytonii*) is listed as federally threatened under the ESA and is a CDFW Species of Special Concern. The Project is located outside the current range of the CRLF (USFWS 2010). The closest known occurrences are in Fresno County, approximately 100 miles north of the Project, and in San Luis Obispo County, approximately 50 miles west of the Project.

Western Pearlshell Mussel

Western pearlshell mussel is a Forest Service watch list species. According to the Xerces Society (2025), western pearlshell mussels were documented in the upper Kern River above Lake Isabella in 1948 and most recently in 2016. Western pearlshell mussels were documented historically (1948) in the lower Kern River (i.e., downstream of Lake Isabella) but were not found in recent surveys in 2008–2009 (Howard et al. 2015).

Western Ridged Mussel

Western ridged mussel is currently a candidate for listing as endangered under the ESA and is classified as a CDFW SSC. Like the western pearlshell mussel, they were documented in the Project vicinity in historical surveys but were not present in recent surveys at historical locations (Howard et al. 2015) and are presumed to be extirpated from southern California and most of the Central Valley (Xerces Society 2020).

7.4.1.8 Aquatic Invasive Species

United States Geological Survey (USGS) (2025) records of aquatic invasive species (AIS) in the Project area include American bullfrog (*Rana catesbeiana*), Asian clam (*Corbicula*

fluminea), bluegill, largemouth bass, and watercress (*Nasturtium officinale)*. Red-eared slider (*Trachemys scripta*), Asian clam, and curly-leaf pondweed (*Potamogeton crispus*) were identified during 2024 fisheries sampling of the Democrat Dam Impoundment. AIS often prey upon, compete with, or degrade habitat for native species. There are no records of non-native, invasive crayfish species in the Project area (USGS 2025).

7.4.2 Proposed Environmental Measures

Under the Proposed Action, SCE proposes to implement PM&E measures associated with ongoing Project operation and maintenance activities. PM&E measures are designed to protect, maintain, or enhance environmental and cultural resources over the term of the new license. SCE proposes implementing the following PM&E measures related to fish and Aquatic resources:

- Minimum Instream Flow Measure
- Stream Gaging Plan
- Sediment Management Plan
- Fish Population Monitoring Plan
- Wildlife Resources Management Plan
- Vegetation Management Plan

Appendix E.1 provides complete descriptions of measures SCE is proposing as part of the license application and to include in any new license issued for the Project.

7.4.3 Potential Project Effects

This section describes the potential effects to fish and aquatic resources that could occur because of continued operation and maintenance activities to be implemented under the Proposed Action. Potential effects are determined by analyzing the changes in fish and aquatic resources that may result from activities implemented under the Proposed Action (Section 5.2) compared to the No-Action Alternative (existing condition) (Section 5.1). Final effects determinations consider PM&E measures to be included under the Proposed Action (refer to Appendix E.1).

Under the Proposed Action, SCE would continue to operate and maintain the Project as described in Section 5.1, *No-Action Alternative*, with minor adjustments to Project operation and maintenance activities in response to implementing proposed PM&E measures. No new or upgraded facilities, structural changes, or operational changes to the Project are proposed.

Consistent with FERC's Scoping Document 2 (FERC 2023), this section evaluates potential effects of continued Project operation and maintenance on the following:

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- Fish habitat and fishery resources in the Project's impoundment, bypass reach, and downstream of the powerhouse.
- Water diversions and instream flow on fish habitat in the Project's bypass reach.
- Fish entrainment at Democrat Dam on fish resources in the Project area.
- Democrat Dam on upstream and downstream fish passage.
- Western pearlshell mussels in the Project area.
- Species in the Project area designated as federally threatened, endangered, proposed, or candidates for listing, and designated critical habitat (proposed and final) under the ESA.
- The spread of non-native, invasive species (American bullfrog, Asian clam, and crayfish species) and their potential effects on native species.

7.4.3.1 Fish Habitat and Fishery Resources

SCE is proposing no changes to Project operation and maintenance or to existing facilities. SCE would continue to operate the Project as a run-of-river facility and continue to provide minimum flow releases to the bypass reach that maintain and support aquatic habitat for fish and other aquatic biota. As such, the Proposed Action would maintain impoundment elevations, instream flow conditions and overall reach hydrology. Aquatic habitat and water quality conditions in the Project area would remain suitable to support native and non-native game and non-game fish species, including hardhead, Sacramento sucker, smallmouth bass, largemouth bass, bluegill, bullhead, and crappie. The continuation of the existing minimum instream flows would continue to provide a high percentage of suitable aquatic habitat (i.e., WUA) for species of management interest (smallmouth bass, hardhead, and rainbow trout). Flow releases from Lake Isabella intended for downstream irrigation users (i.e., in the Bakersfield area) will likely continue to reduce the suitability of the instream flow habitat in the bypass reach on a seasonal basis; however, this is outside of the control of SCE and not a part of the Proposed Action. SCE's proposed Fish Population Monitoring Plan would allow SCE to continue monitoring the fish assemblage in the Project area following license issuance to verify that the proposed instream flow regime is adequate.

As described in Section 7.3, *Water Quality*, the Proposed Action would have no effect on COLD and WARM fish habitat beneficial uses and the bypass reach would continue to meet Basin Plan water quality objectives for the Project area. Water temperature, DO, and other water quality variables (e.g., pH, conductivity, dissolved metals, nutrients, suspended solids) would continue to be suitable for growth and rearing of resident native and non-native fish species and other aquatic organisms. Water temperature is not affected by the Proposed Action and therefore would remain suitable for native species such as hardhead and Sacramento sucker as well as bass species of management interest, and provide for a continued, seasonal put-and-take rainbow trout fishery. With the implementation of the Sediment Management Plan, the Proposed Action is expected

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to have no effect on DO within the Project area, thereby maintaining suitable conditions to support the stocked rainbow trout fishery, native fish species, and other aquatic organisms. To address potential impacts on aquatic resources from full sediment bypass operations, these activities would only be conducted between November 15 and March 14 to (1) avoid impacts on hardhead minnow spawning and rearing (March 15–June 30), (2) avoid impacts on northwestern pond turtle juveniles and adults during the in-water rearing period (March 15–November 14), and (3) seasonally align releases to meet dissolved oxygen and temperature requirements in the Water Quality Control Plan for the Tulare Lake Basin. Additional information about the effects of sediment bypass on DO are provided in Section 7.3, *Water Quality.* Bioaccumulation of methylmercury in individual fish is expected to continue with large or predatory fish developing higher tissue concentrations; however, mercury loading in the watershed is outside the control of SCE and not related to Project operation and maintenance.

Sediment supply and transport into the Democrat Dam Impoundment and bypass reach under the Proposed Action would remain comparable to existing conditions under the No-Action Alternative. Periodic sediment flushing from behind the dam would occur. These activities would be conducted under SCE's proposed Sediment Management Plan, which includes detailed operational procedures, monitoring requirements, and permitting requirements for sediment management within the Project area. The plan includes both partial and full sediment bypass operations, designed to be and similar in magnitude and timing to those that would occur under natural, unimpaired flow conditions that would occur without the influence of Lake Isabella Dam. Partial bypass operations would only be implemented during high-flow precipitation events or when river flow in the bypass reach exceeds 600 cfs between July 1 to March 14, or 1,200 cfs from March 15 to June 30 (the smallmouth bass spawning and rearing period). Additionally, SCE would limit full sediment bypass operations to the period between November 15 and March 14 to avoid affecting hardhead minnow spawning and rearing season, which occurs from March 15 to June 30, and avoid affecting rearing juvenile and adult northwestern pond turtles. The timing of both partial and full sediment bypass operations ensures that release of suspended sediment and settleable material occurs when flows are sufficient to transport the material and avoid accumulation on spawning substrates or fish eggs, thereby minimizing potential impacts to reproductive success. With implementation of the Sediment Management Plan, the Proposed Action is expected to have a negligible effect on fish and aquatic resources due to suspended sediment and settleable material compared the No-Action Alternative.

The Proposed Action would not adversely affect current fisheries management or recreational angling in the Project area compared to the No-Action Alternative. SCE is proposing no changes to Project operation and maintenance or facilities that would affect access and angling opportunities. The Proposed Action would not affect angling opportunities for stocked trout and cool and warm water species (e.g., largemouth bass, smallmouth bass, catfish).

The Proposed Action would not affect the distribution or abundance of AIS in the Project area compared to the No-Action Alternative. Available habitat for AIS would remain like

existing conditions. An expansion of the range of AIS is not expected under Proposed operation and maintenance.

7.4.3.2 Water Diversions and Instream Flows

The Proposed Action would not affect diversions or instream flows in the Project area compared to the No-Action Alternative. SCE would continue to provide existing minimum flows to the bypass reach (50 cfs from June 1 through September 30; 15 cfs from October 1 through May 31, or inflow, whichever is less) under the proposed Minimum Instream Flow Measure. SCE's proposed Stream Gaging Plan would provide for the accurate measurement and maintenance of flows in the bypass reach. Overall hydrologic conditions under the Proposed Action would generally mirror existing conditions.

SCE's proposed minimum flows for the bypass reach would maintain existing, suitable aquatic habitat. This includes high percentages of WUA for target species such as smallmouth bass, rainbow trout, and hardhead, as well as approximately 58 acres of shoreline and riparian habitat. Seasonal increases in flow during the irrigation period are anticipated to continue, which may temporarily reduce habitat suitability for these species. However, flow releases from Lake Isabella are outside of SCE's operational control. The powerhouse can utilize up to 412 cfs; any river flow exceeding this amount spills into the bypass reach. Run-of-river operations would maintain the normal elevation of the Democrat Dam Impoundment and existing aquatic and riparian habitat in and around the impoundment (i.e., 247 acres of lacustrine habitat for fish and aquatic biota and 32 acres of riparian habitat). SCE's proposed Minimum Instream Flow Measure and Stream Gaging Plan would provide for minimum instream flows and associated post-license monitoring of flows in the bypass reach.

7.4.3.3 Fish Entrainment and Fish Passage

The intakes and trash racks at Democrat Dam are designed with low-approach velocities (the intakes are large in proportion to the capacity of the diversion size) to reduce the risk of fish entrainment. The Proposed Action could result in the non-volitional entrainment of juvenile life stages of largemouth bass and other small fish with swim speeds less than 0.86 fps, which is the average approach velocity in front of the upstream Project intake; however, there is a limited amount of suitable aquatic habitat near the intake and largemouth bass are not a migratory species. As such the overall risk of entrainment is low. Based on the high relative density of juvenile and adult largemouth bass captured in Democrat Dam in 2024, there is no evidence of population-level effects from entrainment under existing conditions. Any entrained juvenile bass are unlikely to survive downstream movements through the Project impulse type turbines. The loss of juvenile largemouth bass a non-native fish species that is prolific in the Project area, however, is not expected to have a population-level effect. The Proposed Action includes the same operations as the No-Action Alternative; therefore, Proposed Action entrainment and mortality would have no effect compared to the No-Action Alternative.

Swim speeds of juvenile, native hardhead and Sacramento sucker have been documented as 1.3 fps or higher (Myrick and Cech 2000), which is well above the average approach and sweeping/bypass velocities measured during the previous relicensing,

demonstrating that Kern River native minnows and suckers can swim away from the intakes to avoid entrainment. Average approach velocities in front of the intakes are expected to remain below 1 fps, which is the threshold recommended by Myrick and Cech (2000).

The Proposed Action would have no effect on fish passage in the lower Kern River compared to the No-Action Alternative. There are no anadromous fish species in the lower Kern River that require upstream and downstream passage. Resident and stocked fish will maintain the ability to move volitionally throughout the bypass reach, impoundment, and into the reach of the river between Democrat Dam and Lake Isabella.

7.4.3.4 Special-Status Aquatic Species, including Northwestern Pond Turtles

Hardhead and northwestern pond turtles are the only special-status aquatic species known to occur in the Project area. As noted above, the Proposed Action is not expected to adversely affect habitat conditions (e.g., water quality, DO, water temperature and streamflow) for hardhead in the Democrat Dam Impoundment and bypass reach. Peak water temperatures would be like existing conditions under the No-Action Alternative and within the range preferred by hardhead, which can tolerate water temperatures above 25°C in flowing river conditions without physiological stress (Cech et al. 1990). The proposed Fish Population Monitoring Plan would allow SCE to continue to monitor hardhead in the Project area.

As described in Section 7.4.1.7, there were two observations of northwestern pond turtle recorded in the Democrat Dam Impoundment during the 2024 AQ 3 – Fish Population study. CNDDB observations (unknown dates) are recorded along the Kern River above and below the Project area, including two directly below Lake Isabella and two near the mouth of the Kern River canyon (CNDDB 2025). Additional incidental observations for northwestern pond turtles by SCE occurred in 2025 during the AQ 2 – Water Quality/Temperature and AQ 3 – Fish Population studies; results will be provided in the USR and FLA.

As an aquatic species that relies on terrestrial habitats for breeding and overwintering along rivers, northwestern pond turtles nest in upland habitats, usually within 5 to 150 meters (approximately 16 to 492 feet) of aquatic habitat, although some nests have been found as far as 500 meters away (Crump 2001; Davidson & Alvarez 2020; Holland 1991, 1994; Lucas 2007; Rathbun et al. 1992; Rathbun et al. 2002; Reese and Welsh 1998; Riensche et al. 2019; Pilliod et al. 2013). Females typically exhibit a degree of nest fidelity, changing sites only if disturbed during upland forays or while forming a nest at a particular site (Holland 1994; Crump 2001). The nesting season is late April through July depending on local environmental conditions (Scott et al. 2008; Shaffer and Toffelmier 2020). Females dig a hole and bury the eggs in dirt and vegetation (to create air space), topped with wet soil. In northern regions, hatchlings often remain in the nest over winter and emerge the following spring. The young typically emerge the following spring in northern areas but may emerge in late summer or fall in warmer climates (Ernst et al. 2009).

Northwestern pond turtles also use upland areas for summer estivation and overwintering, particularly when aquatic habitats experience drying or high winter flows.

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Estivation may be a response to drought conditions and involves turtles burying and concealing themselves just beneath the surface under organic duff and leaf litter in shaded and moist areas. Estivation sites have been documented in mostly dried wetlands, willow woodlands, and scrub brush habitat (Rathbun et. al. 2002; Bondi and Marks 2013; Zaragoza et al. 2015; Nerhus 2016). Upland overwintering sites are generally within 500 meters (1,640 feet) of aquatic habitats and often located under leaf litter or in soil beneath dense understory vegetation such as blackberry, poison oak, and stinging nettle, which reduces the likelihood of predation (Davis 1998). Pond turtles in warmer climates such as southern California may spend only one or two months overwintering in terrestrial habitats (Lovich and Meyer 2002). They typically move following the first winter storm in November or December, and this movement is attributed to the avoidance of high flow of winter and spring runoff (Goodman 1997; Reese 1996; Rathburn et al. 2002 in Pilliod et al. 2013). The propensity for terrestrial overwintering for pond turtles living in stream and river populations appears to be much higher than those individuals living in perennial ponds (Reese 1996, in Pilliod et al. 2013).

A review of aerial imagery (Google Earth 2025) indicates that potential nesting and upland habitat exists in a narrow, patchy, and disconnected band along the Kern River corridor and along the margin of the Democrat Dam Impoundment within the Project area. The steep, deeply incised V-shaped river canyon between the Democrat Dam Impoundment and the powerhouse is dominated by large, granitic substrate (bedrock and boulders) generally representing marginal nesting habitat for northwestern pond turtle, which are generally known to seek out more accessible microhabitats with friable, well-drained soils, sparse vegetation and a significant degree of solar exposure (Davidson and Alvarez 2020). The proximity to State Highway 178 along the southern margin of the river represents a barrier with increased chances of road mortality, nest disturbance, or predator attraction. However, these conditions may concentrate upland activities such as nesting, estivation, or overwintering into the limited suitable microhabitats that do occur within the Project area, including benches of fine sediment deposits, sparsely vegetated sandbars, or tributary confluences. Potential examples of these habitats in the Project area include the Upper and Lower Richbar picnic areas, Live Oak picnic site, unnamed tributaries, and the margins of the Democrat Dam Impoundment.

With lower water velocities, smaller substrate sizes in both instream and upland habitats (e.g., sand, mud, and silt), aquatic vegetation, variable water depths, and lower-gradient accessible upland habitats, the Democrat Dam Impoundment presents high-quality habitat for northwestern pond turtle. Below the impoundment, the Kern River canyon is marked by flow fluctuations due to upstream releases from Lake Isabella intended for downstream irrigation users (i.e., in the Bakersfield area) and storm events, which likely reduce the availability of stable instream and adjacent nesting habitats in the bypass reach on a seasonal basis. These flow releases are outside of the control of SCE and not a part of the Proposed Action.

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Potential effects to northwestern pond turtle and/or their habitat resulting from implementation of the Proposed Action include:

- Direct effects, including effects to individuals resulting from road and trail maintenance activities, herbicide application in association with vegetation management activities, sediment management activities, and water and flow management.

- Indirect effects, including the degradation or loss of suitable habitat due to the disturbance of suitable upland or estivation habitat associated with road and trail maintenance activities, vegetation management activities, sediment management activities, and water and flow management.

Potential direct and indirect effects to northwestern pond turtle are further described below.

Road and Trail Maintenance

Under the Proposed Action, SCE would continue to implement road and trail maintenance activities. Minor road maintenance generally includes debris removal; mechanical brushing of road edges; basic repairs, including blading or grading of native roads within the existing road prism to ensure a smooth surface and adequate drainage; filling of potholes; maintenance of erosion control features such as culverts (including inlets / outlets and dissipators), drains, ditches, and water bars; sealing or resurfacing existing roads; repair, replacement, or installation of access control structures such as posts, cables, rails, gates, and barrier rock; and repair / replacement of signage. Major road maintenance generally includes placement or replacement of culverts and other drainage features; major grading, and/or road replacement. Trail maintenance generally includes debris and rock removal; basic repairs including minor brushing; maintenance of erosion control features such as water bars; repair, replacement, or installation of access control structures such as barrier rock; and repair / replacement of signage.

Potential suitable upland habitat for northwestern pond turtle can be found along Project access roads and trails, including the lower portions of Willow Spring Creek Road (Democrat Dam Road), Flume No. 1 Road, Powerline Road, Democrat Gage Trail, Conduit No. 3 Trail, Cow Flat Creek Trail, Cow Flat Creek to Conduit No. 6 Trail, and the Lucas Creek Trail.

Direct Effects

Direct effects to northwestern pond turtle individuals could occur during road and trail maintenance activities that involve ground disturbance. Major road maintenance activities that involve ground disturbance outside of the footprint of the existing road or involve culvert replacement may potentially affect northwestern pond turtle sheltering under vegetative cover or other cover objects, or northwestern pond turtle nests. Contact with ground-disturbing heavy equipment could result in injury or mortality to adult turtles, hatchlings, or incubating eggs in these areas.

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Minor road and trail maintenance activities within the prism of existing roads and trails that do not involve ground disturbance would not affect northwestern pond turtles, as the species is unlikely to occur on or immediately adjacent to a road/trail or could self-relocate in the event of disturbance.

INDIRECT EFFECTS

Indirect effects to northwestern pond turtle because of road and trail maintenance activities could include disturbance of suitable nesting habitat or upland estivation or overwintering sites.

The potential for direct and/or indirect effects to northwestern pond turtle from road and trail maintenance activities would be minimized through implementation of the Wildlife Resources Management Plan (WRMP), which includes the following measures:

- Environmental screening process – Planned routine operation and maintenance activities are screened annually to determine whether avoidance and protection measures are necessary to minimize potential effects to northwestern pond turtle individuals or their habitat. Typical avoidance and protection measures are reviewed during the Annual FERC Environmental Training Program (ETP).

  Other measures may also be developed, as needed, based on the specific activity or resource, or in consultation with resource agencies. New or non-routine maintenance or construction activities that are not included in the Proposed Action may be subject to separate, additional environmental review, as well as agency approvals, permits, or other authorizations, to be determined on a case-by-case basis.

- Environmental training – SCE staff or contractors operating in the Project area are required to take an Annual FERC ETP that provides a review of sensitive species that may occur in the vicinity of planned routine operation and maintenance activities, as well as associated measures to minimize or avoid environmental effects. Additional training may be required prior to new or non-routine maintenance or construction activities, typically through a project-specific Worker Environmental Awareness Program (WEAP).

With implementation of the WRMP, road and trail maintenance activities conducted under the Proposed Action may affect, but are not likely to adversely affect, northwestern pond turtle individuals and/or their habitat.

Vegetation Management

Under the Proposed Action, SCE would continue to implement vegetation management, including hand trimming, hazard tree removal, and herbicide application, within defined areas around the dam, exposed water conveyance system features, the forebay perimeter fence, the powerhouse and switchyard, communications and power lines, and access roads and trails. Vegetation trimming may also occur as part of road and trail maintenance.

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DIRECT EFFECTS

In general, hand trimming and hazard tree removal are not expected to affect northwestern pond turtle. Hand trimming is typically conducted at the end of the vegetative growing season in late spring/early summer when pond turtles occupy primarily aquatic habitat. Hazard tree removal would typically occur in more developed upland areas along roads or adjacent to facilities and would not be expected to directly affect pond turtle individuals.

However, northwestern pond turtle may be affected by herbicide applications. SCE implements herbicide applications consistent with Pesticide Use Proposal (PUP) approved by the Sequoia National Forest, and herbicide application locations in the PUP may overlap with suitable upland refugia or nesting habitat for northwestern pond turtle. Pre-emergent herbicides are typically applied in the early growing season in February when target plants have just emerged. Vegetation emergence is monitored for a month, then a second round of post-emergent herbicide (glyphosate) is applied in March only if the initial treatment was unsuccessful in preventing vegetation growth. In the Kern Canyon, the February and March herbicide application time period overlaps with the rainy season in late winter/early spring when northwestern pond turtles may still be in upland refugia, or when hatchlings emerge from underground nests. Therefore, northwestern pond turtles could potentially be affected by herbicides through direct contact with the application spray during their overwintering period. During other times of the year (summer/fall), turtles would be in aquatic habitats and less likely to be affected by herbicide applications; however, late-nesting females may continue to enter upland areas through mid-summer and could come into contact with applied herbicides.

Upon review of the chemical-specific Syracuse Environmental Research Associates (SERA) risk assessments prepared for the Forest Service and other relevant literature, most of the chemicals utilized by SCE for vegetation management pose little to no risk reptiles in the concentrations authorized in the PUP (Grove 2019; McFall et al. 2023; SERA 2007; SERA 2011a; SERA 2011b; Wan et al. 1992; Yahnke et al. 2013; Yahnke et al. 2017). However, direct contact with glyphosate could result in lethal effects to northwestern pond turtle.

Glyphosate, along with the common additive R-11, has been shown to be highly lethal to reptiles when individuals are directly sprayed (Relyea 2005). Glyphosate may also affect reptiles that come into contact with contaminated water (Trumbo 2005), or when concentrated applications are sprayed on soil or vegetation and individuals move over the contaminated habitats (Brühl et al. 2011). Northwestern pond turtles may also be indirectly affected by runoff of herbicides into aquatic foraging habitats.

INDIRECT EFFECTS

Hand trimming and hazard tree removal may indirectly affect northwestern pond turtle through minor alteration of suitable upland habitat; however, these impacts are anticipated to be negligible. The use of herbicides (discussed in greater detail above) may indirectly affect northwestern pond turtle through modification of suitable upland habitat

or indirect contact with applied herbicides, such as consumption of contaminated prey or the runoff of herbicides into aquatic foraging habitats.

The potential for direct and/or indirect effects to northwestern pond turtle from vegetation management would be minimized through implementation of the WRMP and Vegetation Management Plan (VMP), which include the following measures:

- Environmental screening process – Planned routine operation and maintenance activities are screened annually to determine whether avoidance and protection measures are necessary to minimize potential effects to northwestern pond turtle individuals or their habitat. Typical avoidance and protection measures are reviewed during the Annual FERC ETP.

  Other measures may also be developed, as needed, based on the specific activity or resource, or in consultation with resource agencies. New or non-routine maintenance or construction activities that are not included in the Proposed Action may be subject to separate, additional environmental review, as well as agency approvals, permits, or other authorizations, to be determined on a case-by-case basis.

- Environmental training – SCE staff or contractors operating in the Project area are required to take an Annual FERC ETP that provides a review of sensitive species that may occur in the vicinity of planned routine operation and maintenance activities, as well as associated measures to minimize or avoid environmental effects. Additional training may be required prior to new or non-routine maintenance or construction activities, typically through a project-specific WEAP.

- Herbicide use – Herbicide applications will be conducted consistent with a Forest Service approved Pesticide Use Proposals and all associated best management practices.

With implementation of the WRMP and VMP, vegetation management activities conducted under the Proposed Action may affect, but are not likely to adversely affect, northwestern pond turtle individuals and/or their habitat.

Sediment Management

Under the Proposed Action, SCE would implement sediment management activities at Democrat Dam Impoundment, including partial and full sediment bypass procedures. Partial sediment bypass includes the release of sediment during normal high flows and precipitation event high flows. These two operations involve opening the low-level outlet, either partially or fully, to allow sediment to bypass Democrat Dam. Because the impoundment remains full, only sediment immediately around the low-level outlet intake and near the diversion screens is passed downstream. Full sediment bypass involves lowering the water level in Democrat Dam Impoundment and allowing the river and sediment to pass through the low-level outlet. During this operation, the low-level outlet is opened, and water is not diverted to the powerhouse (refer to Section 7.4.1.4 and Sediment Management Plan in Appendix E.1 for additional details).

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DIRECT EFFECTS

Full sediment bypass involves lowering the water level in Democrat Dam Impoundment annually and allowing the river and temporarily accumulated sediment to pass through the low-level outlet. This activity has the potential to directly affect northwestern pond turtle, particularly more sensitive life stages such as hatchlings or breeding females that may be more vulnerable to changes in aquatic habitat or other environmental disturbances. If present in the impoundment during full sediment bypass activities, hatchlings could be flushed downstream as shallow, low-velocity margin habitats are reduced, or could become more vulnerable to desiccation or predation. A reduction in water surface elevation could also affect breeding females by disrupting travel to established nesting locations or increasing predation risk during movement across exposed streambed areas.

INDIRECT EFFECTS

Indirect effects of sediment management on northwestern pond turtles under the Proposed Action could potentially consist of short-term changes in water quality, habitat features, and food availability associated with sediment release events. Increased turbidity or sediment concentrations downstream of Democrat Dam could temporarily decrease foraging efficacy due to reduced visibility. Sediment deposition downstream may also temporarily cover benthic habitats, reducing short-term availability of prey species. However, these effects are anticipated to largely remain within the natural range of variability the Kern River below Isabella Dam. Within the impoundment, sediment management activities could indirectly affect pond turtle behavior and could increase predation risk or energy expenditure.

Implementation of the flow and seasonal restrictions included in the Sediment Management Plan will minimize potential direct and indirect effects to northwestern pond turtles during partial and full sediment bypass events. Specifically, the Sediment Management Plan establishes that partial sediment bypass (normal high-flow conditions) would occur when flows in the bypass exceed 600 cfs (July 1–March 14) or 1,200 cfs (March 15–June 30; smallmouth bass / hardhead minnow spawning period). Full sediment bypass would occur between November 15 and March 14 to avoid impacts to aquatic species, including northwestern pond turtle juveniles and adults during the in-water rearing period (March 15–November 14). This would restrict full sediment bypass activities to periods when adult turtles are less active and overwintering hatchlings have not yet emerged from upland nests, or if young-of-year hatchlings have already emerged, are less reliant on shallow water margin habitats.

Implementation of sediment management activities under the Proposed Action may also provide indirect beneficial effects to northwestern pond turtle habitat downstream of Democrat Dam. By allowing accumulated sediment to pass through, natural sediment transport processes would be emulated. This sediment delivery supports the formation and maintenance of shallow, low-velocity aquatic habitats and depositional features (i.e., sandbars) that provide foraging, basking, and rearing habitats for pond turtles. Periodic deposition of fine sediment also maintains suitable nesting substrates and promotes vegetative growth to stabilize bank habitat.

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With implementation of the Sediment Management Plan, sediment management activities conducted under the Proposed Action may affect, but are not likely to adversely affect, northwestern pond turtle individuals and/or their habitat.

Water Diversions and Instream Flows

Under the Proposed Action, there would be no change to minimum instream flow requirements. As described in the proposed Minimum Instream Flow Measure, SCE would continue to provide existing minimum flows to the bypass reach (50 cfs from June 1 through September 30; 15 cfs from October 1 through May 31 or inflow, whichever is less). SCE's proposed Stream Gaging Plan would provide for the accurate measurement and maintenance of flows in the bypass reach. Overall, hydrologic conditions under the Proposed Action would generally mirror existing conditions.

DIRECT EFFECTS

SCE's proposed minimum flows (same as exiting condition) for the bypass reach would maintain existing, suitable aquatic habitat for northwestern pond turtle. Seasonal increases in flow during the irrigation period or storm events are anticipated to continue, which could temporarily reduce habitat suitability for this species. However, flow releases from Lake Isabella are outside of SCE's operational control. The powerhouse can utilize up to 412 cfs; any river flow exceeding this amount spills into the bypass reach. Run-of-river operations would maintain the normal elevation of the Democrat Dam Impoundment and existing aquatic and riparian habitat in and around the impoundment (i.e., 247 acres of lacustrine habitat for fish and aquatic biota and 32 acres of riparian habitat).

INDIRECT EFFECTS

Implementation of the Proposed Action would not change diversions or instream flows in the Project area compared to the No-Action Alternative. Therefore, no indirect effects to northwestern pond turtles or their habitats from water diversions or instream flow management are anticipated.

SCE's proposed Minimum Instream Flow Measure and Stream Gaging Plan would provide for minimum instream flows and associated post-license monitoring of flows in the bypass reach. With implementation of the Minimum Instream Flow Measure and the Stream Gaging Plan, water diversion and instream flows implemented under the Proposed Action would not affect northwestern pond turtle individuals or their habitat.

7.4.3.5 Aquatic Invasive Species

SCE is proposing no changes to Project operation and maintenance activities. As such, the Proposed Action would be the same as the No-Action Alternative and would not affect the distribution or abundance of AIS in the Project area. Available habitat for AIS would remain like existing conditions. An expansion of the range of AIS is not expected under Proposed Action. As such, the Proposed Action is not expected to affect native aquatic and terrestrial species in the Project area.

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7.4.4 Unavoidable Adverse Effects

There are no unavoidable adverse effects to fish and aquatic resources from continued operation and maintenance of the Project under the Proposed Action.

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TABLES

Table 7.4-1. Fish Stocking Records (Total Pounds) from 2017–2025, Kern River Downstream of Lake Isabella

Year	Section 1*: Democrat Dam to Live Oak Day Use Area (RM 48.8)	Section 2: Sandy Flat to Democrat Beach (RM 57.5)	Section 3: Keyesville below Isabella (RM 71.8)
2017	100	1,600	200
2018	–	1,750	–
2019	650	1,652	3,450
2020	700	600	1,600
2021	800	2,000	–
2022	600	1,000	1,000
2023	300	300	100
2024	600	1,500	1,300
2025	600	1,000	600

Notes: * Section 1 is in the Project's bypass reach; Section 2 and 3 are upstream of Democrat Dam.
Key: RM = river mile

Table 7.4-2. Temperature Preferences for Smallmouth Bass Based on a Literature Review

Smallmouth Bass Life Stage	Temperature Preferences (°C)	Lab-Based Temperature Preferences (°C)	Optimum Temperature (°C)
Spawning	12–25	>25	N/A
Fry	>20	25–27	25–26
Juvenile Rearing	>20	25–27	25–29
Adult Rearing	21–27	28–31	26–29

Source: SCE 2009
Key: °C = degrees Celsius

Table 7.4-3. Temperature Preferences for Hardhead Based on a Literature Review

Hardhead Life Stage	Acclimation Temperature in Lab (°C)	Temperature Selected (°C)
Juvenile	10	15.3
	30	28.6
Adult	12	20
	15	21
	18	19.6

Source: SCE 2009
Key: °C = degrees Celsius

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Table 7.4-4. Species and Fork Length Range (mm) collected from Democrat Dam Impoundment, 2024

Species	Total Fish (n)	Length Range (mm)
Brown Bullhead	15	159–251
Black Crappie	7	104–223
Bluegill Sunfish	8	44–169
Common Carp	13	475–610
Channel Catfish	1	545
Hardhead Minnow	2	86–360
Largemouth Bass	131	44–520
Sacramento Sucker	50	81–525
Threadfin Shad	96	43–103
White Catfish	6	150–172

Key: mm = millimeter
n = number

Table 7.4-5. Average Condition Factors by Species Collected in Democrat Dam Impoundment, 2024

Species	Average Condition Factor	Total Fish (n)*
Brown Bullhead	1.30	15
Black Crappie	1.49	7
Bluegill Sunfish	2.35	8
Common Carp	2.02	13
Channel Catfish	1.24	1
Hardhead Minnow	1.10	2
Largemouth Bass	1.29	131
Sacramento Sucker	1.35	50
Threadfin Shad	1.16	96
White Catfish	1.32	6

Notes: * Fish smaller than 50-mm FL were excluded from the condition factor analysis because condition factors are generally applied to larger fish.

Key: n = number

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Table 7.4-6. Estimated Seasonality by Species in the Project Area

	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
Smallmouth Bass												
Spawning												
Fry/YOY												
Juvenile												
Adult												
Largemouth Bass												
Spawning												
Fry/YOY												
Juvenile												
Adult												
Sacramento sucker												
Spawning												
Fry/YOY												
Juvenile												
Adult												
Sacramento pikeminnow												
Spawning												
Fry/YOY												
Juvenile												
Adult												
Hardhead												
Spawning												
Fry/YOY												
Juvenile												
Adult												
Common Carp												
Spawning												
Fry/YOY												
Juvenile												
Adult												

Source: Moyle 2002
Key: YOY = young-of-year

FIGURES

Figure 7.4-1. Photo of Kern River No. 1 Project Bypass Reach.

Figure 7.4-2. Democrat Dam Impoundment from the Democrat Raft Take-Out Boating Site.

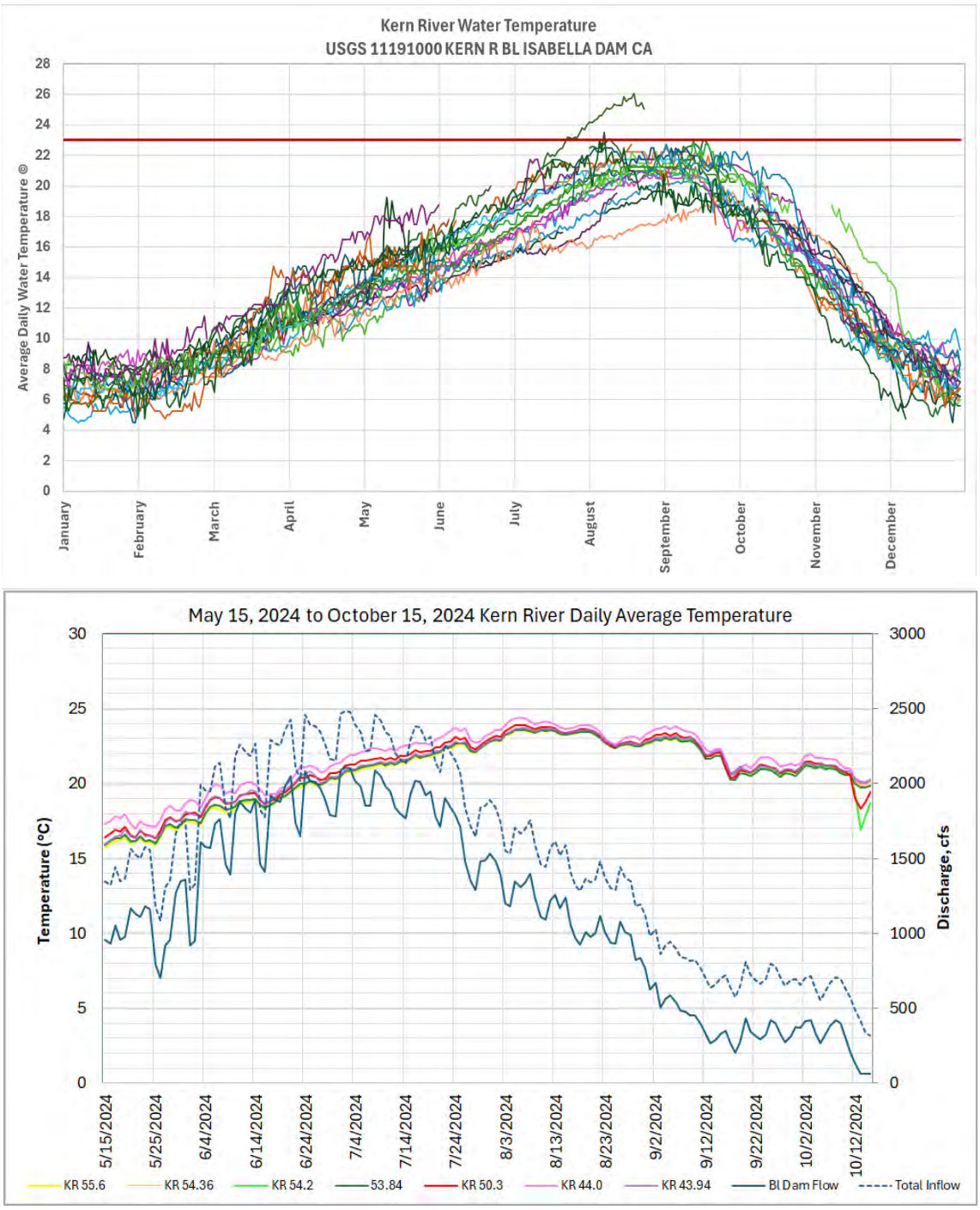


Figure 7.4-3. Kern River water temperature below Lake Isabella Dam (top) (23ºC line for reference) and from Democrat Dam to the Powerhouse (bottom).

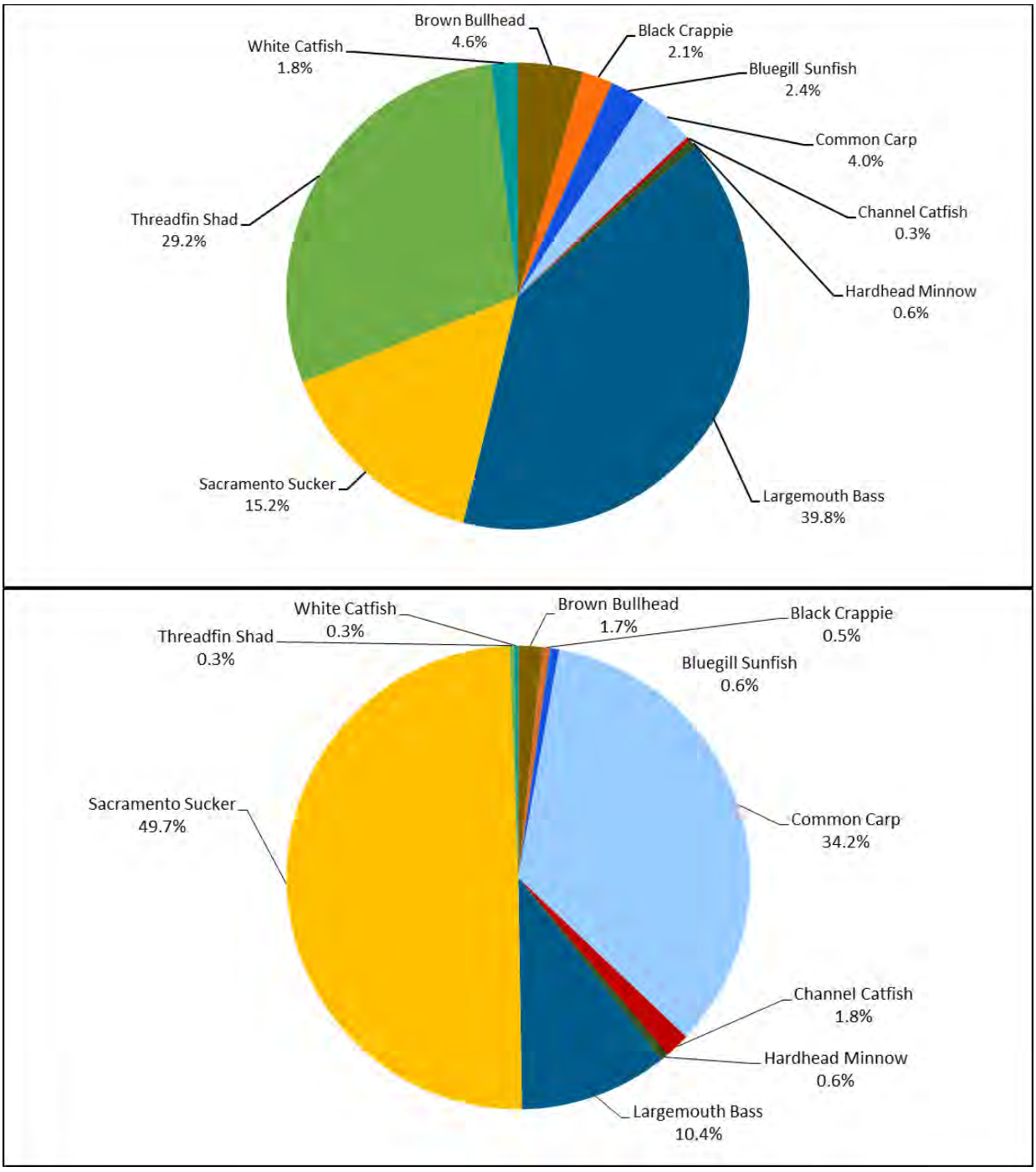


Figure 7.4-4. Democrat Dam Impoundment Species Composition in 2024 by Number Captured (top) Biomass (bottom).

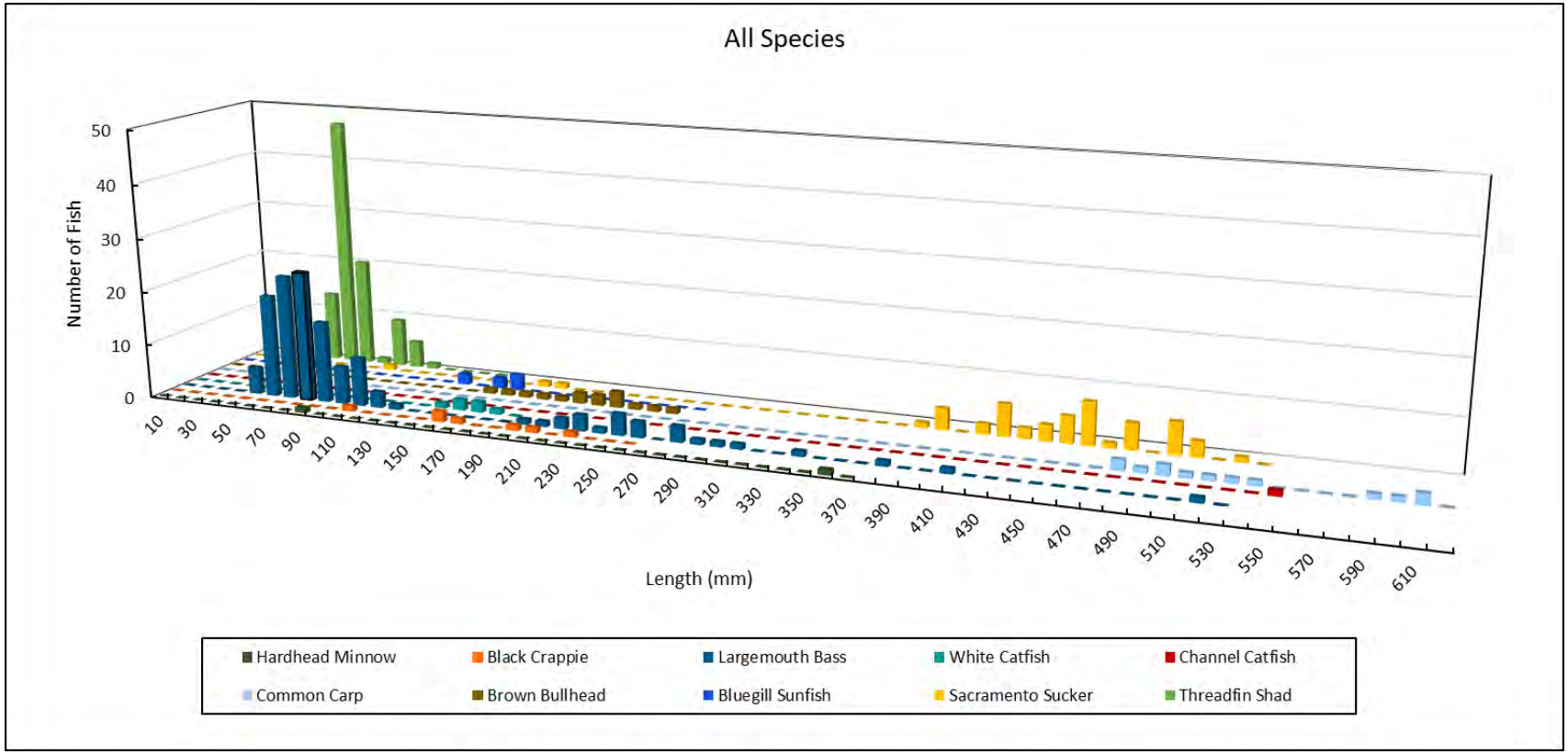
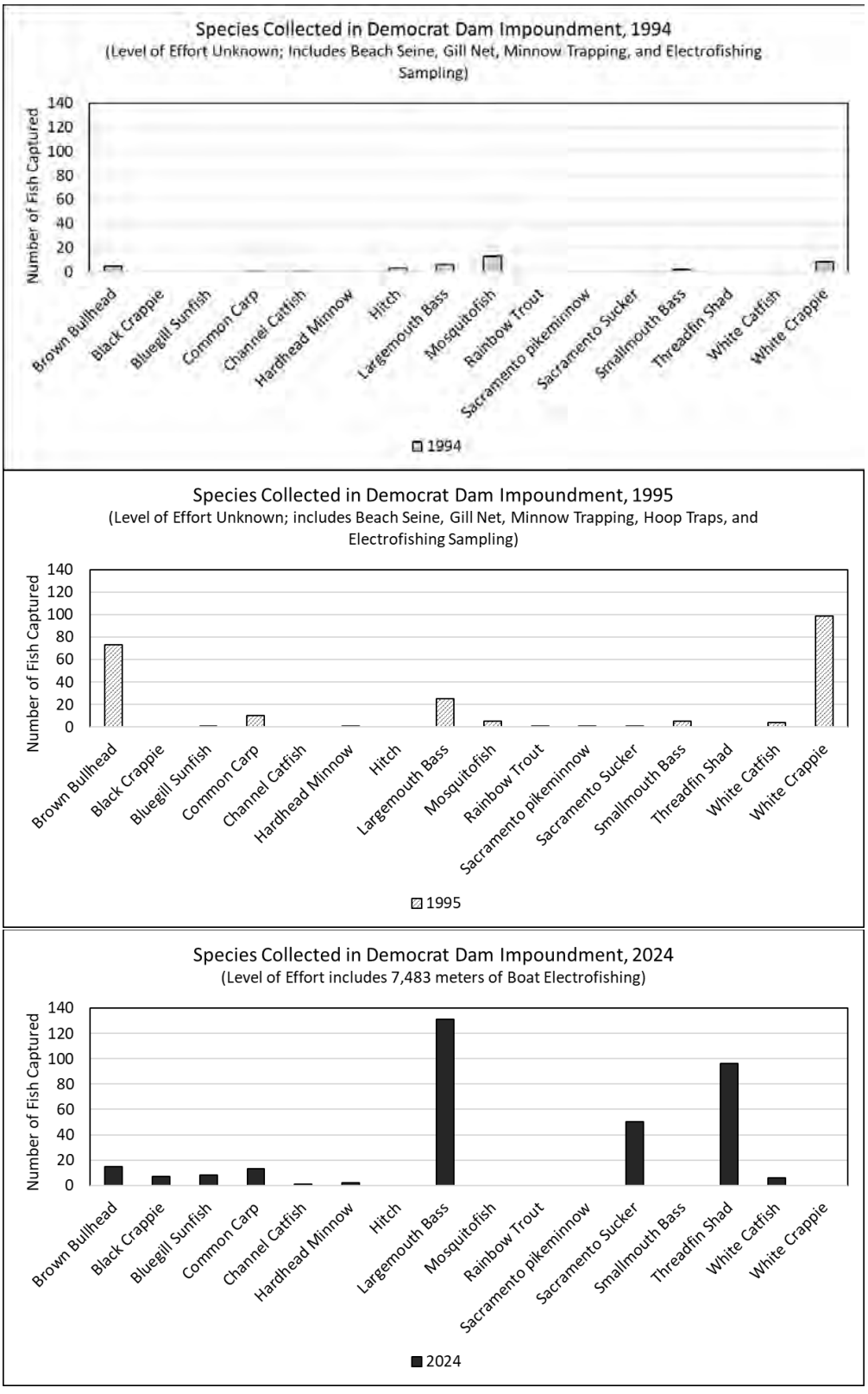


Figure 7.4-5. Length-Frequency Histogram for all Species Captured during Electrofishing Sampling in the Democrat Dam Impoundment in 2024.



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LIST OF ACRONYMS

APLIC	Avian Power Line Interaction Committee
AQ 1 TM	AQ 1 – Hydrology Technical Memorandum
BCC	Birds of Conservation Concern
BMP	Best Management Practices
Cal-IPC	California Invasive Plant Council
CALVEG	Classification and Assessment with LANDSAT of Visible Ecological Groupings
CC	California Candidate Endangered
CD	California delisted
CDFW	California Department of Fish and Wildlife
CE	California Endangered
CEQA	California Environmental Quality Act
CESA	California Endangered Species Act
CFP	California Fully Protected
CNDDB	California Natural Diversity Database
CNPS	California Native Plant Society
CR	California Rare
CRPR	California Rare Plant Rank
CSC	California Species of Special Concern
CT	California Threatened
CWHR	California Wildlife Habitat Relationships
EFPU	Big brown bat
ESA	Federal Endangered Species Act
ETP	Environmental Training Program
EUPE	Western mastiff bat
FC	Federal Candidate

FD	Federally delisted
FE	Federally Endangered
FERC	Federal Energy Regulatory Commission
Forest Service	United States Forest Service
FPD	Federally Proposed for Delisting
FPE	Federally Proposed Endangered
FPT	Federally Proposed Threatened
FSCC	SQF Species of Conservation Concern
FT	Federally Threatened
GIS	geographic information system
Inventory	California Invasive Plant Inventory
IPaC	Information for Planning and Consultation
LACI	Hoary bat
LANDSAT	land satellite
LANO	Silver-haired bat
LFAR	Western red bat
LOP	Limited Operation Period
MYCA	California myotis
MYCI	Small-footed myotis
MYEV	Long-eared myotis
MYLU	Little brown bat
MYTH	Fringed myotis
MYVO	Long-legged myotis
MYYU	Yuma myotis
NNIP	Non-Native Invasive Plant
NRIS	Natural Resource Information System
PAC	Protected Activity Center
PAD	Pre-Application Document
PAHE	Canyon bat
PM&E	protection, mitigation, and enhancement measures
Project	Kern River No. 1 Hydroelectric Project
PUP	Pesticide Use Proposals
QAC	Qualified Applicator Certificate

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QAL	Qualified Applicator License
SCE	Southern California Edison
SERA	Syracuse Environmental Research Associates
SMP	Sediment Management Plan
SQF	Sequoia National Forest
SWRCB	State Water Resources Control Board
TABR	Mexican free-tailed bat
TERR 1 TM	Botanical Resources TM
TERR 2 TM	Wildlife Resources TM
TM	Technical Memorandum
USFWS	United States Fish and Wildlife Service
VES	Visual Encounter Survey
VMP	Vegetation Management Plan
WL	California Watch List
WEAP	Worker Environmental Awareness Program
WRMP	Wildlife Resources Management Plan

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7.5 BOTANICAL AND WILDLIFE RESOURCES

This section describes botanical and wildlife resources in the vicinity of Southern California Edison's (SCE) Kern River No. 1 Hydroelectric Project (Project), including identification of vegetation alliances and wildlife habitats; federally listed rare, threatened, and endangered plant or wildlife species; other special-status plants and wildlife; non-native invasive plants (NNIPs); and game species. Information on special-status fish is provided in Section 7.4, *Fish and Aquatic Resources* and information on riparian and littoral resources is provided in Section 7.8, *Wetland, Riparian, and Littoral Habitats*.

Section 7.5.1 describes the affected environment and resource conditions under current Project operation and maintenance (i.e., baseline condition). Section 7.5.2 identifies proposed environmental measures, management, and monitoring plans (collectively referred to as protection, mitigation, and enhancement [PM&E] measures]) to be implemented under the Proposed Action (see Appendix E.1 for a full description of proposed PM&E measures). Section 7.5.3 includes an analysis of the potential environmental effects of the Proposed Action, including potential beneficial effects of proposed PM&E measures. Section 7.5.4 describes unavoidable adverse effects of the Proposed Action on botanical and wildlife resources.

7.5.1 Affected Environment

7.5.1.1 Information Sources

This section was developed using existing, relevant, and reasonably available information in the following primary sources. Additional references are cited in the text, as appropriate.

- Order Issuing New License for the Kern River No. 1 Hydroelectric Project No. 1930-014 (Federal Energy Regulatory Commission [FERC] 1998)
- California Department of Fish and Wildlife's (CDFW) California Natural Diversity Database (CNDDB) (CNDDB 2025)
- California Invasive Plant Council's (Cal-IPC's) California Invasive Plant Inventory (Inventory) (Cal-IPC 2022)
- California Native Plant Society's (CNPS) Inventory of Rare, Threatened and Endangered Plants (CNPS 2025)
- Final Environmental Assessment for Kern River No. 1 Hydroelectric Project – FERC No. 1930-014, California (Environmental Assessment) (FERC and United States Forest Service [Forest Service] 1998)
- Order Issuing New License for the Kern River No. 1 Hydroelectric Project No. 1930-014 (FERC 1998)
- A Guide to Wildlife Habitats of California (Mayer and Laudenslayer 1988)

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- Natural Resource Information System (NRIS) (Forest Service 2022)
- Application for New License, Kern River No. 1 Hydroelectric Project – FERC Project No. 1930, Kern County, California (License Application) (SCE 1994)
- United States Fish and Wildlife Service's (USFWS) Birds of Conservation Concern (USFWS 2021)
- USFWS Information for Planning and Consultation (IPaC) website (USFWS 2022a)
- SCE Technical Memoranda developed for the relicensing that are provided in Appendix E.2, including:
  - AQ 1 – Hydrology Technical Memorandum (AQ 1 TM) (SCE 2025a)
  - TERR 1 – Botanical Resources Technical Memorandum (TERR 1 TM) (SCE 2025b)
  - TERR 2 – Wildlife Resources Technical Memorandum (TERR 2 TM) (SCE 2025c)

7.5.1.2 Botanical Resources

Information on botanical resources is based on data from resource agency files and reports; SCE's Pre-Application Document (PAD) (SCE 2023); and botanical resources technical studies completed in 2024 and 2025 for the Kern River No. 1 Project relicensing. A summary of agency and stakeholder consultation is provided in Appendix E.4, *Consultation Documentation*. Detailed descriptions of the study methods and results are provided in the TERR 1 TM (SCE 2025b).

Extensive field surveys were conducted as part of the TERR 1 technical studies to document the location of botanical resources in relation to the Project area. Field surveys included:

- Vegetation alliances mapping (including riparian and sensitive alliances)
- Botanical inventory surveys (including identification of special-status plants and NNIPs)

The results of the TERR 1 technical studies are summarized below. Refer to Section 7.8, *Wetland, Riparian, and Littoral Habitats* for information on wetland and riparian resources.

Vegetation Alliances

The study area for vegetation alliances includes areas within 1 mile of the FERC Project boundary. Vegetation alliances are classified based on the Classification and Assessment with Land Satellite (LANDSAT) of Visible Ecological Groupings (CALVEG) mapping and

vegetation alliance descriptions developed by the Forest Service Region 5 (Forest Service 2014).

A total of 14 vegetation alliances are present within the study area, including one herb-dominated alliance, two shrub-dominated alliances, six tree-dominated alliances, three other non-vegetated cover types, and two aquatic area types. Most of the study area is dominated by the Annual Grasses and Forbs Alliance, with smaller inclusions of Blue Oak, Valley Oak, California Sycamore, Gray Pine, Interior Mixed Hardwood and Ultramafic Mixed Shrub Alliances.

Refer to Table 7.5-1 for a complete list of vegetation alliances present within the study area. Detailed information and vegetation alliance maps are provided in TERR 1 TM (SCE 2025b). Note that two CALVEG alliances identified in the study area, the *Baccharis* (riparian) alliance and the California sycamore alliance, are considered riparian habitats. Detailed information on riparian habitat is provided in Section 7.8, *Wetland, Riparian, and Littoral Habitats*.

SENSITIVE NATURAL COMMUNITIES

CDFW defines sensitive natural communities as follows:

- Evaluation is done at both the Global (full natural range within and outside of California) and State (within California) levels resulting in a single G (global) and S (state) rank ranging from 1 (very rare and threatened) to 5 (demonstrably secure).

- Natural Communities with ranks of S1–S3 are considered Sensitive Natural Communities to be addressed in the environmental review processes of the California Environmental Quality Act (CEQA) and its equivalents.

- For alliances with State ranks of S1–S3, all associations within them are also considered Sensitive.

A query of CNDDB yielded no records for sensitive natural communities within 1 mile of the FERC Project boundary (CNDDB 2025). However, two riparian alliances that are considered sensitive natural communities were documented during the TERR 1 technical studies. These are the *Platanus racemosa – Quercus agrifolia* Woodland Alliance (California sycamore – Pacific live oak riparian woodlands) (G3 S3) and the *Salix lucida* ssp. *lasiandra* Woodland Alliance (shining willow groves) (G4 S3). Refer to Section 7.8, *Wetland, Riparian, and Littoral Habitats* for additional information on these sensitive natural communities.

Special-Status Plants

For the purposes of this document, special-status plants are defined as any plant granted protection by a federal, state, or local agency, including:

- Federally listed plant species granted status by the USFWS under the Federal Endangered Species Act (ESA) include threatened (FT), endangered (FE),

proposed threatened or endangered (FPT, FPE), candidate (FC), or listed species proposed for delisting (FPD).

- State of California listed plant species granted status by the CDFW under the California Endangered Species Act (CESA) include state threatened (CT), endangered (CE), and rare (CR).

- CNPS listed plant species, which uses the California Rare Plant Rank (CRPR) system for rare, threatened, or endangered plants in California. Under the CEQA, special-status plants include the following CRPR:

  – 1A (presumed extirpated in California and either rare or extinct elsewhere);

  – 1B (rare, threatened, or endangered in California and elsewhere);

  – 2A (presumed extirpated in California, but common elsewhere); and

  – 2B (rare, threatened, or endangered in California, but common elsewhere).

- Sequoia National Forest (SQF) list of Species of Conservation Concern (FSCC) (Forest Service 2022).

The study area for special-status plants is defined as the FERC Project boundary (excluding underground Project features and lands overlying the underground Project features) and 10 feet on either side of Project access trails located outside the FERC Project boundary. Refer to Table 7.5-2 for a list of Project facilities.

Based on database queries and literature searches conducted for the TERR 1 technical studies, 16 special-status botanical species were determined to have the potential to occur within the study area, including three species listed under ESA and eight FSCC species. Refer to Table 7.5-3 for the status of each species, a summary of life history requirements, and information on their presence in the study area.

Federally Listed Plants and Designated Critical Habitat

No ESA-listed plants were identified during field surveys, and no federally designated Critical Habitat for listed plants occurs within the FERC Project boundary.

Other Special-Status Plants

One special-status plant, rose-flowered larkspur (*Delphinium purpusii*) (FSCC, CRPR 1B.3) was identified during the botanical surveys within the study area. Surveyors documented nine new populations of this species, ranging between approximately 1 to 1,800 square feet and supporting collectively a total of approximately 434 individuals. The populations documented did not coincide with previously reported populations.

Table 7.5-4 provides the unique population identification, total number of individuals, and approximate size in square feet for each population. Refer to Map 7.5-1 for the location of each population in the study area.

Note that only one special-status plant that is associated with riparian habitat, alkali mariposa lily (*Calochortus striatus*) (FSCC, CRPR 1B.2), has the potential to occur in the study area. This plant was not observed during surveys.

Non-Native Invasive Plants

A preliminary list of NNIPs potentially occurring in the study area was developed for the PAD (SCE 2023). This preliminary list, which included 154 species, was generated based on the Cal-IPC Inventory (Cal-IPC 2022). Cal-IPC defines NNIPs as plants that (1) are not native to, yet can spread into, wildland ecosystems; and (2) that also displace native species, hybridize with native species, alter biological communities, or alter ecosystem processes (Cal-IPC 2022). The Inventory was queried for two parameters (i.e., Jepson geographic floristic province and general habitat types [grassland, riparian, woodland, and scrub habitat]). Prior to implementation of the TERR 1 botanical surveys, this list was refined based on updated information on CALVEG vegetation alliances in the study area, as well as Forest Service publications pertinent to the study area (Moore and Gerlach 2001).

The study area for NNIPs is defined as the FERC Project boundary (excluding underground Project features and lands overlying the underground Project features) and 10 feet on either side of Project access trails located outside the FERC Project boundary. Refer to Table 7.5-2 for a list of Project facilities.

Five NNIP species were identified during botanical surveys, including:

- Red brome (*Bromus madritensis*) (Cal-IPC High) – 24 populations totaling approximately 499.4 acres.
- Cheatgrass (*Bromus tectorum*) (Cal-IPC High) – 10 populations totaling approximately 1.9 acres.
- Scotch thistle (*Onopordum acanthium*) (Cal-IPC High) – 36 populations totaling approximately 2.7 acres.
- Rabbitsfoot grass (*Polypogon monspeliensis*) (Cal-IPC Limited) – 20 populations totaling approximately 5.2 acres.
- Common mullein (*Verbascum thapsus*) (Cal-IPC Limited) – 17 populations totaling approximately 5.5 acres.

Refer to Table 7.5-5 for a summary of each NNIP population and to Map 7.5-2 for the location of these populations in the study area. The full extent of each population was mapped.

7.5.1.3 Wildlife Resources

Information on wildlife resources is based on data from resource agency files and reports; SCE's PAD (SCE 2023); and wildlife resources technical studies completed in 2024 and 2025 for the Kern River No. 1 Project relicensing. A summary of agency and stakeholder

consultation is provided in Appendix E.4, *Consultation Documentation*. Detailed descriptions of the study methods and results are provided in TERR 2 TM (SCE 2025c).

Extensive field surveys were conducted as part of the TERR 2 technical studies to document the location of wildlife resources and their habitats in relation to the Project area. Field surveys included:

- Wildlife habitat mapping
- Wildlife reconnaissance surveys
- Special-status amphibian habitat evaluation and visual encounter surveys (VES)
- Special-status bat reproductive and seasonal use surveys
- Evaluation of distribution and power lines for consistency with Avian Power Line Interaction Committee (APLIC) Guidelines
- Evaluation of open segments of Project water conveyance features

The results of these studies are summarized below.

Wildlife Habitats

The study area for wildlife habitats includes areas within 1 mile of the FERC Project boundary. Information on wildlife habitats was obtained to characterize habitat conditions and identify common wildlife species in the study area. Vegetation alliances described in Section 7.5.2.1 were cross-walked with the California Wildlife Habitat Relationships (CWHR) habitats using a CALVEG–CWHR Crosswalk for California (Forest Service 2024). This crosswalk was developed by Forest Service and CDFW as a method to determine which wildlife habitats are likely to be present based on existing vegetation alliances and forest structural characteristics.

Twelve wildlife habitats were identified in study area. Dominant habitats in the study area include mixed chaparral and annual grasslands at higher elevations along the slopes of the Kern River Canyon with Blue Oak Woodland, Valley Oak Woodland, Valley Foothill Riparian, and Montane riparian at lower elevations along the Kern River. Refer to Table 7.5-1 for a list of the wildlife habitats that occur within one mile of the FERC Project boundary. Detailed maps and descriptions of wildlife habitats are provided in TERR 2 TM (SCE 2025c). Detailed information on riparian habitat is provided in Section 7.8, *Wetland, Riparian, and Littoral Habitats.*

Special-Status Wildlife

This section describes special-status wildlife that occur or may potentially occur in the study area. The study area for special-status wildlife includes areas within one mile of the FERC Project boundary and Project facilities where operations and/or maintenance activities are conducted. This section addresses only special-status terrestrial wildlife

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species. Aquatic species, including fish, amphibians, and aquatic reptiles, are addressed in Section 7.4, *Fish and Aquatic Resources*.

For the purposes of this document, a special-status wildlife species is defined as any animal species that is granted status by a federal or state agency including:

- Federally listed species granted status by USFWS under the ESA include FT, FE, FPT, FPE, FC, or FPD. Also included are those species listed by USFWS as Birds of Conservation Concern (BCC) which include "species, subspecies, and populations of all migratory nongame birds that, without additional conservation action, are likely to become candidates for listing under the ESA of 1973" (USFWS 2021).

- State of California listed wildlife species which are granted status by the CDFW under the CESA include CT, CE, Fully Protected species (CFP), and California Species of Special Concern (CSC).

- SQF FSCC List (Forest Service 2022).

Based on database queries and literature searches conducted in support of the TERR 2 technical studies (SCE 2025c), 44 special-status wildlife species were determined to be known to occur or have the potential to occur within the study area. This includes eight species listed (or proposed for listing) under the ESA and six FSCC species. Refer to Table 7.5-6 for the status of each species, a summary of life history requirements, and information on their presence in the study area. Refer to Map 7.5-3 for known database records of special-status wildlife from the CNDDB and NRIS (CNDDB 2025, Forest Service 2022). Refer to Map 7.5-4 for wildlife habitats and special-status wildlife species observed as part of technical studies conducted for the TERR 1 TM and TERR 2 TM.

Federally Listed Wildlife and Designated Critical Habitat

Provided below is a description of federally listed wildlife known to occur or potentially occurring in the study area. A northwestern pond turtle (*Actinemys marmorata*, FPT, CSC) was observed during implementation of TERR 1 botanical resource studies. Refer to Section 7.4, *Fish and Aquatic Resources* for additional information on northwestern pond turtle in the study area.

Monarch Butterfly

Floral resources throughout the study area provide foraging habitat for monarch butterflies (*Danaus plexippus*, FPT). In addition, this species requires milkweed (*Asclepias*) species as the host plant for its larvae. Biologists documented nine populations of California milkweed (*Asclepius californica*) and one population of narrow leaf milkweed (*Asclepias fascicularis*) in the study area (Map 7.5-4). The largest population, located along the northwestern side of Willow Spring Creek Road (Democrat Dam Road), covered approximately 6,500 square feet, and included at least 70 individuals. Additional smaller populations were documented along the Democrat Gage

Trail (one individual), Stark Creek Trail (one individual), and the Overflow Spillway Trail (four populations with a total of 11 individuals).

Currently, USFWS is proposing 4,395 acres of Critical Habitat (overwintering) for the western migratory monarch population across Alameda, Marin, Monterey, San Luis Obispo, Santa Barbara, Santa Cruz and Ventura counties in California (USFWS 2024). The study area does not overlap with this proposed critical habitat.

Two monarch butterflies were observed during botanical studies for the TERR 1 TM in the vicinity of the Democrat Dam Impoundment. The first was observed in May 2024 on the island in the impoundment; and the second was observed during riparian studies conducted in October 2024 for the TERR 1 TM along the northern shore of the Kern River near the island. These observations were approximately 0.5 mile from the nearest milkweed population (along Willow Spring Creek Road). Refer to Map 7.5-4 for the locations of both milkweed populations and monarch butterfly observations.

Kern Canyon Slender Salamander

Kern Canyon slender salamanders (*Batrachoseps simatus*, FPT, CT) inhabit stream and seep margins within rocky narrow canyons supporting chaparral shrubs, California sycamore (*Platanus racemosa*), California buckeye (*Aesculus californica*), willow (*Salix spp*.), Fremont cottonwood (*Populus fremontii*), interior live oak (*Quercus wislizenii*), canyon live oak (*Q. agrifolia*), and foothill pine (*Pinus sabiniana*). This species is primarily associated with riparian habitats, but the species may also utilize upland areas with moist microsite characteristics such as mesic rocky hillsides containing talus and scree with associated hydrophytic vegetation such as mosses, ferns, or herbaceous vegetation (Lannoo 2005, Jockusch 2021, USFWS 2022a, pers. comm. in USFWS 2022b; Jockusch et al. 2022). There are approximately 284 acres of suitable habitat for Kern Canyon slender salamander in the study area (approximately 38 percent of the study area). Kern Canyon slender salamander habitat overlaps 57 Project facilities, including roads, trails, conduits, flumes, and many other facilities. Kern Canyon slender salamander habitat was also found in areas that lacked Project facilities such as along the Democrat Dam Impoundment.

There is proposed Critical Habitat for this species designated along Bodfish Creek, Erskine Creek, and tributaries to the Kern River (USFWS 2023a) which overlaps with the study area extending from the Democrat Dam Impoundment to Adit 13 & 14.

There were two observations of Kern Canyon slender salamanders recorded during the 2025 VES. One was located approximately 10 feet downslope of Stark Creek Trail, under a piece of wood near a talus slope approximately 52 feet downslope of Adit 13 &14. The second was observed on an unnamed trail within the FERC Project boundary approximately 83 feet upslope of the Stark Creek Road. This salamander was found in a wooden stump on a steep rocky slope.

Refer to Map 7.5-5 for the locations of Kern Canyon slender salamander proposed Critical Habitat and observations in relation to Project facilities and the FERC Project boundary.

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There are 10 additional historic records known from CNDDB and other SCE studies (refer to Map 7.5-3).

Relictual Slender Salamander

The relictual slender salamander (*Batrachoseps relictus*, FPE, CSC) occupies seeps, perennial springs, and streams in rocky habitat supporting limited tree cover of oaks, buckeyes, sycamores, pines, and firs (USFWS 2022b). This species is associated with aquatic habitats compared to other slender salamanders, and is found in areas of reduced flow, such as side seeps and relatively flat terrain, but in contact with water or fully saturated soil (Jockusch et al. 2022). There are approximately 47 acres of relictual slender salamander habitat present in the study area (approximately 0.06 percent of study area), overlapping 32 Project facilities. Due to the relictual slender salamander's dependance on water, habitat for this species is restricted to areas along creeks or where water conveyance system leaks were present.

There is proposed Critical Habitat designated for this species that overlaps with the study area from the Democrat Dam Impoundment to an unnamed creek near Conduit No. 9 just upstream from the Powerhouse (USFWS 2023a). Refer to Map 7.5-6 for the location of relictual slender salamander proposed Critical Habitat in relation to Project facilities and the FERC Project boundary.

No individuals of this species were observed during VES conducted in 2025. There are seven historic records of this species in the study area, as recorded from CNDDB and the SQF data (refer to Map 7.5-3).

Western Spadefoot

There are three locations in the study area that represent suitable habitat for western spadefoot (*Spea hammondi*; FPT, CSC):

- An unnamed seep located along Willow Spring Creek Road (Democrat Dam Road) (WSF-1);
- Dougherty Creek in the vicinity of Flume No. 5 (WSF-2); and
- Stark Creek in the vicinity of Flume No. 6 (WSF-3).

These areas support aquatic habitat located adjacent to suitable upland habitat defined as gently sloping grasslands with burrows for refugia. Refer to Map 7.5-4 for the location of the three suitable habitat areas. There is no Critical Habitat designated or proposed for this species.

No western spadefoot individuals were observed in the study area.

California Condor

The California condor (*Gymnogyps californianus*; FE, CE, CFP) occupies semi-arid, rugged mountain ranges of the southwestern United States, where it forages for carrion over open rangelands. This species nests in caves or cliff openings, especially ones with

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nearby roosting trees and open spaces. Cliff habitat in and immediately surrounding the study area may potentially provide habitat for California condors. Approximately 3.7 miles of cliff habitat were mapped in the study area, primarily along the Kern River, near Conduit No. 2, and surrounding the Kern River No. 1 Powerhouse and the Forebay Operations area. Refer to Map 7.5-4 for the location of suitable cliff habitat in relation to Project facilities and the FERC Project boundary.

There is designated Critical Habitat for this species, however it does not overlap with the study area.

No California condor individuals were observed during wildlife surveys in conjunction with the TERR 2 TM. However, a nesting pair is known to be present on SQF lands, in the vicinity of the Forebay (Forest Service 2018). Refer to Map 7.5-3 for the location of this observation.

Southwestern Willow Flycatcher

The southwestern willow flycatcher (*Empidonax traillii extimus*; FE, CE) is a riparian specialist that requires dense stands of riparian tree and shrubs of (at least 0.25 acre in size and 30 feet wide) associated with rivers, swamps, wetlands, lakes, and other large water bodies (USFWS 2002). Nesting habitats are defined as mosaics of relatively dense and expansive growths of riparian trees and shrubs that are established near or adjacent to surface water and/or underlain by saturated soil (USFWS 2002). Typical riparian species used for nesting includes willows, *Baccharis*, boxelders (*Acer* spp.), tamarisks (*Tamarix* spp.), and Russian olive (*Eleagnus angustifolia*), but California sycamore is not used for nesting (USFWS 2002). Suitable foraging habitat also includes riparian habitats or patches that would be unsuitable for nest placement (i.e., the vegetation structure is too short or spare, or the patch of vegetation is too small) (USFWS 2002).

Riparian habitats in the study area include *Baccharis salicifolia* Shrubland, *Platanus racemosa – Quercus agrifolia* Woodland, *Salix exigua*, Shrubland *Salix lasiolepis* Shrubland, *Salix lucida ssp. lasiandra* Woodland Alliances. The study area is mostly dominated by *Platanus racemosa – Quercus agrifolia* Woodland, which consists of large, scattered California sycamore in the overstory with limited, patchy, and sparse growth of willows and *Baccaris* in the understory. The California sycamore riparian alliance would not represent appropriate nesting habitat for southwestern willow flycatcher. *Baccharis salicifolia* Shrubland, *Salix exigua* Shrubland, *Salix lasiolepis* Shrubland, and *Salix lucida ssp. lasiandra* Woodland Alliances are small and fragmented and do not reach the 0.25 acre in size with 30-foot width requirement for southwestern willow flycatcher (USFWS 2002). However, riparian habitat may represent suitable foraging habitat for the species.

Refer to Map 7.5-7 for the location and extent of riparian habitats in the study area.

While there is federally designated Critical Habitat designated for this species, it does not overlap with the study area.

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No southwestern willow flycatchers were identified during wildlife surveys conducted under the TERR 2 TM. This species is known to breed at the Audubon Reserve at Lake Isabella approximately 20 miles northeast of the study area (SCE 2012).

California Spotted Owl

The California spotted owl (*Strix occidentalis occidentalis*; FPT, BCC, FSCC, CSC) is a denizen of mid-elevation Sierra Nevadan forests, and is highly associated with the presence of large, old-growth trees with canopy cover of at least 70 percent (USFWS 2023b). California spotted owls can be sensitive to noise disturbance around their nest sites during the nesting season (Forest Service 2023).

No California spotted owls were identified during wildlife surveys conducted for the TERR 2 TM. However, California spotted owls are known to occur in suitable habitat outside of the FERC Project boundary and there are 11 recorded observations of this species within the study area, including a designated Protected Activity Center (PAC) that is approximately 0.75 mile from the Democrat Dam Impoundment (Forest Service 2022). Refer to Map 7.5-3 for the location of these observations and refer to Table 7.5-6 for more details.

While there is some montane hardwood and blue oak-foothill pine habitats that are suitable habitat types for California spotted owl, forest and woodland habitat types in the study area are patchy and are interspersed within a grassland matrix and do not meet the closed-canopy cover requirements for this species (refer to Map 7.5-4). Therefore, while suitable habitat may be present at the edges of the study area where known occurrences have been recorded, areas within a 0.25 mile of Project facilities do not provide suitable nesting or foraging habitat for California spotted owl.

There is no Critical Habitat designated or proposed for this species.

San Joaquin Kit Fox

The San Joaquin kit fox (*Vulpes macrotis mutica*; FE, CT) inhabits grasslands and shrublands throughout the San Joaquin Valley. Friable soil is required for excavating underground dens. Biologists identified seven larger burrows and dens in the study area that may potentially be used by burrowing mammals in the study area. Several of these burrows had modifications that are typical of burrows used by San Joaquin kit fox. However, there were no signs of active use by this special-status species (e.g., presence of scat or prey remains). Refer to Map 7.5-4 for the locations of the large burrows.

There is no Critical Habitat designated for this species.

No San Joaquin kit foxes were observed during wildlife surveys in conjunction with the TERR 2 TM. There are no existing records of this species within the study area, but suitable habitat is present.

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OTHER SPECIAL-STATUS WILDLIFE

Bumble Bee Species

Flowering herbs and shrubs in the study area provide potential foraging habitat for special-status bumble bees; and areas with friable soils or small burrows may provide suitable habitat for nests.

There are four recent records (between 2021 and 2025) of Crotch's bumble bee (*Bombus crotchii,* California Candidate Endangered [CC]) recorded within the study area (CNDDB 2025). Refer to Map 7.5-3 for the locations of these observations. The study area also contains suitable habitat for the western bumble bee (*Bombus occidentalis,* CC).

Three individual bumble bees belonging to the genus *Bombus* were observed during wildlife surveys in conjunction with the TERR 2 TM. These individuals could not be identified down to a species level. However, there are a number of *Bombus* species that are listed as CC under the CESA, as well as previous records of Crotch's bumble bee in the study area (CNDDB 2025). Refer to Map 7.5-4 for the locations of these bumble bee observations.

Yellow-Blotched Salamander

Habitat for yellow-blotched salamander (*Ensatina eschscholtzii croceater*, FSCC, California Watchlist [WL]) includes evergreen and deciduous forests with abundant cover objects including rocks, logs, and peeled off bark in proximity creeks, streams, or seeps. There are approximately 120 acres of habitat for this species present in the study area (approximately 16 percent of study area) intersecting with 24 Project facilities. Habitat was identified along roads, trails, conduits, flumes, and many other facilities.

One yellow-blotched salamander was observed during TERR 2 TM studies adjacent to Flume No. 1 in the Democrat Dam area on March 3, 2025 (SCE 2025c). This salamander was found under a piece of bark approximately 10 feet west of the flume in a wood pile. Refer to Map 7.5-8 for the locations of suitable habitat and this observation.

Terrestrial Reptiles

The soils of the study area are mostly composed of a coarse sandy loam with decomposed granite bedrock that is highly suitable for California legless lizard (*Anniella* spp.; CSC), California glossy snake (*Arizona elegans occidentalis*; CSC), San Joaquin coachwhip (*Masticophis flagellum ruddocki*; CSC), and coast horned lizard (*Phrynosoma blainvillii*; CSC). Burrows are abundant throughout the study area, with a noticeable concentration of burrows along Stark Creek Trail, Dougherty Creek Trail, Lucas Creek Trail, and the beginning of Democrat Gage Trail. The shoulders along two roads, Stark Creek Road and Willow Spring Creek Road, also had large numbers of burrows. Common reptiles were regularly seen sunning along the trails and roads before retreating into cracks in rocks or burrows. One special-status reptile species, the California legless lizard (*Anniella* spp.), was observed during VES for special-status amphibians in association with the TERR 2 TM (SCE 2025c). No other special-status terrestrial reptiles were observed during reconnaissance surveys or VES.

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Cliff Nesting-Raptors

There are approximately 3.7 miles of cliffs in the study area that may provide habitat for special-status cliff-nesting raptors including, but not limited to, golden eagle (*Aquila chrysaetos*; Eagle Act, BCC, CFP and WL), prairie falcon (*Falco mexicanus*; WL), and American peregrine falcon (*Falco peregrinum anatum*; federally delisted [FD], CD), primarily along the Kern River, near Conduit No. 2, and surrounding the Kern River No. 1 Powerhouse and the Forebay Operations area.

Two special-status birds that may nest on cliffs, the golden eagle and American peregrine falcon, were observed in the study area. Golden eagles were observed in May 2024 during wildlife reconnaissance surveys and incidentally during TERR 1 TM riparian surveys. An additional golden eagle was also seen in March 2025 during the special-status salamander VES. An American peregrine falcon was also incidentally observed near Stark Creek during botanical surveys for the TERR 1 TM. No nests of special-status cliff-nesting birds were observed. Refer to Map 7.5-4 for the locations of cliff nesting habitat and these observations.

Coniferous Forest Birds

No conifer-dominant CWHR wildlife habitats were mapped in the study area. One CWHR wildlife habitat, Blue Oak–Foothill Pine, which is present along Willow Spring Creek Road (Democrat Dam Road), Stark Creek Road and a portion of the Stark Creek Trail, includes conifers as a co-dominant (i.e., foothill pines). However, this is an open woodland habitat type that does not provide suitable nesting habitat for special-status forest-dwelling raptors and other birds including, but not limited to, Vaux's swift (*Chaetura vauxi*; CSC) or bald eagle (*Haliaeetus leucocephalus*; FD, Eagle Act, FSCC, CE, CFP).

Two bald eagle observations were documented in the study area during TERR 2 TM wildlife reconnaissance surveys in May 2024 (SCE 2025c). However, there are no known bald eagle nest territories (CDFW 2016) and trees within the study area do not generally fit the characteristics for nesting habitat (Jackman and Jenkins 2004). Therefore, bald eagles are not expected to nest in the area. Refer to Map 7.5-4 for the location of bald eagle observations.

One white-headed woodpecker (*Dryobates albolarvatus,* BCC) was observed during the wildlife reconnaissance surveys along Willow Spring Creek Road. No other special-status coniferous forest birds, or their nests, were observed. Refer to Map 7.5-4 for the location of the white-headed woodpecker observation.

Grassland/Shrubland Birds

Grasslands (i.e., Annual Grassland) and shrublands (i.e., Mixed Chaparral) are predominant throughout the study area and provide habitat for special-status birds such as grasshopper sparrow (*Ammodramus savannarium*; CSC), northern harrier (*Circus cyaneus*; BCC, CSC), and loggerhead shrike (*Lanius ludovicianus*; CSC). These habitats surround many of the Project facilities. Blue Oak–Foothill Pine, Blue Oak Woodlands, and Valley Oak Woodlands are open woodland communities that also typically include large

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extents of grasses and shrubs in the understory. Grassland and shrubland birds were found throughout the study area where their preferred habitat was present.

During TERR 2 TM studies, two special-status raptors were observed flying over grasslands, including golden eagles (see *Cliff Nesting Birds*) and one Swainson's Hawk (*Buteo swainsoni*, CT) observed near Stark Creek Road in May 2024 (SCE 2025c). Other special-status grassland birds observed during these studies include one savannah sparrow (*Passerculus sandwichensis*, BCC), one oak titmouse (*Baelophus inornatus*, BCC), and one Lawrence's goldfinch (*Spinus lawrencei,* BCC), in May and June 2024. Refer to Map 7.5-4 for the location of special-status grassland and shrubland bird species observations.

Riparian Birds

Riparian areas in the study area may provide habitat for special-status birds such as tricolored blackbird (*Agelaius tricolor*; BCC, FSCC, CT, CSC), yellow-breasted chat (*Icteria virens*; CSC), purple martin (*Progne subis*; CSC), and yellow warbler (*Setophaga petechia*; CSC). These habitats are concentrated along the Kern River and tributary streams—refer to Map 7.5-7, for the location and extent of riparian habitats in the study area. Streams that had observable active or seasonal water flow at the time of the surveys also had the largest and most robust riparian habitats. Additionally, riparian vegetation was observed in the vicinity of leaks in the water conveyance system (i.e., conduits or flumes).

During TERR 2 TM reconnaissance surveys in May 2024, five observations of Bullock's oriole (*Icterus bullockii,* BCC) individuals and pairs were recorded displaying behaviors associated with mating. These behaviors included carrying and depositing nesting materials, and defending territories. Three additional observations of this species were made with individuals not displaying evidence of active mating. These individuals were observed either foraging or singing. No other special-status riparian bird species were observed in the study area. Refer to Maps 7.5-4 for the location of Bullock's oriole observations in the study area.

Fossorial Denning Mammals

In general, soils in the study area are highly suitable for burrowing providing habitat for special-status fossorial denning mammals, including Tulare grasshopper mouse (*Onychomys torridus tularensis*; CSC) and American badger (*Taxidea taxus*; CSC). Small animal burrows are abundant, particularly along flat or less steeply sloped lands along Project access roads and trails, and may be used by Tulare grasshopper mouse. Biologists identified seven larger burrows and dens in the study area that may potentially be used by other mammals in the study area. No American badger burrows were observed in the study area. Refer to Map 7.5-4 for the locations of the large burrows.

Bats

Four special-status bat species were identified in the study area during surveys conducted in support of the TERR 2 TM. These special-status bat species include: the pallid bat (*Antrozous pallidus*, CSC), western mastiff bat (*Eumops perotis californicus*,

CSC), western red bat (*Lasiurus frantzii*, CSC), and fringed myotis (*Myotis thysanodes*; FSCC). Refer to Map 7.5-9 for the location of special-status bats identified during these surveys.

One other special-status bat species, the Townsend's big-eared bat (*Corynorhinus townsendii*, FSCC, CSC), is also known to occur in the study area based on Forest Service records (Forest Service 2022). Refer to Map 7.5-3 for the location of these observations.

Of the 43 Project facilities evaluated, 21 were determined to have features potentially used by roosting bats. Bat roosts were identified at eight Project facilities, including:

- Western mastiff bat day and night roost at the Democrat Dam Access Walkway;
- Yuma myotis (*Myotis yumanensis*) night roost at the Democrat Dam Intake Gatehouse;
- California myotis (*Myotis californicus*), long-legged myotis (*Myotis volans*), and Yuma myotis night roosts at Flume No. 4 by Lucas Creek;
- Western mastiff bat and Yuma myotis night roosts at the gaging station by Cow Flat Creek;
- Long-eared myotis (*Myotis evotis*), fringed myotis, or little brown bat (*Myotis lucifugus*) night roosts at Adit 13 & 14 by Stark Creek;
- Big brown bat (*Eptesicus fuscus*) and Yuma myotis night roost, seasonal day roost, and maternity roosts at the Kern River No.1 Powerhouse;
- An undetermined species' night roost at the water tank in the Kern River No. 1 Powerhouse area;
- An undetermined species' seasonal night roost at Building No. 0146 (Garage) in the Kern River No. 1 Powerhouse area.

Refer to Table 7.5-7 for details on the roosts.

Game Species

A game species is an animal that is hunted for sport or pleasure. Information on game species potentially present in the study area is provided in this section because of their commercial and recreational value. Game species are regulated by CDFW and are defined under the California Fish and Game Code as follows:

- Resident and migratory game birds are defined in California Fish and Game Code § 3500. Examples of upland resident game birds listed include sooty grouse (*Dendragapus fuliginosus*), wild turkey (*Meleagris gallopavo*), mountain quail (*Oreortyx pictus*), and California quail (*Callipepla californica*). Upland migratory

game birds include (but are not limited to) Wilson's snipe (*Gallinago delicata*), band-tailed pigeon (*Patagioenas fasciata*), and mourning dove (*Zenaida macroura*).

- Game mammals are defined in California Fish and Game Code § 3950(a) to include (but are not limited to) deer (*Odocoileus* spp.), wild pig (*Sus scrofa*), black bear (*Ursus americanus*), rabbits and hares, and tree squirrels, as game mammals. Note that mountain lions (*Puma concolor*) are included in § 3950 but are explicitly excluded as a game mammal in § 3950.1.

Game species described in the California Fish and Game Code were evaluated for their likelihood to occur based on the geographic and elevation range of the study area and wildlife habitats present. A table was then developed listing each species and its status; followed by a generalized habitat description and a summary of applicable CDFW hunting regulations.

Table 5.7-8 lists the resident and migratory game birds and game mammals that have the potential to occur in the study area, including their habitat requirements and a summary of state hunting regulations for each species. Hunting of game species is permitted during seasons regulated by the CDFW.

A brief summary of the game species in the study area, including resident game birds, migratory game birds and game mammals, is provided below.

Resident and Migratory Game Birds

Three species of game birds were identified within the study area during the TERR 2 TM 2024 and 2025 surveys (SCE 2025c). Upland species include California quail and mountain quail. Mourning dove was the only species identified in the TERR 2 TM that met the definition of migratory game bird.

Four other game bird species were identified as having the potential to occur within the study area. These species include ring-necked pheasant (*Phasianus colchicus*), wild turkey, Wilson's snipe, and band-tailed pigeon.

Game Mammals

Provided below is a description of mule deer and other game mammals occurring in the study area.

Mule Deer

Mule deer (*Odocoileus hemionus*) are among the most visible and widespread wildlife species in California. The study area is within Deer Hunt Zone D8 and D9 (CDFW 2025a, 2025b). Deer hunting is regulated by California state law through CDFW. A hunting license and a hunting tag are required to take mule deer, and only bucks with antlers with demonstrable forks (or greater) may be taken, except during special hunts. Antlers must be forked on one side in the upper two-thirds section of the antler.

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Three herds, the Greenhorn Deer Herd, the South Sierra Foothill Deer Herd, and the Piute Deer Herd are present in the study area (CDFW 2025a). The Greenhorn Herd is migratory and occupies higher elevation sites as well as lower elevations near recent wildfire or prescribed burned areas that attract the deer after snows have driven them to winter ranges. The northeast end of the study area lies within the southwest portion of the Greenhorn Herd unit (SCE 1994). The Southern Sierra Foothill Herd is a resident, non-migratory herd that occupies the western Sierra Nevada foothills across multiple Deer Management Units. This herd is located near the study area, but away from the Project-related facilities (SCE 1994). The Piute Herd is also a resident, non-migratory herd that occupies various elevations throughout the year based on their response to weather and vegetation availability. This herd occupies land in the vicinity of the Project flowline, forebay, penstock, and forebay overflow spillway pipe (SCE 1994). The populations of these herds are stable to declining, although there is an overall decline in population numbers in California (CDFW 2025a). Survival rates of fawns have been low in the past few years, which can be attributed to weather conditions that affect forage production (CDFW 2025a).

Other Game Mammals

Mule deer was the only game mammal species observed in the study area during surveys conducted in support of the TERR 2 TM.

Other game mammals having the potential to occur in the study area include long-tailed weasel (*Mustela frenata*), wild pig, black bear, gray fox (*Urocyon cinereoargenteus*), raccoon (*Procyon lotor*), American mink (*Mustela vison*), and western gray squirrel (*Sciurus griseus*).

Beginning July 1, 2019, non-lead ammunition was required when taking any wildlife with a firearm anywhere in California (California Fish and Game Code § 3004.5).

7.5.1.4 Evaluation of Powerline Configurations and Avian Mortalities

SCE monitors avian electrocutions and mortalities, as well as avian-caused outages, along Project powerlines as part of its corporate Avian Protection Program. Since publication of the PAD for the Project (SCE 2023), there have been no reports of avian electrocutions or mortalities, or of bird-caused outages, associated with the Project.

There are two Project powerlines, the Erskine 12 kV Distribution Line and Camp 2.4 kV Distribution / Communication Line. Both lines have pole configurations that pose a potential risk of avian electrocution according to APLIC guidelines (APLIC 2012). Refer to Table 7.5-9 for details on the evaluation of pole configurations for consistency with APLIC guidelines.

7.5.1.5 Evaluation of Open-Air Segments of the Water Conveyance System

There are 12 open-air segments along Project water conveyance systems. Based on the field evaluations conducted under the TERR 2 TM (SCE 2025c), of these 12 facilities, five flumes exhibited some potential for wildlife to become entrapped (Flume No. 2, Flume No. 3, Flume No. 4, Flume No. 5, and Flume No. 6). While all of these flumes are elevated

and difficult to access from the ground level, the flumes lack covers and may be accessible to wildlife from the surrounding sloping landscape at the point where the flumes re-enter tunnels.

Refer to Table 7.5-10 for details on the evaluation of open-air segments of the water conveyance system and Map 7.5-4 for the location of each segment.

7.5.2 Proposed Environmental Measures

Under the Proposed Action, SCE proposes to implement PM&E measures associated with ongoing Project operation and maintenance activities. PM&E measures are designed to protect, maintain, or enhance environmental and cultural resources over the term of the new license. SCE proposes implementing the following PM&E measures related to botanical and wildlife resources:

- Sediment Management Plan (SMP)
- Vegetation Management Plan (VMP)
- Wildlife Resources Management Plan (WRMP)

Appendix E.1 provides complete descriptions of measures SCE is proposing as part of the license application and to include in any new license issued for the Project.

7.5.3 Potential Project Effects

This section describes the potential effects to botanical and wildlife resources that could occur because of continued operation and maintenance activities to be implemented under the Proposed Action. Potential effects are determined by analyzing the changes in botanical and wildlife resources that may result from activities implemented under the Proposed Action (Section 5.2) compared to the No-Action Alternative (existing condition) (Section 5.1). Final effects determinations consider PM&E measures to be included under the Proposed Action (refer to Appendix E.1).

Under the Proposed Action, SCE would continue to operate and maintain the Project as described in Section 5.1, *No-Action Alternative*, with minor adjustments to Project operation and maintenance activities in response to implementing proposed PM&E measures. No new or upgraded facilities, structural changes, or operational changes to the Project are proposed.

Consistent with FERC's Scoping Document 2 (FERC 2023), this section evaluates potential effects of continued Project operation and maintenance on the following:

- Species in the study area designated as federally threatened, endangered, proposed, or candidates for listing, and designated critical habitat (proposed and final) under the ESA.

- The potential for the introduction and spread of NNIPs, including the potential effects of NNIPs on native plant communities, special-status species, and wildlife habitat.

- Vegetation management and herbicide use on native vegetation and wildlife, game species, and the special-status species identified in SCE's PAD (SCE 2023), including SQF FSCC and nesting migratory bird species.

- Project facilities that present potential entrapment hazards to wildlife, including open-air flumes.

Refer to Section 7.4, *Fish and Aquatic Resources* for a discussion of the effects of non-native, invasive wildlife species, including the American bullfrog (*Rana catesbeiana*), Asian clam (*Corbicula fluminea*), and crayfish species on native aquatic, semi-aquatic, and terrestrial wildlife. Refer to Section 7.8, *Wetland, Riparian, and Littoral Habitats* for a discussion of the effects of the timing and magnitude of flows on wetlands and riparian habitat along the Kern River, including the bypass reach.

7.5.3.1 Botanical Resources

This section describes potential Project effects on vegetation alliances, including sensitive natural communities, and special-status plant species. The study area for sensitive natural communities and special-status plants is defined as the FERC Project boundary (excluding underground Project features and lands overlying the underground Project features) and 10 feet on either side of Project access trails located outside the FERC Project boundary.

There are two sensitive communities within the study area. Refer to Section 7.5.1.2 for more information.

No plants or mosses listed under the ESA or CESA have been identified in the study area. One special-status plant considered FSCC by SQF, the rose-flowered larkspur, was identified in the study area. Suitable habitat is present for 15 special-status plant species that may potentially occur in the study area. Refer to Table 7.5-3 for a list of plant species known to occur or potentially occurring in the study area, and their status and habitat requirements.

Effects to Vegetation Alliances

In general, the Proposed Action will have minimal effects to vegetation alliances in the study area. Most Project facilities are set within Annual Grassland habitat. Vegetation management, including vegetation removal as part of road and trail maintenance, is limited to defined areas around the dam, exposed water conveyance system features, the forebay perimeter fence, the powerhouse and switchyard, communications and power lines, and access roads and trails. Refer to Section 5.1.5.5 for a list of the specific vegetation management areas. The purpose of vegetation management is to minimize vegetation growth around facilities to ensure visibility and safety; facilitate efficient operation of the Project and minimize fire risk. Vegetation management is consistently

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conducted at Project facilities under the current FERC license; therefore, these areas support minimal vegetation under existing conditions. Natural areas outside of the vegetation management or other work area buffers would not be affected by the Proposed Action.

Several NNIPs were identified during implementation of the TERR 1 TM technical studies. NNIPs can degrade native vegetation by outcompeting and displacing native plants. Under the Proposed Action, SCE would implement the VMP (Appendix E.1), which includes strategies to minimize the potential for the introduction or spread of NNIPs, as well as a monitoring and treatment program for known NNIP populations.

Considering that vegetation management is limited to defined areas, and with implementation of the VMP, effects to vegetation alliances under the Proposed Action would be negligible.

Two habitats that are considered sensitive natural communities by CDFW were identified in the Project area. These are *Platanus racemosa* – *Quercus agrifolia* Woodland Alliance (California sycamore – Pacific live oak riparian woodlands) (G3 S3) and the *Salix lucida* ssp. *lasiandra* Woodland Alliance (shining willow groves) (G4 S3). These communities are considered riparian habitats. Refer to Section 7.8, *Wetland, Riparian, and Littoral Habitats* for a discussion of potential effects to riparian vegetation alliances in the study area.

Effects to Special-Status Plants

One upland plant species classified as FSCC by the SQF, rose-flowered larkspur (*Delphinium purpusii*, FSCC, CRPR 1B.3), was documented during special-status plant surveys associated with the TERR 1 TM (SCE 2025b). Provided below is a description of potential effects to rose-flowered larkspur from implementation of Project maintenance activities under the Proposed Action.

Rose-flowered larkspur

As described in Section 7.5.1.1, nine populations of rose-flowered larkspur were recorded during implementation of TERR 1 technical studies. Populations of rose-flowered larkspur were documented primarily along Project trails (i.e., Conduit No. 3 Trail, Lucas Creek Trail, Stark Creek Trail, Dougherty Creek Trail, and the Overflow Spillway Trail), as well as near Flume No. 3, Conduit No. 5, and Adit 14 & 15. Under the Proposed Action, SCE would continue to implement vegetation management and trail management activities around these facilities (as applicable). Potential effects to rose-flowered larkspur resulting from implementation of the Proposed Action would therefore include:

- Direct effects, including the removal of individuals resulting from vegetation management and trail maintenance.
- Indirect effects, including the degradation of habitat resulting from vegetation management, trail maintenance, or from the introduction or spread of NNIPs.

Each of these effects are further described below.

Direct Effects

Under the Proposed Action, SCE would continue to implement vegetation management, including hand trimming, hazard tree removal, and herbicide application. Herbicide applications are not currently implemented in the vicinity of any rose-flowered larkspur populations. However, hand trimming could result in a loss of individuals. The bloom period for this species is April through June, with the peak seed production occurring immediately following bloom; therefore, the sensitive period for this species is April through July. Vegetation management typically occurs in the spring or early summer, which overlaps with the peak reproductive season for rose-flowered larkspur.

Under the Proposed Action, SCE would implement the VMP (Appendix E.1) to minimize effects to sensitive plants. This would include the following measures to minimize the potential for direct or indirect effects to rose-flowered larkspur populations:

- Environmental screening process – Planned routine operation and maintenance activities are screened annually to determine whether avoidance and protection measures are necessary to minimize potential effects to sensitive botanical resources or involve the potential for introduction or spread of NNIPs. Typical avoidance and protection measures are reviewed during the Annual FERC Environmental Training Program (ETP). Measures associated with planned operation and maintenance activities may include, but are not limited to:

  – Limiting vegetation management activities to defined work areas, and avoiding work within sensitive habitats (e.g., riparian habitats), to the degree possible.

  – Avoidance buffers or seasonal restrictions for special-status plants: avoiding vegetation removal within known populations or conducting operation and maintenance activities outside of the emergence period (post-senescence or pre-emergence) to avoid disturbance to reproductive life cycle and seed dispersal.

  – Topsoil salvage and replacement to preserve existing native seedbank when new ground disturbance is needed for operation and maintenance.

  – Implementation of herbicide applications consistent with approved Pesticide Use Proposals (PUPs) and all associated Best Management Practices (BMPs). This includes a requirement for applications to be supervised by an individual with a Qualified Applicator License (QAL) or Qualified Applicator Certificate (QAC), use of selective application techniques to avoid desirable vegetation, and work in appropriate weather conditions.

  Other measures may also be developed, as needed, based on the specific activity or resource, or in consultation with resource agencies

  New or non-routine maintenance or construction activities that are not included in the Proposed Action may be subject to separate, additional environmental review,

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as well as agency approvals, permits, or other authorizations, to be determined on a case-by-case basis.

- Environmental training – SCE staff or contractors operating in the Project area are required to take an Annual FERC ETP that provides a review of sensitive species or NNIPs that may occur in the vicinity of planned routine operation and maintenance, as well as associated measures to minimize or avoid environmental effects. Additional training may be required prior to new or non-routine maintenance or construction activities, typically through a project-specific Worker Environmental Awareness Program (WEAP).

With implementation of the VMP and associated programs and measures, direct effects to rose-flowered larkspur would be negligible.

Indirect Effects

Habitat for rose-flowered larkspur could also potentially be reduced or degraded through the introduction or spread of NNIPs that could outcompete or displace native floral resources. The VMP (Appendix E.1) includes prevention strategies for NNIPs, including equipment and vehicle cleaning, use of weed-free straw, and use of native species for revegetation as part of erosion control or in large ground disturbance or cleared areas. In addition, known or new populations of NNIPs would be monitored and treated in consultation with SQF over the term of the new license. In addition, SCE will implement a program to monitor and treat new or established NNIPs in consultation with SQF.

With the implementation of the VMP, the Proposed Action would have a negligible effect on habitat for rose-flowered larkspur or other native plants over the term of the new license.

OTHER SPECIAL-STATUS PLANTS

Implementation of the Proposed Action could potentially affect new special-status plant individuals or populations that may be identified over the term of the new license. As described above, SCE would implement the VMP as part of the Proposed Action. The measures described above under effects to rose-flowered larkspur would also protect other special-status plants, if discovered in the future. These include the environmental review process, Annual FERC ETP and project-specific WEAP training, the NNIP prevention strategies, and the NNIP monitoring and treatment program. With implementation of the VMP, the Proposed Action would have a negligible effect on any additional special-status plant populations, or their habitats, over the term of the new license.

7.5.3.2 Wildlife Resources

This section describes potential effects to wildlife resources under the Proposed Action.

Effects to Federally Listed Wildlife and Designated Critical Habitat

This section provides information on potential effects of the Proposed Action on species listed as endangered or threatened under the ESA, as well as species proposed for listing as endangered or threatened (referred to in this section as "federally listed" species).

Table 7.5-6 includes 17 federally listed terrestrial species generated by a query of the IPaC database for the study area (USFWS 2025). Of these, nine species were eliminated from analysis because the study area is outside the known geographic range of the species and/or does not contain suitable habitat for the species. A discussion of potential effects of the Proposed Action to the remaining eight federally listed or proposed wildlife species known to occur or potentially occurring in the study area is provided below.

The study area for special-status wildlife (excluding bats) includes areas within one mile of the FERC Project boundary and Project facilities where operations and/or maintenance activities are conducted. Refer to Table 7.5-2 for a list of Project facilities.

Refer to Table 7.5-5 for a list of special-status wildlife species (including federally listed species) known to occur or potentially occurring in the study area, their status, and habitat requirements.

MONARCH BUTTERFLY

As described in Section 7.5.1.2, two monarch butterfly occurrences were recorded during implementation of technical studies, and 10 populations of the species' host plant (milkweed species) were mapped in the study area. Refer to Map 7.5-4 for the location of these resources.

Potential effects to monarch butterfly resulting from implementation of the Proposed Action include:

- Direct effects, including flushing of adults or loss of eggs, caterpillars, or pupae, as a result of vegetation management (hand trimming and herbicide use) around facilities or road and trail maintenance.

- Indirect effects, including degradation or removal of floral resources as a result of vegetation management (hand trimming and herbicide use) or from the introduction or spread of NNIPs.

Direct Effects

Under the Proposed Action, SCE would continue to implement vegetation management, including hand trimming, hazard tree removal, and herbicide application, within defined areas around the dam, exposed water conveyance system features, the forebay perimeter fence, the powerhouse and switchyard, communications and power lines, and access roads and trails. Refer to Section 5.1.5.5 for a list of the specific vegetation management areas. Some vegetation removal may also be required as part of road and trail maintenance. The purpose of vegetation management is to minimize vegetation growth around facilities to ensure visibility and safety, facilitate efficient operation of the

Project, and minimize fire risk. Vegetation management is conducted under the current license; therefore, these areas support minimal vegetation under existing conditions.

However, several species of milkweed are present in the study area, and portions of milkweed populations overlap vegetation management and road/trail maintenance areas. Vegetation management typically occurs in the spring or early summer, which overlaps with the breeding season for monarchs in California (typically May through July). Cutting or spraying of milkweed plants could therefore remove or kill monarch eggs, caterpillars, or pupae attached to the plants' leaves.

The WRMP would be implemented to minimize the potential for effects to these life stages of monarch. Measures in the WRMP include:

- Environmental screening process – Planned routine operation and maintenance activities are screened annually to determine whether avoidance and protection measures are necessary to minimize potential effects to monarchs or their habitat. Typical avoidance and protection measures are reviewed during the Annual FERC ETP. Measures that may be applicable in the vicinity of milkweed populations include:

  – Staff would be informed of the location of milkweed populations that intersect vegetation management or road/trail maintenance work buffers.

    ➢ Removal of milkweeds would be avoided, when possible (i.e., when presence of the plants would not affect safety or operations).

    ➢ Implementation of herbicide applications consistent with approved PUPs and all associated BMPs, such as selective application techniques and in weather conditions that would minimize the potential for effects to desirable vegetation (including milkweeds).

  Other measures may also be developed, as needed, based on the specific activity or resource, or in consultation with resource agencies.

  New or non-routine maintenance or construction activities that are not included in the Proposed Action may be subject to separate, additional environmental review, as well as agency approvals, permits, or other authorizations, to be determined on a case-by-case basis.

- Environmental training – SCE staff or contractors operating in the Project area are required to take an Annual FERC ETP that provides a review of sensitive species that may occur in the vicinity of planned routine operation and maintenance activities, as well as associated measures to minimize or avoid environmental effects. Additional training may be required prior to new or non-routine maintenance or construction activities, typically through a project-specific WEAP.

Operation and maintenance activities could also result in minor disturbance effects (i.e., flushing) to adult monarch butterflies during implementation of vegetation management

or other activities. This effect would be minor, short-term, and temporary, and would have negligible effects on monarch butterflies.

With implementation of the WRMP, the Proposed Action may affect, but is not likely to adversely affect, monarch butterfly individuals.

Indirect Effects

Vegetation management could also result in the reduction or degradation of habitat for all stages of monarch butterfly through removal of floral resources (including milkweeds) or through the introduction or spread of NNIPs that could outcompete or displace native floral resources. As described under direct effects, vegetation management activities are restricted to a defined buffer around facilities. These areas support minimal vegetation under existing conditions, and planned routine operation and maintenance activities would not affect natural vegetation, including flowering resources, outside the work buffers.

In addition, the VMP includes prevention strategies for NNIPs, including equipment and vehicle cleaning, use of weed-free straw, and use of native species for revegetation as part of erosion control or in large ground disturbance or cleared areas. In addition, SCE will monitor and treat new or established NNIPs in consultation with SQF.

Considering that vegetation management, and potential removal of floral resources, is limited to work buffers in the direct vicinity of developed facilities, and with the implementation of NNIP strategies and programs in the VMP, the Proposed Action may affect, but is not likely to adversely affect, habitat for monarch butterflies.

KERN CANYON SLENDER SALAMANDER AND RELICTUAL SLENDER SALAMANDER

As described in Section 7.5.1.2, there were two observations of Kern Canyon slender salamanders recorded during the 2025 VES associated with the TERR 2 TM. There were no observations of relictual slender salamander. Proposed Critical Habitat and suitable habitat for both species is present in the study area. Refer to Map 7.5-5 for the location of suitable habitat and proposed Critical Habitat for Kern Canyon slender salamander in the study area, and to Map 7.5-6 for the location of suitable habitat and Critical Habitat for relictual slender salamander in the study area.

Potential effects to Kern Canyon and relictual slender salamanders and/or their proposed Critical Habitat resulting from implementation of the Proposed Action include:

- Direct effects, including effects to individuals resulting from road maintenance activities or from herbicide application in association with vegetation management activities.

- Indirect effects, including the degradation or loss of suitable microhabitat due to the removal of cover objects associated with road and trail maintenance activities.

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Direct Effects

Slender salamanders spend most of the year in burrows or other underground refugia and are only active on the surface during precipitation events. Planned routine operation and maintenance activities involve minimal ground disturbance, are restricted to immediate vicinity of developed Project facilities, and are implemented during dry conditions; and are therefore generally not expected to affect slender salamanders. However, two planned routine operation and maintenance activities—herbicide application and major road maintenance—do have some potential to directly affect slender salamanders when implemented in suitable habitat (including Critical Habitat). Potential direct effects of these activities, as well as measures that would be implemented to minimize the potential for direct effects to salamanders during implementation of planned routine operation and maintenance activities, are further described below.

Herbicide Application

Under the Proposed Action, SCE would continue to implement vegetation management activities, including hand trimming, hazard tree removal, and herbicide application, within defined areas around the dam, exposed water conveyance system features, the forebay perimeter fence, the powerhouse and switchyard, communications and power lines, and access roads and trails. Vegetation trimming may also occur as part of road and trail maintenance. In general, hand trimming and hazard tree removal are not expected to affect slender salamanders. Hand trimming is typically conducted at the end of the vegetative growing season in late spring/early summer when salamanders have retreated to their underground burrows. These species spend most of the year in burrows or other underground refugia and are only active on the surface during precipitation events.

Kern Canyon slender salamander, relictual slender salamander, and/or their Proposed Critical Habitat may, however, be affected by herbicide applications. SCE implements herbicide applications consistent with PUPs approved by the SQF. Herbicide application locations in the PUPs overlap with suitable habitat observed during the 2025 VES and with proposed Critical Habitat for both species. Refer to Table 7.5-11 for a summary of areas where herbicide applications occur within suitable habitat and proposed Critical Habitat.

Pre-emergent herbicides are typically applied in the early growing season in February when target plants have just emerged. Vegetation emergence is monitored for a month, then a second round of post-emergent herbicide (glyphosate) is applied in March only if the initial treatment was unsuccessful in preventing vegetation growth. In the Kern Canyon, the February and March herbicide application time period overlaps with the rainy season in late winter/early spring when the salamanders are most active at the surface. Amphibian skin is particularly sensitive to the absorption of chemicals. Therefore, slender salamanders could potentially be affected by herbicides through direct contact with the application spray (Brühl et al. 2011) during their active period. During other times of the year (summer/fall), salamanders would be in their underground refugia and would not be affected by herbicide applications.

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Upon review of the chemical-specific Syracuse Environmental Research Associates (SERA) risk assessments prepared for the Forest Service and other relevant literature, most of the chemicals utilized by SCE for vegetation management pose little to no risk to special-status amphibians in the concentrations authorized in the PUP (Grove 2019, McFall et al. 2023, SERA 2007, SERA 2011a, SERA 2011b, Wan et al. 1992, Yahnke et al. 2013, Yahnke et al. 2017). However, direct contact with glyphosate could result in lethal effects to Kern Canyon slender salamander or relictual slender salamander.

Glyphosate, along with the common additive R-11, has been shown to be highly lethal to amphibians when individuals are directly sprayed (Relyea 2005). Glyphosate may also affect amphibians that come into contact with contaminated water (Trumbo 2005), or when concentrated applications are sprayed on soil or vegetation and individuals move over the contaminated habitats (Brühl et al. 2011). Relictual slender salamanders may also be indirectly affected by runoff of herbicides into their suitable aquatic breeding habitats.

Major Road Maintenance

Suitable habitat for Kern Canyon and relictual slender salamanders can be found along four Project roads, including Willow Spring Creek Road (Democrat Dam Road), Flume No. 1 Road, Dougherty Creek Road, and Stark Creek Road. Under the Proposed Action, SCE would continue to implement planned routine road maintenance activities, which may include minor repairs (e.g., debris removal, filling of potholes, maintenance of erosion control features, etc.) or major road maintenance that involve ground disturbance such as the replacement of culverts. Minor road maintenance activities within the prism of existing roads that do not involve ground disturbance would not affect slender salamanders, as salamanders are unlikely to occur on or immediately adjacent to the road.

However, major road maintenance activities that involve ground-disturbance outside the footprint of the existing road or involve culvert replacement may potentially affect salamanders sheltering under cover objects. Contact with ground-disturbing heavy equipment could result in injury or mortality to salamanders in these areas. As described in the WRMP, new or non-routine maintenance or construction efforts (e.g., new or major repair of existing structures, relocating a section of Project road, or major culvert upgrade, etc.) that have the potential to directly affect wildlife and/or their habitat may be subject to separate, additional environmental review.

The potential for direct effects to the Kern Canyon slender salamander or relictual slender salamander from planned routine use of herbicides or major road maintenance activities would be minimized through implementation of the WRMP, which includes the following measures:

- Environmental screening process – Planned routine operation and maintenance activities are screened annually to determine whether avoidance and protection measures are necessary to minimize potential effects to special-status slender salamanders. Typical avoidance and protection measures are reviewed during the Annual FERC ETP. Measures associated with planned routine operation and

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maintenance activities within suitable habitat for slender salamander may include, but are not limited to:

– Limit operation and maintenance activities to defined work areas.

– Conduct operation and maintenance activities in a manner that minimizes disturbance of suitable habitat[1] such as minimizing (and avoiding wherever feasible) off-road vehicle travel, minimizing ground disturbance, and implementing the least ground disturbing approach to the work.

– Retain cover objects (e.g., downed wood), to the degree possible, within suitable habitat for sensitive amphibians (e.g., Kern Canyon slender salamander, relictual slender salamander, and yellow-blotched salamander).

– Within occupied and suitable habitat, O&M work activities shall, to the extent feasible, be conducted when there is no predicted rain in the forecast.

– Herbicide applications will be conducted consistent with a Forest Service approved Pesticide Use Proposal and all associated BMPs (e.g., no predicted rain during herbicide application and/or as consistent with label requirements).

– Major road repairs that require significant ground disturbance within suitable habitat for slender salamanders may require one or more of the following, as appropriate:

  - Work crews may attend a project-specific WEAP to discuss Kern Canyon and relictual slender salamander ecology, habitat, and required avoidance measures.

  - A qualified biologist may conduct a pre-activity survey to determine whether the species or suitable habitat features (e.g., burrows or downed wood piles) are present.

  - If a Kern Canyon or relictual slender salamander is observed during pre-activity surveys or during construction activities, the following will be implemented:

    - Work activities that could result in harm of slender salamanders will cease temporarily.

    - SCE's Environmental Department will be contacted and appropriate avoidance and protection measures developed and implemented. Measures may include but are not limited to moving the individual to the

[1] Defined as areas determined during TERR 2 studies as supporting habitat elements necessary for all life stages of the species and/or physical and biological features necessary for the conservation of the species.

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nearest suitable habitat or having a monitor present to ensure avoidance.

Other measures may also be developed, as needed, based on the specific activity or resource, or in consultation with resource agencies. New or non-routine maintenance or construction activities that are not included in the Proposed Action may be subject to separate, additional environmental review, as well as agency approvals, permits, or other authorizations, to be determined on a case-by-case basis.

- Environmental training – SCE staff or contractors operating in the Project area are required to take an Annual FERC ETP that provides a review of sensitive species that may occur in the vicinity of planned routine operation and maintenance activities, as well as associated measures to minimize or avoid environmental effects. Additional training may be required prior to new or non-routine maintenance or construction activities, typically through a project-specific WEAP.

With implementation of the WRMP, the Proposed Action may affect, but is not likely to adversely affect Kern Canyon slender salamander or relictual slender salamander individuals.

Indirect Effects

Based on a review of planned routine operation and maintenance activities, one activity—trail maintenance—has some potential to affect suitable habitat (including Critical Habitat) for slender salamanders. Under the Proposed Action, SCE would continue to conduct trail maintenance and repair as described under Section 5.1.5.9. Trail maintenance activities include as-needed repairs, debris and rock removal, minor brushing, and maintenance of erosion control features. Refer to Map 7.5-6 for the location of trails within suitable or proposed Critical Habitat for Kern Canyon slender salamander; and to Map 7.5-7 for the location of trails within suitable or proposed Critical Habitat for relictual slender salamander.

Kern Canyon slender salamanders and relictual slender salamanders select microhabitat sites under suitable cover objects when terrestrially active. Some of these activities, particularly the removal of debris and rocks, may result in indirect effects to slender salamanders through removal suitable cover objects from the study area. These activities are restricted to the immediate vicinity of the trails themselves and would not occur within surrounding natural areas.

As described above under direct effects, measures in the WRMP would be implemented for planned routine operation and maintenance activities. All proposed trail maintenance activities would undergo an annual screening process, and work crews would be instructed to retain cover objects (e.g., downed wood), to the degree possible, within suitable habitat for sensitive amphibians. Implementation of the Annual FERC ETP would also provide information on the location and extent of suitable habitat and proposed Critical Habitat in the Project area, and associated measures. As described previously, new or non-routine maintenance or construction activities that are not included in the

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Proposed Action may be subject to separate, additional environmental review, as well as agency approvals, permits, or other authorizations, to be determined on a case-by-case basis.

With implementation of the WRMP, the Proposed Action will have no effect on cover objects within suitable habitat or proposed Critical Habitat for Kern Canyon slender salamander or relictual slender salamander.

WESTERN SPADEFOOT (DIRECT AND INDIRECT EFFECTS)

As described in Section 7.5.1.2, there are no previously recorded occurrences of western spadefoot, and the species was not observed during the wildlife reconnaissance surveys. There are three locations in the study area that represent potentially suitable habitat for western spadefoot, including an unnamed seep located along Willow Spring Creek Road (Democrat Dam Road); Dougherty Creek in the vicinity of Flume No. 5; and Stark Creek in the vicinity of Flume No. 6.

The unnamed seep is located in a rock outcrop located to the west of and outside of vegetation and road maintenance work area buffers defined for Democrat Dam Road (up to approximately 10 feet of the road). Planned routine operation and maintenance activities that would continue to be implemented at Flume No. 5 and Flume No. 6 include flume inspections and maintenance and vegetation management. These activities would not affect aquatic habitat in the creeks themselves, and would be limited to areas within approximately 10 feet on either side of the exposed portion of the flume.

Herbicides are applied along Willow Spring Creek Road and Stark Creek Road in the vicinity of the potentially suitable western spadefoot habitat. While herbicide applications are limited to areas within 10 feet of the road, there is some potential for contamination of natural areas or aquatic habitats outside of the targeted areas. The potential for degradation of potentially suitable habitat would be minimized through implementation of the WRMP, which includes the following measures:

- Environmental screening process – Planned routine operation and maintenance activities are screened annually to determine whether avoidance and protection measures are necessary to minimize potential effects to western spadefoot habitat. Typical avoidance and protection measures are reviewed during the Annual FERC ETP. Measures associated with planned routine operation and maintenance activities may include, but are not limited to:

  – Herbicides would be applied consistent with the approved PUP, with implementation of waterway buffers, and using selective application techniques and in weather conditions that would minimize the potential for effects to aquatic habitats.

  Other measures may also be developed, as needed, based on the specific activity or resource, or in consultation with resource agencies. New or non-routine maintenance or construction activities that are not included in the Proposed Action may be subject to separate, additional environmental review, as well as agency

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approvals, permits, or other authorizations, to be determined on a case-by-case basis.

- Environmental training – SCE staff or contractors operating in the Project area are required to take an Annual FERC ETP that provides a review of sensitive species that may occur in the vicinity of planned routine operation and maintenance activities, as well as associated measures to minimize or avoid environmental effects. Additional training may be required prior to new or non-routine maintenance or construction activities, typically through a project-specific WEAP.

Considering that there are no known occurrences of western spadefoot in the study area, and with implementation of the WRMP to minimize the potential for effects to suitable habitat, the Proposed Action would have no effect on western spadefoot.

CALIFORNIA CONDOR

As described in Section 7.2.1.2, no California condor individuals were observed during implementation of technical studies. However, a nesting pair has historically nested on SQF lands in the vicinity of the Forebay (Forest Service 2018). In addition, the study area contains approximately 3.7 miles of cliff habitat that represents suitable nesting areas for California condor along the Kern River, as well as grassland foraging habitat. Refer to Map 7.5-4 for the location of suitable cliff habitat in the study area.

The Proposed Action will not affect cliff habitat; and operation and maintenance activities would be restricted to defined areas around developed facilities and would not affect grassland habitats where condors may forage. Therefore, the Proposed Action would not result in habitat-related effects to condor. The Proposed Action does have the potential to directly affect California condor along Project distribution lines or as a result of helicopter use. These effects are described below.

Direct Effects

Under existing conditions (No-Action Alternative), several Project distribution line and power line poles have design elements that may pose a potential risk for raptor electrocution. The California condor is a heavy-bodied bird with a large wingspan making them slow to maneuver and highly susceptible to powerline collisions (APLIC 2012). There are no documented avian mortalities on powerlines associated with the Project (TERR 2 TM) (SCE 2025c). However, there is still some potential for California condors or other birds to be electrocuted on Project powerlines or poles that do not have raptor-safe configurations.

In addition, SCE uses helicopters to support powerline maintenance and to remove large wood or debris from the dam intake gates on a periodic, as-needed basis. Helicopters are known to cause disturbance to nesting birds and may cause flushing of adults from nests. California condors are reported as being susceptible to aircraft disturbance and have been observed flushing in response to aircraft disturbance (Sibley 1969, Knight and Cole 1995). Flushing can lead to the failure of a nest if early in the nesting period (Sibley 1969).

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However, condors are unlikely to abandon their nest entirely if the young are still viable (Sibley 1969).

To minimize the potential for avian collisions with or electrocution on Project distribution and power lines, and to minimize the potential for disturbance of California condors from helicopter flights, SCE will implement the WRMP, which includes following measures:

- Environmental screening process – Planned routine operation and maintenance activities are screened annually to determine whether avoidance and protection measures are necessary to minimize potential effects to condor nests. Typical avoidance and protection measures are reviewed during the Annual FERC ETP.

  New or non-routine maintenance or construction activities that are not included in the Proposed Action may be subject to separate, additional environmental review, as well as agency approvals, permits, or other authorizations, to be determined on a case-by-case basis.

- Avian Protection Program – SCE implements an Avian Protection Program that integrates USFWS guidelines for sensitive raptors, as well as APLIC guidelines for raptor-safe transmission and powerline configurations. The Program includes:

  – Employee training

  – Construction standards for new or replacement powerlines and poles/structures

  – Nesting bird guidelines (e.g., nest buffers and limited operating periods (LOPs) for small-scale construction activities and helicopter use)

  – Reporting program for avian nests

  – Avian mortality reporting and mortality reduction measures

  – Quality control (assessments and audits) performed to ensure data integrity and compliance with the Program

- Environmental training – SCE staff or contractors operating in the Project area are required to take an Annual FERC ETP that provides a review of sensitive species that may occur in the vicinity of planned routine operation and maintenance activities, as well as associated measures to minimize or avoid environmental effects. Additional training may be required prior to new or non-routine maintenance or construction activities, typically through a project-specific WEAP.

Considering that there is no history of avian mortalities related to Project powerlines, and with implementation of the WRMP, the Proposed Action would have no direct effect on condors related to Project powerlines or helicopter use.

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Indirect Effects

As described previously, the Proposed Action will not affect cliff habitat; and planned routine operation and maintenance activities would be restricted to defined areas around developed facilities and would not affect grassland habitats where condors may forage. Therefore, the Proposed Action would have no effect on condor nesting or foraging habitat.

SOUTHWESTERN WILLOW FLYCATCHER

As described in Section 7.5.1.2, southwestern willow flycatchers were not observed in the study area during implementation of TERR 2 technical studies. The nearest breeding records are at the Audubon Reserve at Lake Isabella, approximately 20 miles northeast of the study area (SCE 2012). While riparian habitats are present in the study area, they do not represent suitable breeding habitat, but may be used by foraging flycatchers.

Direct Effects

The study area does not support breeding habitat for southwestern willow flycatcher and would not result in direct effects to nesting flycatchers. Flycatchers may forage in riparian habitats surrounding developed facilities. There is some potential for disturbance-type effects (i.e., flushing) from use of any heavy equipment or human presence during operation and maintenance activities. Such effects would be minimal, short-term, and temporary and would have a negligible effect on foraging flycatchers. The Proposed Action, therefore, would have no direct effects on the southwestern willow flycatcher.

Indirect Effects

Riparian foraging habitat for willow flycatcher is present in the vicinity of Project facilities along Flume No. 1 and the Democrat Gage Trail in the Democrat Dam vicinity; near Flume No. 2 and the Cow Flat Creek Trail; along the Lucas Creek Trail and Flume No. 4; along Stark Creek Road, the Dougherty Creek Trail near Flume No.5, the Stark Creek Trail by Adit 12 & 13, and near the powerhouse. Refer to Map 7.5-7 for the location of riparian habitat in relation to Project facilities. Under the Proposed Action, SCE would continue to manage vegetation up to 5 feet on either side of access trails and up to 10 feet along roads and open water conveyance systems. Trimming along the powerhouse will occur up to 100 feet around the facility. The purpose of vegetation management is to minimize vegetation growth around facilities to ensure visibility and safety; facilitate efficient operation of the Project and minimize fire risk. Due to ongoing management, these areas support minimal vegetation under existing conditions and therefore do not represent suitable foraging habitat for southwestern willow flycatcher. Therefore, habitat-related effects to southwestern willow flycatcher are expected to be negligible.

Under the Proposed Action, SCE would continue to implement sediment management activities as conducted under the existing license (refer to the SMP in Appendix E.1). Healthy riparian ecosystems depend on a supply of sediment (Kondolf et al. 1996). Recruitment of riparian vegetation in Sierra Nevada streams requires both scouring flows and fresh sediment deposits to allow the recruitment of new riparian vegetation and to increase the diversity of the age-class structure in riparian systems (Kondolf et al. 1996).

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In sediment starved systems (such as streams below large reservoirs), flow releases tend to (1) erode the bed and bank of the stream, thereby removing the surface area where riparian vegetation can establish, and (2) drop the alluvial water table, resulting in moisture stress on remaining riparian vegetation (Williams and Wolman 1984). Continued sediment management activities would benefit riparian habitats within the bypass reach by providing a sediment supply that provides colonization substrates and enhances the diversity of floodplain geomorphology. While sediment activities should lead to a more diverse and healthier riparian ecosystem, these activities are not expected to increase the overall amount of riparian within the study area. Therefore, continued sediment management activities would have negligible to slightly beneficial effect on riparian habitat for southwestern willow flycatcher.

Considering that vegetation management and sediment management activities would have no effect on the amount of riparian vegetation in the study area, the Proposed Action would have no effect on southwestern willow flycatcher habitat.

CALIFORNIA SPOTTED OWL (DIRECT AND INDIRECT EFFECTS)

As described in Section 7.5.1.2, no California spotted owls were identified during wildlife surveys in conjunction with the TERR 2 technical studies. There are 11 records of California spotted owl within the study area (Forest Service 2022); however, open woodland habitats surrounding Project facilities where operation and maintenance activities would occur are not suitable for California spotted owl nesting and foraging.

There is one designated PAC within the study area approximately 0.75 mile north of the Democrat Dam Impoundment (refer to Map 7.5-3). The SQF defines management guidelines for ground-disturbing or noisy activities near California spotted owl PACs, and requires a LOP for operation of equipment or helicopter landings within 0.25 mile of California spotted owl nests during the nesting season (Forest Service 2023). There are no Project operation and maintenance activities that would occur within the Forest Service recommended 0.25-mile no-disturbance buffer of the designated PAC. Therefore, Project activities would have no effect on this PAC.

Considering that there is no suitable habitat for California spotted owl within 0.25-mile of the FERC Project boundary where Project operation and maintenance activities would occur, implementation of the Proposed Action would have no effect on this species.

SAN JOAQUIN KIT FOX (DIRECT AND INDIRECT EFFECTS)

As described in Section 7.5.1.2, there were no San Joaquin kit foxes observed during wildlife surveys in conjunction with the TERR 2 technical studies, and there are no existing records within the study area (CNDDB 2025). However, suitable habitat is present in the study area and the study area is within the range of the species. Annual grasslands with friable soils provide habitat for this species, and seven large mammal dens that show past use by fossorial denning mammals were identified along the Lucas Creek Trail. Under the Proposed Action, SCE would continue to conduct trail maintenance and repair as described under Section 5.1.5.9. Trail maintenance activities include as-needed repairs, debris and rock removal, minor brushing, and maintenance of erosion control features.

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These activities are restricted to the access trails themselves and would not occur within natural habitats, and therefore are not anticipated to affect suitable habitat or burrows that may be used by kit foxes or other fossorial denning mammals.

Under the Proposed Action, SCE will continue to maintain and operate water conveyance facilities, including 12 open-air segments along Project water conveyance systems that may have some potential to entrap wildlife. Based on field examinations, five of the 12 open-air segments lack covers, and there is some potential for access to these facilities from high areas in the adjacent landscape. However, the access is still minimal, and there is a low likelihood for animals to attempt to move into these areas. No wildlife mortalities associated with open-air segments along Project water conveyances were recorded over the term of the existing license. SCE would implement the WRMP over the term of the new license. The WRMP describes a protocol for reporting observations of wildlife mortalities or other incidents. Should a special-status wildlife or avian species mortality be documented within the FERC Project boundary, SCE would provide notification to the Forest Service and other appropriate resource agencies upon report of discovery of the mortality.

Considering that trail maintenance activities would have minimal or no effect on burrow habitat; that only five of 12 open water conveyance facilities lack covers; that these five facilities are still difficult to access; that there are no reported mortalities of kit foxes or other animals; and with implementation of the WRMP, the Proposed Action would have no effect on San Joaquin kit fox or its habitat.

Effects to Other Special-status Wildlife

The following section provides an analysis of potential effects of the Proposed Action on special-status wildlife and game species known to occur or potentially occurring in the study area. The analyses are grouped to follow formatting established in Section 7.5.1.2: bumble bees, yellow-blotched salamander, terrestrial reptiles, birds (including cliff-nesting, coniferous forest, grassland/shrubland and riparian birds), fossorial denning mammals, bats, and game species. The study area for special-status wildlife (excluding bats) includes areas within one mile of the FERC Project boundary and Project facilities where operations and/or maintenance activities are conducted. Refer to Table 7.5-2 for a list of Project facilities.

The study area for special-status bats includes facilities listed on Table 7.5-7.

Refer to Table 7.5-5 for a list of special-status wildlife species and Table 7.5-8 for a list of game species known to occur or potentially occurring in the study area, their status, and habitat requirements.

Bumble Bee Species (Direct and Indirect Effects)

As described in Section 7.5.1, one individual belonging to the genus *Bombus* was identified along the Lucas Creek Trail. This individual was not identified to species, however two species, Crotch's bumble bee (*Bombus crotchii*, CC) and western bumble bee (*Bombus occidentalis*, CC) could potentially occur in the study area. Bumble bees

are habitat generalists and may be found wherever there are flower-bearing plants for foraging and friable soils that support burrows for nesting.

Operation and maintenance activities could result in minor disturbance effects (i.e., flushing) to bumble bees during implementation of vegetation management or other activities. This effect would be minor, short-term, and temporary, and would have a negligible effect on the species.

Vegetation management could also result in the reduction or degradation of habitat through use of herbicides, removal of floral resources, or through the introduction or spread of NNIPs that could outcompete or displace native floral resources. In general, vegetation management is restricted to a defined buffer around facilities and would not affect surrounding vegetation, including flowering resources. As described in the VMP (Appendix E.1), all herbicides would be applied consistent with approved PUPs and by an individual with a QAC or QAL. These approved PUPs require selective application techniques to avoid desirable vegetation, and include measures that restrict herbicide applications during precipitation events or high wind conditions to avoid runoff and drift into surrounding environments. With implementation of the VMP, there would be negligible effects to bumble bee individuals from application of herbicides.

In addition, NNIPs could reduce the quantity or quality of foraging habitat by outcompeting native floral resources used by bumble bees. The VMP includes prevention strategies for NNIPs, including equipment and vehicle cleaning, use of weed-free straw, and use of native species for revegetation as part of erosion control or in large ground disturbance or cleared areas. In addition, SCE will monitor and treat new or established NNIPs in consultation with SQF. With implementation of the VMP, there would be negligible effects to bumble bee habitat from NNIPs.

With implementation of the VMP, the Proposed Action would have a negligible effect on special-status bumble bees or their habitats.

YELLOW BLOTCHED SALAMANDER

As described in Section 7.5.1.2, approximately 120 acres of suitable habitat for this species was identified in the study area, and a yellow-blotched salamander was observed adjacent to Flume No. 1 in the Democrat Dam area during VES. Refer to Map 7.5-8 for the location of this observation and appropriate habitat in the study area.

Direct and indirect impacts of the Proposed Action to yellow-blotched salamander would be similar to those described for Kern Canyon slender salamander and relictual slender salamander. Refer to Section 7.5.3.2 for a detailed description of these effects and application measures that would be implemented to minimize effects. A brief summary is provided below.

Direct Effects

Yellow-blotched salamander could potentially be directly affected by road maintenance and herbicide use implemented under the Proposed Action.

Suitable habitat for yellow-blotched salamander can be found along Powerline Road, Flume No. 1 Road, and Willow Spring Creek Road (all in the vicinity of the Democrat Dam Impoundment). As described in Section 7.5.3.2, major road maintenance activities that involve ground-disturbance outside the footprint of the existing road or involve culvert replacement may potentially affect salamanders sheltering under cover objects. Contact with ground-disturbing heavy equipment could result in injury or mortality to salamanders in these areas.

Under the Proposed Action, herbicides would be applied around Flume No. 1, where the yellow-blotched salamander individual was observed, and along Willow Spring Creek Road and Flume No. 1 Road, which intersect suitable habitat for this species. Herbicide applications in February and March overlap with the rainy season in late winter/early spring when the salamanders are most active at the surface. Amphibian skin is particularly sensitive to the absorption of chemicals. Therefore, salamanders could potentially be affected by herbicides through direct contact with the application spray during their active period. Yellow-blotched salamanders may also be indirectly affected by runoff of herbicides into their suitable aquatic breeding habitats.

Potential effects to yellow-blotched salamanders resulting from ground-disturbing road repairs or from herbicide use would be minimized through implementation of the WRMP. Refer to Section 7.5.3.2, Kern Canyon slender salamander and relictual slender salamander, for a description of these measures.

With implementation of the WRMP, the Proposed Action would result in negligible direct effects to yellow-blotched salamanders.

Indirect Effects

Yellow-blotched salamanders may be indirectly affected by trail maintenance. Several access trails, including the Democrat Gage Trail, the Conduit No. 3 Trail, the Cow Flat Creek Trail, Cow Flat Creek to Conduit No. 6 Trail overlap with observed suitable habitat for yellow-blotched salamanders identified during the 2025 VES.

Trail maintenance activities include as-needed repairs, debris and rock removal, minor brushing, and maintenance of erosion control features. Yellow-blotched salamanders select microhabitat sites under suitable cover objects when terrestrially active. Some of these activities, particularly the removal of debris and rocks, may result in indirect effects to salamanders through removal suitable cover objects. Refer to Section 7.5.3.2, Kern Canyon slender salamander and relictual slender salamander, for a description of this effect, and measures implemented under the WRMP that would be implemented to minimize effects and protect yellow-blotched salamanders over the term of the new license.

With implementation of the WRMP the Proposed Action will have no effect on cover objects within suitable habitat for yellow-blotched salamander.

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TERRESTRIAL REPTILES (DIRECT AND INDIRECT EFFECTS)

The study area provides suitable habitat for a variety of terrestrial reptiles, and a California legless lizard was observed during implementation of technical studies. Burrows are abundant throughout the study area, with a noticeable concentration of burrows along Stark Creek Trail, Dougherty Creek Trail, Lucas Creek Trail, and the beginning of Democrat Gage Trail. The shoulders along two roads, Stark Creek Road and Willow Spring Creek Road, also had large numbers of burrows. Friable soils and surface cover objects are also abundant in the study area.

Under the Proposed Action, SCE would continue to implement planned routine road maintenance activities, which may include minor repairs (e.g., debris removal, filling of potholes, maintenance of erosion control features, etc.). Continued planned routine trail maintenance activities would include as-needed repairs, debris and rock removal, minor brushing, and maintenance of erosion control features. These activities are restricted to the road or trail footprint and immediate vicinity, and would typically avoid natural habitats and burrows where terrestrial lizards are most likely to be present. Therefore, direct and indirect habitat-related effects to terrestrial reptiles from planned routine road and trail maintenance would be negligible.

Major road maintenance activities that involve ground-disturbance outside the footprint of the existing road or involve culvert replacement may potentially affect reptiles sheltering under cover objects. Contact with ground-disturbing heavy equipment could result in injury or mortality in these areas. As described in the WRMP, new or non-routine maintenance or construction efforts (e.g., new or major repair of existing structure, relocating a section of a Project road, or major culvert upgrade, etc.) that have the potential to directly affect wildlife and/or their habitat may be subject to separate, additional environmental review.

Any potential effects to terrestrial reptiles over the term of the new license would be further minimized through implementation of the WRMP and associated measures. As described previously, the WRMP includes an environmental screening process under which all planned routine operation and maintenance activities are screened annually, and avoidance and protection measures are assigned, as appropriate. Sensitive resources and associated protective measures are reviewed in the Annual FERC ETP.

New or non-routine maintenance or construction activities that are not included in the Proposed Action may be subject to separate, additional environmental review, as well as agency approvals, permits, or other authorizations, to be determined on a case-by-case basis. Additional training may be required prior to new or non-routine maintenance or construction activities, typically through a project-specific WEAP.

With implementation of the WRMP, the Proposed Action would result in negligible effects to terrestrial reptiles over the term of the new license.

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RAPTORS AND OTHER BIRDS

This section provides an evaluation of potential effects to special-status birds, including cliff-nesting raptors, coniferous forest birds, grassland/shrubland birds, and riparian birds known to occur or potentially occurring in the study area. As described in Section 7.5.1.2, special-status birds observed during implementation of technical studies included two cliff-nesting raptors (golden eagle and American peregrine falcon); two coniferous forest birds (bald eagle and white-headed woodpecker); five shrubland/grassland birds (golden eagle, Swainson's hawk, savannah sparrow, oak titmouse, and one Lawrence's goldfinch); and one riparian bird (Bullock's oriole). Refer to Map 7.5-4 for the location of these observations.

The Proposed Action has the potential to affect special-status birds, including:

- Potential direct effects to raptors related to electrocution on Project power and communication lines; noise from helicopter flights; or effects to passerine nests from implementation of vegetation management.

- Potential indirect effects to suitable habitat resulting from implementation of vegetation management and sediment management.

Direct Effects

Under existing conditions (No-Action Alternative), several Project powerline poles have design elements that may pose a potential risk for raptor electrocution. Refer to the TERR 2 TM for the detailed evaluation (SCE 2025c). There are no documented avian mortalities on Project distribution and power lines (SCE 2025c). However, there is still some potential for raptors or other birds to be electrocuted on Project powerlines or poles that do not have raptor-safe configurations.

In addition, SCE uses helicopters to support powerline maintenance and to remove large wood or debris from the dam intake gates on a periodic, as-needed basis. Helicopters are known to cause disturbance to nesting birds and may cause flushing of adults from nests. Both peregrine falcon and golden eagle, which were identified in the study area, have been documented as being resilient to aircraft flyovers and do not flush easily (Windsor 1977, Grubb et al. 2007). Additionally, raptors that are exposed to more frequent vehicle disturbances tend to habituate and become more resilient to them (Grubb et al. 2007). Kochert et al. (2002) reported no adverse effects to golden eagles from over 900 helicopter flights used to check nesting status. However, if approached too close by a helicopter individuals may flush from the nest or exhibit stressed behaviors (Windsor 1977, Grubb et al. 2007). Adverse effects from helicopter flyovers to raptors are also more common earlier on in the nesting season (Grubb et al. 2007).

Under the Proposed Action, SCE would continue to manage vegetation up to 5 feet on either side of access trails and up to 10 feet along roads and open water conveyance systems. Trimming along the powerhouse will occur up to 100 feet around the facility. In addition, hazard trees would be removed as needed to minimize risk to property or safety. The purpose of vegetation management is to minimize vegetation growth around facilities

to ensure visibility and safety; facilitate efficient operation of the Project and minimize fire risk. Vegetation management, if implemented during the breeding season for raptors and other birds, could result in direct impacts to nesting birds (i.e., through disturbance or removal of nests).

SCE will implement measures in the WRMP to minimize the potential for effects to raptors or other birds related to Project distribution lines; periodic helicopter use; and vegetation management. This would include the following:

- Environmental screening process – Planned routine operation and maintenance activities are screened annually to determine whether avoidance and protection measures are necessary to minimize potential effects to raptor nests. Typical avoidance and protection measures are reviewed during the Annual FERC ETP.

  New or non-routine maintenance or construction activities that are not included in the Proposed Action may be subject to separate, additional environmental review, as well as agency approvals, permits, or other authorizations, to be determined on a case-by-case basis

- Avian Protection Program – SCE implements an Avian Protection Program that integrates USFWS guidelines for sensitive raptors, as well as APLIC guidelines for raptor-safe transmission and power line configurations. The Program includes:

  – Employee training

  – Construction standards for new or replacement powerlines and poles/structures

  – Nesting bird guidelines (e.g., nest buffers and LOPs for small-scale construction activities and helicopter use)

  – Reporting program for avian nests

  – Avian mortality reporting and mortality reduction measures

  – Quality control (assessments and audits) performed to ensure data integrity and compliance with the Program

- Environmental training – SCE staff or contractors operating in the Project area are required to take an Annual FERC ETP that provides a review of sensitive species that may occur in the vicinity of planned routine operation and maintenance activities, as well as associated measures to minimize or avoid environmental effects. Additional training may be required prior to new or non-routine maintenance or construction activities, typically through a project-specific WEAP.

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With implementation of the WRMP, direct effects to special-status raptors and other birds related to powerlines, helicopter use, and from continued vegetation management would be negligible.

Indirect Effects

Provided below is a discussion of potential indirect habitat-related effects to special-status raptors and other birds resulting from continued vegetation management and sediment management under the Proposed Action.

Under the Proposed Action, SCE would continue to manage vegetation up to 5 feet on either side of access trails and up to 10 feet along roads and open water conveyance systems. Trimming along the powerhouse will occur up to 100 feet around the facility. Some vegetation removal may also be required as part of planned routine road and trail maintenance. The purpose of vegetation management is to minimize vegetation growth around facilities to ensure visibility and safety; facilitate efficient operation of the Project and minimize fire risk. Due to ongoing management, these areas support minimal vegetation under existing conditions, and therefore do not represent suitable habitat. Therefore, habitat-related effects to special-status raptors and other birds are expected to be negligible.

Under the Proposed Action, SCE will prepare an updated SMP. Sediment management activities under the Proposed Action include partial sediment bypass and full sediment bypass (previously referred to as operational sluicing, full pond drain, and peak flow sediment bypass). These procedures only occur when expected flows are predicted to be high enough to prevent downstream sediment build up. Sediment management activities could potentially affect riparian nesting habitat or bald eagle aquatic foraging habitat (i.e., fish prey resources). As described under Section 7.5.3.2, subsection “Southwestern Willow Flycatcher”, healthy riparian ecosystems depend on a supply of sediment (Kondolf et al. 1996). Continued sediment management activities would benefit riparian habitats within the bypass reach by providing a sediment supply that provides colonization substrates and enhances the diversity of floodplain geomorphology. Sediment management activities should lead to a more diverse and healthier riparian and aquatic ecosystem. Additionally, as described in Section 7.4, *Fish and Aquatic Resources,* sediment management activities would not affect fish prey resources for bald eagle.

Considering that vegetation management areas do not provide suitable habitat for special-status birds; that sediment management activities should result in a net benefit to the riparian ecosystem within the study area and would not adversely affect fish prey resources for bald eagle foraging; and with implementation of the WRMP, indirect effects of the Proposed Action on special-status raptors and other birds would be negligible.

FOSSORIAL DENNING MAMMALS (DIRECT AND INDIRECT EFFECTS)

As described in Section 7.5.1.2 no special-status fossorial denning mammals were observed in the study area during technical studies. However, grassland and shrubland habitats in the study area that are underlain by friable soils provide potentially suitable habitat for mammals such as the Tulare grasshopper mouse and American badger. Small

rodent burrows were abundant and seven large burrows were identified along Project roads and trails.

Under the Proposed Action, SCE would continue to implement planned routine road maintenance activities which may include minor repairs (e.g., debris removal, filling of potholes, maintenance of erosion control features, etc.). Ongoing trail maintenance activities would include as-needed repairs, debris and rock removal, minor brushing, and maintenance of erosion control features. These activities are primarily restricted to the immediate vicinity of the roads and trails themselves and would not occur within natural habitats, and therefore are not anticipated to affect suitable habitat or burrows that may be used by fossorial denning mammals. As described in the WRMP, new or non-routine maintenance or construction activities (e.g., new or major repair of existing structure, relocating a section of Project road, or major culvert upgrade, etc.) that have the potential to directly affect wildlife and/or their habitat may be subject to separate, additional environmental review.

Under the Proposed Action, SCE will continue to maintain and operate water conveyance facilities, including 12 open-air segments along Project water conveyance systems that may have some potential to entrap wildlife. Based on field examinations, five of the 12 open-air segments lack covers, and there is some potential for access to these facilities from high areas in the adjacent landscape. However, the access is still minimal, and, considering that there are no previously reported mortalities associated with Project water conveyance facilities, there is a low likelihood for mammals to become entrapped.

SCE would implement the WRMP over the term of the new license. The WRMP describes a protocol for reporting observations of wildlife mortalities or other incidents. Should a special-status wildlife or avian species mortality be documented within the FERC Project boundary, SCE would provide notification to the Forest Service and other appropriate agencies upon report of discovery of the mortality. Additional protection measures or facilities modifications may be developed in consultation with resource agencies, if determined necessary.

Considering that road and trail maintenance activities would have minimal or no effect on burrow habitat; that only five of 12 open water conveyance facilities lack covers and that these five facilities are still difficult to access; that there are no reported wildlife mortalities; and with implementation of the WRMP, the Proposed Action would have a negligible effect on fossorial denning mammals over the term of the new license.

BATS

Four special-status bats, pallid bat, western mastiff bat, western red bat, and fringed myotis were identified in the study area during implementation of TERR 2 technical studies. Bat roosts of both special-status and common bat species were identified at eight facilities. Refer to Map 7.5-9 for the locations of special-status bats in the study area. Refer to Table. 7.5-7 for a list of all bat species detected in the study area.

Potential effects to special-status bats resulting from implementation of the Proposed Action include:

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- Potential disturbance of night, day, and maternity bat roosts from implementation of planned routine operation and maintenance activities or vegetation management (i.e., hazard tree removals).

- Indirect effects to aquatic foraging habitats from sediment management and vegetation management (i.e., herbicide use).

Direct Effects

Provided below is a discussion of potential effects to night roosts, day roosts, and one maternity roost present on Project facilities.

Night roosts were identified at the Democrat Dam Access Walkway; Democrat Dam Intake Gatehouse; Flume No. 4; gaging station by Cow Flat Creek; Adit 13 & 14; the water tank and Building No. 0146 (Garage) in the vicinity of the Kern River No. 1 Powerhouse; and in the powerhouse itself. Planned routine maintenance activities at these facilities would be conducted during the day, and therefore would not affect night-roosting bats.

Day roosts were identified at the Democrat Dam Access Walkway, Adit 13 & 14, and the powerhouse. A maternity roost was also present in the powerhouse. A brief assessment of potential effects to roosts at these facilities is provided below.

- Democrat Dam Access Walkway – Special-status western mastiff bats are roosting in cracks in a rock outcrop approximately 60 feet above the walkway. Maintenance activities would not physically affect this roost. Based on the extensive amount of urine staining on the rocks, this roost has been present for a number of years, and is presumably tolerant of ongoing human activity. Therefore, disturbance-related effects resulting from periodic maintenance of the walkway, or ongoing operation and maintenance activities at the nearby Democrat Dam, under the Proposed Action would be negligible.

- Adit 13 & 14 – Several bat species, including special-status fringed myotis, day-roost in this cave-like facility. This facility does not require routine maintenance, and therefore no disturbance of day-roosting bats would occur.

- Kern River No. 1 Powerhouse – Day roosts and maternity roosts of common bat species (big brown bat and Yuma myotis) are present along ledges and cracks in the ceiling on the interior and exterior of the powerhouse. Based on the extent of urine staining and guano deposits, these roosts have been present for many years. Under the Proposed Action, SCE would continue to implement daily inspections, and minor maintenance and repairs as needed, as well as more extensive maintenance on the four generating units once a year. Activities at ground level would not affect roosting bats. Roof repair or maintenance activities (e.g., painting), if necessary, would have some potential, however, to affect day roosts and maternity roosts.

SCE would implement the WRMP to minimize the potential for disturbance effects related to non-routine Adit 13 & 14 maintenance or powerhouse maintenance that affects the

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upper structures of the powerhouse (e.g., roof, eaves, ceiling) where the bat roosts are present. Specifically, new or non-routine maintenance or construction activities that may potentially affect wildlife, including bat roosts, may be subject to separate, additional environmental review, to be determined on a case-by-case basis. The project would be assessed to determine the necessary agency approvals, if additional surveys are required, and would follow conditions of agency approvals or permits to avoid or minimize effects.

In addition, bats may also roost in trees or snags, typically selecting the largest available trees or snags that feature cavities or sloughing bark. The western red bat also roosts in foliage of large riparian trees. There is some potential, therefore, for hazard tree removal to affect roosting bats. Adult bats that can fly would be minimally affected; therefore effects would be limited primarily to non-volant young, in the (relatively unlikely) case that maternity roost is present in a tree. As stated in the VMP, removal of hazard trees is subject to Forest Service approval. Any measures identified by the Forest Service for the protection of special-status tree-roosting bats would be implemented, consistent with Forest Service approvals.

The following additional measures in the WRMP would further minimize direct effects to bats over the term of the new license:

- Environmental training – SCE staff or contractors operating in the Project area are required to take an Annual FERC ETP that provides a review of sensitive species that may occur in the vicinity of planned routine operation and maintenance activities, as well as associated measures to minimize or avoid environmental effects. Additional training may be required prior to new or non-routine maintenance or construction activities, typically through a project-specific WEAP.

With implementation of the WRMP and the VMP, potential effects of the Proposed Action on bats, including continued maintenance of the powerhouse and hazard tree removal, would be negligible.

Indirect Effects

Under the Proposed Action, sediment management and vegetation management activities have the potential to affect water quality in aquatic habitats, which may, in turn, affect the availability of aquatic macroinvertebrates, which constitute a food source for many foraging bats. Specifically, sediment management activities have the potential to increase suspended sediments and increase turbidity of the Kern River downstream from the Democrat Dam Impoundment. In addition, use of herbicides as part of vegetation management could affect water quality, if chemicals were applied in the vicinity of aquatic habitats.

SCE will implement the SMP to minimize the potential for effects to aquatic foraging habitat for special-status bats. Sediment management activities that would continue to be implemented under the Proposed Action include partial sediment bypass and full sediment bypass (previously referred to as operational sluicing, full pond drain, and peak flow sediment bypass) (refer to the SMP in Appendix E.1). These activities entail the

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release of sediment trapped within the Democrat Dam Impoundment, and would result in a short-term, temporary increase in suspended sediments in the bypass reach; which may temporarily degrade over-water foraging habitat for special-status bats. The SMP includes seasonal timing and annual frequency guidelines, and environmental monitoring, which would minimize effects of suspended sediments. In addition, SCE is currently in the process of renewing Clean Water Act Permits with State Water Resources Control Board (SWRCB) and the United States Army Corps of Engineers and Section 1600 Agreement with the CDFW to continue sediment management activities. All permit conditions, including conditions to minimize the potential for indirect effects to aquatic habitats, would be implemented as part of the Proposed Action. Over the long term, sediment management activities are expected to benefit aquatic and riparian habitats within the bypass reach by providing a sediment supply that provides colonization substrates and enhances the diversity of floodplain geomorphology.

Furthermore, SCE will implement the VMP to minimize the potential for effects to aquatic foraging habitat resulting from herbicide applications. Under the VMP, all herbicides are required to be implemented consistent with the approved PUP and all associated BMPs. This includes a requirement for applications to be supervised by an individual with a QAL or QAC, use of selective application techniques to avoid desirable vegetation, and work in appropriate weather conditions.

Finally, SCE staff or contractors operating in the Project area are required to take an Annual FERC ETP that provides a review of sensitive species that may occur in the vicinity of planned routine operation and maintenance activities, as well as associated measures to minimize or avoid environmental effects.

With implementation of the agency permits and the WRMP, indirect effects to bats related to aquatic foraging habitat would be negligible.

GAME SPECIES (DIRECT AND INDIRECT EFFECTS)

As described in Section 7.5.1.2, four game species were observed in the study area during implementation of technical studies. This includes three game birds—California quail (*Callipepla californica*), mountain quail (*Oreotyx pictus*) and mourning dove (*Zenaida macroura*), and one game mammal—mule deer (*Odocoileus hemionus)*. Refer to **Table 7.5-8** for a list of all game species with the potential to occur in the study area.

Under existing conditions (No-Action Alternative), SCE uses helicopters to support powerline maintenance and to remove large wood or debris from the dam intake gates on a periodic, as-needed basis. Helicopters may potentially result in short-term disturbance-type effects to game birds and mammals. In the case of game birds, noise disturbance from helicopters during the breeding season (typically March through August) could result in flushing from nests or other effects to breeding birds.

SCE would continue to manage vegetation up to 5 feet on either side of access trails and up to 10 feet along roads and open water conveyance systems. Trimming along the powerhouse will occur up to 100 feet around the facility. In addition, hazard trees would be removed as needed to minimize risk to property or safety. The purpose of vegetation

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management is to minimize vegetation growth around facilities to ensure visibility and safety; facilitate efficient operation of the Project and minimize fire risk. Vegetation management, if implemented during the breeding season for raptors and other birds, could result in direct impacts to nesting birds, including game birds (i.e., through disturbance or removal of nests).

SCE will implement measures in the WRMP to minimize the potential for effects to game birds and mammals related to periodic helicopter use and vegetation management. This includes implementation of the environmental screening process for planned routine operation and maintenance activities and the Avian Protection Program that integrates USFWS guidelines for sensitive raptors, as well as APLIC guidelines for raptor-safe transmission and power line configurations.

Under the Proposed Action, SCE will continue to maintain and operate water conveyance facilities, including 12 open-air segments along Project water conveyance systems that may have some potential to entrap wildlife. Based on field examinations, five of the 12 open-air segments lack covers, and there is some potential for access to these facilities from high areas in the adjacent landscape. However, access is still minimal, and there is a low likelihood for animals to become entrapped. No wildlife mortalities associated with open-air segments along Project water conveyances were recorded over the term of the existing license.

As stated previously, SCE would implement the WRMP over the term of the new license. The WRMP describes a protocol for reporting observations of wildlife mortalities or other incidents. If mortality of any game species is documented within the FERC Project boundary, SCE would provide notification to the Forest Service and other appropriate agencies upon report of discovery of the mortality.

With implementation of the WRMP, effects to game species resulting from helicopter use, vegetation management, and open-air segments of the water conveyance system would be negligible.

7.5.4 Unavoidable Adverse Effects

There are no unavoidable adverse effects to botanical or wildlife resources from continued operation and maintenance of the Project under the Proposed Action.

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TABLES

Table 7.5-1. Vegetation Alliances and Wildlife Habitats Occurring within 1 Mile of the Kern River No. 1 Hydroelectric Project FERC Boundary

CALVEG Vegetation Alliance[1]	CALVEG Code	CWHR Wildlife Habitat[2]	CWHR Code
Herb-Dominated Alliances			
Annual Grasses and Forbs Alliance	HG	Annual Grassland	AGS
Shrub-Dominated Alliances			
Ultramafic Mixed Shrub Alliance	C1	Mixed Chaparral	MCH
Baccharis (Riparian) Alliance	ML	Montane Riparian	MRI
Tree-Dominated Alliances			
Interior Mixed Hardwoods Alliance	NX	Montane Hardwood	MHW
Gray Pine Alliance	PD	Blue Oak-Foothill Pine	BOP
Blue Oak Alliance	QD	Blue Oak Woodland	BOW
Valley Oak Alliance	QL	Valley Oak Woodland	VOW
California Sycamore	QP	Valley Foothill Riparian	VRI
Interior Live Oak	QW	Montane Hardwood	MHW
Non-vegetated Areas			
Tilled Earth	A3	Barren	BAR
Barren	BA		
Urban-related Bare Soil	IB		
Aquatic Areas			
Agriculture Pond or Water Feature	A7	Lacustrine	LAC
River/Stream/Canal	W1	Riverine	RIV

Notes: [1] Source: Forest Service 2016. Calveg Geographic Information Systems (GIS) data and vegetation descriptions. South Sierran Ecological Province. Available at: http://www.fs.usda.gov/detail/r5/landmanagement/resourcemanagement/?cid=stelprdb5347192.
[2] Source: Forest Service 2024. Calveg Crosswalk to CWHR. Available at: https://www.fs.usda.gov/detail/r5/landmanagement/resourcemanagement/?cid=fsbdev3_046735
[3] The Baccharis (riparian) alliance can be associated with desert riparian, montane riparian, and/or Valley foothill riparian CWHR wildlife habitat classifications.

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Table 7.5-2. Kern River No. 1 Hydroelectric Project Facilities

Diversion Dam
Democrat Dam
Impoundment
Democrat Dam Impoundment
Water Conveyance System
Sandbox
Tunnels, Flumes, Conduits, and Adits
Forebay
Forebay Overflow Spillway
Penstock
Powerhouse and Switchyard
Kern River No. 1 Powerhouse
Kern River No. 1 Switchyard
Access Roads
Willow Spring Creek Road (also referred to as Democrat Dam Road)
Powerline Road
Flume No. 1 Road
Dougherty Creek Road
Stark Creek Road
Forebay Operations Area Road
Lower Powerhouse Road
Upper Powerhouse Road
Access Trails
Democrat Gage Trail
Conduit No. 3 Trail
Cow Flat Creek Trail
Cow Flat Creek to Conduit No. 6 Trail
Lucas Creek Trail
Dougherty Creek Trail
Stark Creek Trail
Forebay to Conduit No. 9 Trail
Overflow Spillway Trail
Forebay Operations Area to Aerial Tram Upper Landing Trail
Access Trail to Aerial Cable Upper Mount
Communication and Power Lines
Erskine 12 kV Distribution Line
Camp 2.4 kV Distribution / Communication Line

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Gages
USGS Gage No. 11192500 / SCE Gage No. 409 (Kern River near Democrat Springs)
USGS Gage No. 11192000 / SCE Gage No. 410 (Kern River No. 1 Conduit near Democrat Springs)
USGS Gage No. 11192501 (Kern River near Democrat Springs; calculated 1192500+1192000)
Ancillary and Support Facilities
Democrat Dam Area
Buoy Line
Democrat Dam Intake Gatehouse
Democrat Dam Drainage Tower
Democrat Dam Drainage Tunnel
Democrat Dam Drainage Tunnel Outlet
Democrat Dam Access Walkway
Sandbox Drainage Channel
Gaging Cableway
Water Conveyance
Flume No. 6 Access Platform
Forebay Operations Area
Building No. 0110 (Old Admin Building)
Building No. 0146 (Garage No. 1)
Building No. 0133 (Garage No. 2)
Building No. 0118 (Ice House)
Water Tank
Aerial Cable Tower
Building No. 0111 (Aerial Tram Hoist House)
Aerial Tram Lower Landing
Aerial Tram
Aerial Tram Upper Landing
Aerial Tram Upper Landing to Forebay Catwalk
Communication Site
Forebay Operations Area Perimeter Fence
Forebay Perimeter Fence
Chlorinator House
Powerhouse Area
Building No. 0112 (Machine Shop)
Office/Lunchroom
Building No. 0142 (Restroom)
Powerhouse and Switchyard Perimeter Fence

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Table 7.5-3. Special-Status Plants Known to Occur or Potentially Occurring in the Study Area

Scientific/Common Name	Federal/ State Status	Sequoia National Forest Status	CRPR	Blooming Period/ Fertile	Habitat	Likelihood for Occurrence
Known to Occur in the Study Area						
Delphinium purpusii rose-flowered larkspur	–	FSCC	1B.3	April–May	A perennial herb that grows on rocky, often carbonate soils in chaparral, cismontane woodland, and pinyon and juniper woodland. Elevation: 1,000–4,470 feet.	**Known to occur.** Nine populations of rose-colored larkspur were identified in the study area during TERR 1 early season botanical surveys in April 2024. This includes: • Three small populations along the Conduit No. 3 Trail (DEPU_01–03); • One population along Flume No. 3 between Conduit Nos. 4 and 5 (DEPU_04); • One small population along the Lucas Creek Trail (DEPU_05); • A single individual along Stark Creek Trail (DEPU_06); • A single individual along Dougherty Creek Trail (DEPU_07) • A small population near Adit 14 & 15 (DEPU_08); and • A large population adjacent to the Overflow Spillway Trail east of the Forebay (DEPU_09). There are two additional records of this species from the CNDDB in the study area (CNDDB 2025): • A 1972 record near Cow Flat Creek Trail along the Kern River; and • A 1982 record along Highway 178 southwest of the Democrat Dam Impoundment.
May Potentially Occur in the Study Area						
Calochortus striatus[1] alkali mariposa lily	–	FSCC	1B.2	April–June	A perennial bulbiferous herb that grows on alkaline and mesic soils in chaparral, chenopod scrub, Mojavean desert scrub, and meadows and seeps. Elevation: 230–5,235 feet.	**May potentially occur.** The study area is within the geographic range and contains suitable habitat for this species.
Camissonia integrifolia Kern River evening-primrose	–	FSCC	1B.3	April (May)	An annual herb that grows in chaparral and Mojavean desert scrub. Elevation: 2,295–3,935 feet.	**May potentially occur.** The study area is within the geographic range and contains suitable habitat for this species.
Clarkia springvillensis Springville clarkia	FT/CE	–	1B.2	April–July	An annual herb that grows on granitic soils in chaparral, cismontane woodland, and valley and foothill grassland. Elevation: 805–4,005 feet.	**May potentially occur.** The study area is within the geographic range and contains suitable habitat for this species.
Diplacus pictus (*Mimulus pictus*) calico monkeyflower	–	FSCC	1B.2	March–May	An annual herb found in granitic, disturbed areas in broad-leafed upland forest and cismontane woodland. Elevation: 330–4,770 feet.	**May potentially occur.** The study area supports suitable habitat and is within the elevational range of this species. There are two additional records of this species from the CNDDB in the study area
Eriastrium tracyi Tracy's eriastrum	–	FSCC	3.2	May–July	An annual herb found in chaparral, cismontane woodland, and valley and foothill grassland. Elevation: 1,035–5,840 feet.	**May potentially occur.** The study area supports suitable habitat and is within the elevational range of this species.

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Scientific/Common Name	Federal/ State Status	Sequoia National Forest Status	CRPR	Blooming Period/ Fertile	Habitat	Likelihood for Occurrence
Eschoscholzia lemmonii ssp. *kernensis* Tejon poppy	–	–	1B.1	March–May	An annual herb that grows in chenopod scrub and valley and foothill grassland. Elevation: 530–3,330 feet.	**May potentially occur.** The study area is within the geographic range and contains suitable habitat for this species.
Fritillaria brandegeei Greenhorn fritillary	–	FSCC	1B.2	April–June	A perennial herb (bulbiferous) that found on granitic areas in lower montane coniferous forest. Elevation: 4,430–7,000 feet.	**May potentially occur.** The study area supports suitable habitat and is within the elevational range of this species. There is one additional record of this species from the CNDDB in the study area (CNDDB 2025): • One occurrence location near the confluence of Dougherty Creek and the Kern River. This occurrence was recorded in 1982.
Fritillaria striata striped adobe lily	CT	–	1B.1	February–April	A perennial herb (bulbiferous) that grows on clay soils in cismontane woodland and valley and foothill grassland. Elevation: 450–4,850 feet.	**May potentially occur.** The study area is within the geographic range and contains suitable habitat for this species.
Hesperocyparis nevadensis Piute cypress	–	FSCC	1B.2	N/A	A perennial evergreen tree that grows in closed-cone coniferous forest, chaparral, cismontane woodland, pinyon and juniper woodland. Elevation: 2,360–6,005 feet.	**May potentially occur.** The study area is within the geographic range and contains suitable habitat for this species.
Heterotheca shevockii Shevock's golden aster	–	FSCC	1B.3	August–November	A perennial herb that grows in chaparral and cismontane woodland. Elevation: 760–3,000 feet.	**May potentially occur.** The study area supports suitable habitat and is within the elevational range of this species. There are three additional records of this species within the study area: • A 1996 detection adjacent to the Cow Flat Creek to Conduit No. 6 Trail and one additional occurrence along State Route 178 approximately 0.25 mile east of the Kern River No. 1 Powerhouse (Forest Service 2022); and • A continuous polygon encompassing both sides of the Kern River from Conduit No 2 downstream to Tunnel No. 14 northeast of Pacheco Creek was documented in 1996 (CNDDB 2025).
Monardella linoides ssp. *anemonoides* southern Sierra monardella	–	–	1B.3	June–August	A perennial herb found in chaparral, cismontane woodland, and lower montane coniferous forest. Elevation: 2,200–8,040 feet.	**May potentially occur.** The study area supports suitable habitat and is within the elevational range of this species. A CNDDB query yielded one occurrence in the study area, a generalized polygon encompassing the Democrat Diversion Dam impoundment and the Willow Spring Creek Road (also referred to as Democrat Dam Road). This occurrence was recorded in 1935 (CNDDB 2025).
Navarretia setiloba Piute Mountains navarretia	–	–	1B.1	April–July	An annual herb that grows on clay or gravelly loam soils in cismontane woodland, pinyon and juniper woodland, and valley and foothill grassland. Elevation: 950–7,000 feet.	**May potentially occur.** The study area supports suitable habitat and is within the elevational range of this species.
Opuntia treleasei Bakersfield cactus	FE/CE	–	1B.1	April–May	A perennial cactus that grows on sandy or gravelly soils in chenopod scrub, cismontane woodland, and valley and foothill grassland. Elevation: 400–4,830 feet.	**May potentially occur.** The study area supports suitable habitat and is within the elevational range of this species.
Pseudobahia peirsonii San Joaquin adobe sunburst	FT/CE	–	1B.1	February–April	An annual herb that grows on adobe clay soils in cismontane woodland and valley and foothill grassland. Elevation: 295–2,670 feet.	**May potentially occur.** The study area supports suitable habitat and is within the elevational range of this species.

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Scientific/Common Name	Federal/ State Status	Sequoia National Forest Status	CRPR	Blooming Period/ Fertile	Habitat	Likelihood for Occurrence
Stylocline citreolum oil neststraw	–	–	1B.1	March–April	An annual herb that grows on clay soils in chenopod scrub, coastal scrub, and valley and foothill grassland. Only known extant populations are from the interior coast ranges. Elevation: 170–1,330 feet.	**May potentially occur.** The study area supports suitable habitat and is within the elevational range of this species.
Unlikely to Occur in the Study Area						
Caulanthus californicus California jewelflower	FE/CE	–	1B.1	February–May	An annual herb that grows on sandy soils in chenopod scrub, pinyon and juniper woodland, and valley and foothill grassland. Extirpated from the San Joaquin Valley, now known only from Santa Barbara canyon, Carrizo Plain, and the Kreyenhagen Hills. Elevation: 200–3,300 feet.	**Unlikely to occur.** The study area is outside of the geographic range for this species.
Cordylanthus eremicus ssp. *kernensis* Kern Plateau bird's-beak	–	FSCC	1B.3	July–September	A hemiparasitic annual herb that grows in Great Basin scrub, Joshua tree "woodland", pinyon and juniper woodland, and upper montane coniferous forest. Elevation: 5,495–9,845 feet.	**Unlikely to occur.** The study area does not contain suitable habitat and is out of the elevational range of this species.
Eremalche parryi ssp. *kernensis* Kern mallow	FE	–	1B.2	January–May	An annual herb that grows on dry and open sandy to clay soils in chenopod scrub, pinyon and juniper woodland, and valley and foothill grassland; often found at edge of balds. Elevation: 230–4,300 feet.	**Unlikely to occur.** The study area is outside of the geographic range for this species.
Layia leucopappa Comanche Point layia	–	–	1B.1	March–April	An annual herb that grows in chenopod scrub and valley and foothill grassland, found only in Kern County. Elevation: 330–1,170 feet.	**Unlikely to occur.** The study area is outside of the geographic range for this species.
Monolopia (=Lembertia) congdonii San Joaquin woolly-threads	FE	–	1B.2	February–May	An annual herb that grows in chenopod scrub and sandy valley and foothill grassland. Elevation: 200–2,670 feet.	**Unlikely to occur.** The study area is outside of the geographic range for this species. Populations in the lower Kern River are believed to be extirpated (USFWS 1998).
Streptanthus cordatus var. *piutensis* Piute Mountains jewel-flower	–	FSCC	1B.2	May–July	A perennial herb that grows on clay and metamorphic soils in broad-leafed upland forest, closed-cone coniferous forest, and pinyon and juniper woodland. Elevation: 3,595–5,990 feet.	**Unlikely to occur.** The study area does not contain suitable habitat and is outside of the elevational range of this species.
Symphyotrichum defoliatum San Bernardino aster	–	FSCC	1B.2	July–November	A perennial rhizomatous herb that grows on streambanks in cismontane woodland, coastal scrub, lower montane coniferous forest, meadows and seeps, marshes and swamps, and valley and foothill grassland (vernally mesic). Elevation: 5–6,695 feet.	**Unlikely to occur.** The study area is outside of the geographic range for this species.
Astragalus ertterae Walker Pass milk-vetch	–	FSCC	1B.3	April–May	A perennial herb that grows on granitic, sandy soils in pinyon and juniper woodland. Elevation: 5,595–6,235 feet.	**Unlikely to occur.** The study area does not contain suitable habitat and is out of the elevational range of this species.
Astragalus lentiginosus var. *kernensis* Kern Plateau milk-vetch	–	FSCC	1B.2	June–July	A perennial herb that grows on sandy soils in meadows and seeps, and subalpine coniferous forest. Elevation: 7,350–9,025 feet.	**Unlikely to occur.** The study area does not contain suitable habitat and is out of the elevational range of this species.
Astragalus shevockii Little Kern (Shevock's) milk-vetch	–	FSCC	1B.3	June–July	A perennial herb that grows on granitic and sandy soils in upper montane coniferous forest. Elevation: 6,200–6,445 feet.	**Unlikely to occur.** The study area does not contain suitable habitat and is out of the elevational range of this species.

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Scientific/Common Name	Federal/ State Status	Sequoia National Forest Status	CRPR	Blooming Period/ Fertile	Habitat	Likelihood for Occurrence
Astragalus subvestitus Kern County milk-vetch	–	FSCC	4.3	June–July	A perennial herb that grows on gravelly and sandy soils in Great Basin scrub, meadows and seeps, and pinyon and juniper woodland. Elevation: 7,645–9,025 feet.	**Unlikely to occur.** The study area does not contain suitable habitat and is out of the elevational range of this species.
Atriplex tularensis Bakersfield saltbush	–	–	1A	June–October	An annual herb that grows in chenopod scrub. Elevation: 295–655 feet.	**Unlikely to occur.** The study area is outside of the geographic range for this species.
Boechera evadens hidden rockcress	–	FSCC	1B.3	May–August	A perennial herb that grows on rocky soils in upper montane coniferous forest. Elevation: 8,400–9,350 feet.	**Unlikely to occur.** The study area does not contain suitable habitat and is out of the elevational range of this species.
Boechera tularensis Tulare rockcress	–	FSCC	1B.3	June–July	A perennial herb that grows along slopes and roadsides on rocky soils in subalpine coniferous forest and upper montane coniferous forest. Elevation: 5,990–10,990 feet.	**Unlikely to occur.** The study area does not contain suitable habitat and is out of the elevational range of this species.
Botrychium crenulatum scalloped moonwort	–	FSCC	2B.2	June–September	A perennial rhizomatous herb that grows in bogs and ferns, lower montane coniferous forest, meadows and seeps, marshes and swamps (freshwater), and upper montane coniferous forest. Elevation: 4,160–10,760 feet.	**Unlikely to occur.** The study area does not contain suitable habitat and is out of the elevational range of this species.
Calochortus westonii Shirley Meadows star-tulip (mariposa lily)	–	FSCC	1B.2	May–June	A perennial herb (bulbiferous) that grows on granitic soils in broad-leafed upland forest, lower montane coniferous forest, and meadows and seeps. Elevation: 4,920–6,905 feet.	**Unlikely to occur.** The study area does not contain suitable habitat and is out of the elevational range of this species.
Calyptridium pygmaeum Pygmy pussypaws	–	FSCC	1B.2	June–August	An annual herb that grows on gravelly and sandy soils in subalpine coniferous forest and upper montane coniferous forest. Elevation: 6,495–10,205 feet.	**Unlikely to occur.** The study area does not contain suitable habitat and is out of the elevational range of this species.
Carlquistia muirii Muir's tarplant	–	FSCC	1B.3	July–August	A perennial rhizomatous herb that grows on granitic soils in chaparral (montane), lower montane coniferous forest, and upper montane coniferous forest. Elevation: 2,475–8,205 feet.	**Unlikely to occur.** The study area does not contain suitable habitat and is out of the elevational range of this species.
Cirsium crassicaule slough thistle	–	–	1B.1	May–August	An annual/perennial herb that grows in chenopod scrub, marshes, and swamps (sloughs), and riparian scrub. Elevation: 10–330 feet.	**Unlikely to occur.** The study area does not contain suitable habitat for this species.
Clarkia tembloriensis ssp. *calientensis* Vasek's Clarkia	–	–	1B.1	April	An annual herb that grows in valley and foothill grassland. Elevation: 900–1,640 feet.	**Unlikely to occur.** The study area is outside of the geographic range for this species.
Deinandra mohavensis Mojave tarplant	FE	FSCC	1B.3	June–October	An annual herb that grows on mesic soils in chaparral, coastal scrub, and riparian scrub. Elevation: 2,100–5,250 feet.	**Unlikely to occur.** The study area does not contain suitable habitat and is out of the elevational range of this species.
Dicentra nevadensis Sierra (Tulare County) bleeding heart	–	FSCC	4.3	June–August	A perennial rhizomatous herb that grows in alpine boulder and rock fields, and subalpine coniferous forest (gravelly, sandy, openings). Elevation: 7,220–10,005 feet.	**Unlikely to occur.** The study area does not contain suitable habitat and is out of the elevational range of this species.
Erigeron aequifolius Hall's daisy (fleabane)	–	FSCC	1B.3	June–August	A perennial rhizomatous herb that grows on granitic and rocky soils in broad-leafed upland forest, lower montane coniferous forest, pinyon and juniper woodland, and upper montane coniferous forest. Elevation: 4,920–8,005 feet.	**Unlikely to occur.** The study area does not contain suitable habitat and is out of the elevational range of this species.

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Scientific/Common Name	Federal/ State Status	Sequoia National Forest Status	CRPR	Blooming Period/ Fertile	Habitat	Likelihood for Occurrence
Erigeron multiceps Kern River daisy	–	FSCC	1B.2	June–September	A perennial herb that grows in meadows and seeps and upper montane coniferous forest (openings). Elevation: 4,920–8,315 feet.	**Unlikely to occur.** The study area does not contain suitable habitat and is out of the elevational range of this species.
Eriogonum breedlovei var. *breedlovei* Breedlove's (Piute) buckwheat	–	FSCC	1B.2	June–August	A perennial herb that grows on carbonate soils in pinyon and juniper woodland and upper montane coniferous forest. Elevation: 6,200–8,500 feet.	**Unlikely to occur.** The study area does not contain suitable habitat and is out of the elevational range of this species.
Eriogonum ovalifolium var. *monarchense* monarch buckwheat	–	FSCC	1B.1	June–August	A perennial herb that grows on carbonate, rocky, and sandy soils in Mojavean desert scrub and pinyon and juniper woodland. Elevation: 5,905–5,955 feet.	**Unlikely to occur.** The study area does not contain suitable habitat and is out of the elevational range of this species.
Gilia yorkii Boyden Cave gilia	–	FSCC	1B.1	May–July	An annual herb that grows on carbonate soils in chaparral and cismontane woodland. Elevation: 4,230–6,005 feet.	**Unlikely to occur.** The study area does not contain suitable habitat and is out of the elevational range of this species.
Githopsis tenella tube flower bluecup	–	FSCC	1B.3	April–June	An annual herb that grows on mesic and serpentinite soils in chaparral and cismontane woodland. Elevation: 1,065–6,235 feet.	**Unlikely to occur.** The study area does not contain suitable habitat for this species.
Helodium blandowii (=*Elodium blandowii*) Blandow's bog moss	–	FSCC	2B.2	N/A	A moss that grows on damp soil in meadows and seeps and subalpine coniferous forest. Elevation: 6,110–8,860 feet.	**Unlikely to occur.** The study area does not contain suitable habitat and is out of the elevational range of this species.
Heterotheca monarchensis Monarch golden aster	–	FSCC	1B.1	May–October	A perennial herb that grows on carbonate soils in cismontane woodland. Elevation: 3,595–6,070 feet.	**Unlikely to occur.** The study area does not contain suitable habitat and is out of the elevational range of this species.
Horkelia tularensis Kern Plateau horkelia	–	FSCC	1B.3	June–August	A perennial herb that grows on rocky soils in upper montane coniferous forest. Elevation: 7,400–9,435 feet.	**Unlikely to occur.** The study area does not contain suitable habitat and is out of the elevational range of this species.
Hulsea brevifolia short-leaved hulsea	–	FSCC	1B.2	May–August	A perennial herb that grows on granitic, gravelly, sandy, and volcanic soils in lower montane and upper montane coniferous forest. Elevation: 4,920–10,500 feet.	**Unlikely to occur.** The study area does not contain suitable habitat and is out of the elevational range of this species.
Ivesia campestris field ivesia	–	FSCC	1B.2	May–August	A perennial herb that grows in meadows and seeps (edges), subalpine coniferous forest, and upper montane coniferous forest. Elevation: 6,480–11,140 feet.	**Unlikely to occur.** The study area does not contain suitable habitat and is out of the elevational range of this species.
Leptosiphon serrulatus [= Linanthus serrulatus] Madera leptosiphon	–	FSCC	1B.2	April–May	An annual herb that grows in cismontane woodland and lower montane coniferous forest. Elevation: 985–4,265 feet.	**Unlikely to occur.** The study area does not contain suitable habitat for this species.
Lewisia disepala Yosemite Lewisia	–	FSCC	1B.2	March–June	A perennial herb that grows on granitic and sandy soils in lower montane coniferous forest, pinyon and juniper woodland, and upper montane coniferous forest. Elevation: 3,395–11,485 feet.	**Unlikely to occur.** The study area does not contain suitable habitat and is out of the elevational range of this species.
Madia radiata showy madia	–	–	1B.1	March–May	An annual herb that grows in cismontane woodland and valley and foothill grassland. Elevation: 80–3,985 feet.	**Unlikely to occur.** The study area is outside of the geographic range for this species.
Meesia uliginosa Meesia moss	–	FSCC	2B.2	July–October	A moss that grows in bogs and fens, meadows and seeps, subalpine coniferous forest, and upper montane coniferous forest. Elevation: 3,970–9,200 feet.	**Unlikely to occur.** The study area does not contain suitable habitat and is out of the elevational range of this species.

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Scientific/Common Name	Federal/ State Status	Sequoia National Forest Status	CRPR	Blooming Period/ Fertile	Habitat	Likelihood for Occurrence
Mielichhoferia shevockii Shevock's copper moss	–	FSCC	1B.2	N/A	A moss that grows in cismontane woodland (mesic, metamorphic, rock). Elevation: 2,460–4,595 feet.	**Unlikely to occur.** The study area does not contain suitable habitat and is out of the elevational range of this species.
Navarretia peninsularis Baja navarretia	–	FSCC	1B.2	June–August	An annual herb that grows on mesic soils in chaparral (openings), lower montane coniferous forest, meadows and seeps, and pinyon and juniper woodland. Elevation: 4,920–7,545 feet.	**Unlikely to occur.** The study area does not contain suitable habitat and is out of the elevational range of this species.
Nemacladus calcaratus Chimney Creek nemacladus	–	FSCC	1B.2	May–June	An annual herb that grows on flats and granitic soils in pinyon and juniper woodland. Elevation: 6,235–6,890 feet.	**Unlikely to occur.** The study area does not contain suitable habitat and is out of the elevational range of this species.
Nemacladus twisselmannii Twisselmann's nemacladus	CR	FSCC	1B.2	July	An annual herb that grows on granitic, sandy, or rocky soils in upper montane coniferous forest. Elevation: 7,350–8,040 feet.	**Unlikely to occur.** The study area does not contain suitable habitat and is out of the elevational range of this species.
Oreonana purpurascens purple mountain-parsley	–	FSCC	1B.2	May–June	A perennial herb that grows on metamorphic soils in broad-leafed upland forest, subalpine coniferous forest, and upper montane coniferous forest. Elevation: 7,860–9,400 feet.	**Unlikely to occur.** The study area does not contain suitable habitat and is out of the elevational range of this species.
Oreonana vestita Woolly mountain-parsley	–	FSCC	1B.3	March–September	A perennial herb that grows on gravelly and talus soils in lower montane coniferous forest, subalpine coniferous forest, and upper montane coniferous forest. Elevation: 5,300–11,485 feet.	**Unlikely to occur.** The study area does not contain suitable habitat and is out of the elevational range of this species.
Orthotrichum spjutii Spjut's bristle moss	–	FSCC	1B.2	N/A	A moss that grows on granitic and rocky soils in lower montane coniferous forest, pinyon and juniper woodland, subalpine coniferous forest, and upper montane coniferous forest. Elevation: 6,890–7,875 feet.	**Unlikely to occur.** The study area does not contain suitable habitat and is out of the elevational range of this species.
Phacelia nashiana Charlotte's phacelia	–	FSCC	1B.2	March–June	An annual herb that grows on granitic and sandy soils in Joshua tree "woodlands", Mojavean desert scrub, and pinyon and juniper woodland. Elevation: 1,970–7,220 feet.	**Unlikely to occur.** The study area does not contain suitable habitat for this species.
Phacelia novenmillensis Nine Mile Canyon phacelia	–	FSCC	1B.2	May–June	An annual herb that grows on gravelly and sandy soils in broad-leafed upland forest, cismontane woodland, pinyon and juniper woodland, and upper montane coniferous forest. Elevation: 5,395–8,660 feet.	**Unlikely to occur.** The study area does not contain suitable habitat and is out of the elevational range of this species.
Ribes menziesii var. ixoderme aromatic canyon gooseberry	–	–	1B.2	April	A perennial deciduous scrub that grows in chaparral and cismontane woodland. Elevation: 2,000–3, 805 feet.	**Unlikely to occur.** The study area does not contain suitable habitat for this species.
Sidalcea multifida cut-leaf checkerbloom	–	FSCC	2B.3	May–September	A perennial herb that grows in Great Basin scrub, lower montane coniferous forest, meadows and seeps, and pinyon and juniper woodland. Elevation: 5,740–9,185 feet.	**Unlikely to occur.** The study area does not contain suitable habitat and is out of the elevational range of this species.
Streptanthus fenestratus Tehipite Valley jewel-flower	–	FSCC	1B.1	May–July	An annual herb that grows in lower montane coniferous forest and upper montane coniferous forest. Elevation: 3,495–5,740 feet.	**Unlikely to occur.** The study area does not contain suitable habitat and is out of the elevational range of this species.

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Scientific/Common Name	Federal/ State Status	Sequoia National Forest Status	CRPR	Blooming Period/ Fertile	Habitat	Likelihood for Occurrence
Trifolium kingii ssp. *dedeckerae (T. dedeckerae)* Dedecker's clover	–	FSCC	1B.3	May–July	A perennial herb that grows on granitic and rocky soils in lower montane coniferous forest, pinyon and juniper woodland, subalpine coniferous forest, and upper montane coniferous forest. Elevation: 6,890–11,485 feet.	**Unlikely to occur.** The study area does not contain suitable habitat and is out of the elevational range of this species.
Viburnum ellipticum oval-leaved viburnum	–	FSCC	2B.3	May–June	A perennial deciduous shrub that grows in chaparral, cismontane woodland, and lower montane coniferous forest. Elevation: 705–4,595 feet.	**Unlikely to occur.** The study area does not contain suitable habitat for this species.

Notes: [1] This species may potentially occur in wetland-riparian habitats.

Federal Status
FC = Federal Candidate Species
FE = Federal Endangered
FT = Federal Threatened
FPD = Federal Proposed for Delisting
FPT, FPE = Federal Proposed Threatened/Endangered

SQF Status
FSCC = Sequoia National Forest Species of Conservation Concern

State Status
CFP = California Fully Protected
CSC = California Species of Special Concern
CCT, CCE = State Candidate Threatened/Endangered
CE = California Endangered
CR = California Rare
CT = California Threatened

CRPR = California Native Plant Society Rare Plant Rank
- CRPR 1B = rare, threatened or endangered in California and elsewhere
- CRPR 2B = rare in California but more common elsewhere
- 3 = need more information
- 4 = plants of limited distribution; a watch list
  - _.1 = Seriously threatened in California (over 80% of occurrences threatened / high degree and immediacy of threat)
  - _.2 = Moderately threatened in California (20–80% occurrences threatened)
  - _.3 = Not very threatened in California (<20% of occurrences threatened or no current threats known)

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Table 7.5-4. Special-Status Plant Populations Identified During Botanical Surveys in the Study Area

Scientific Name	Final Map ID	Facility	Total Number of Individuals	Population Size (Square Feet)	Survey Date
Rose-flowered larkspur *(Delphinium purpusii)* Sequoia National Forest Species of Conservation Concern; CRPR 1B.3	DEPU_01	Conduit No. 3 Trail	35	75	4/26/2024
	DEPU_02	Conduit No. 3 Trail	17	40	4/26/2024
	DEPU_03	Conduit No. 3 Trail	16	60	4/26/2024
	DEPU_04	Flume No. 3	25	1,000	4/28/2024
	DEPU_05	Lucas Creek Trail	7	250	4/28/2024
	DEPU_06	Stark Creek Trail	1	1	4/27/2024
	DEPU_07	Dougherty Creek Trail	1	1	4/27/2024
	DEPU_08	Adit 14 & 15	12	150	4/29/2024
	DEPU_09	Overflow Spillway Trail	320	1,800	4/25/2024
		Totals	**434**	**3,377**	

Key: CRPR = California Rare Plant Rank

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Table 7.5-5. Non-Native Invasive Plant Populations Identified During Botanical Surveys in the Study Area

Final Map ID[1]	Facility	Level of Infestation[2]	Population Size (sq ft)
Red brome *(Bromus madritensis* ssp. *rubens)* – Cal-IPC High			
BRMA_01	Kern River No. 1 Powerhouse and Switchyard	Mod	1,445,321
BRMA_02	Forebay to Conduit No. 9 Trail	Mod	202,000
BRMA_03	Forebay to Conduit No. 9 Trail	Mod	25,000
BRMA_04	Adit 18 & 19	Mod	10,000
BRMA_05	Adit 14 & 15	Mod	10,000
BRMA_06	Stark Creek Road	Mod	225,000
BRMA_07	Adit 12 & 13	Mod	10,000
BRMA_08	Stark Creek Road	Mod	0
BRMA_09	Lucas Creek Trail	Mod	68,233
BRMA_10	Flume No. 4 Lucas Creek	Mod	9,000
BRMA_11	Cow Flat Creek to Conduit No. 6 Trail	Mod	24,812
BRMA_12	Conduit No. 6	Mod	5,600
BRMA_13	Cow Flat Creek to Conduit No. 6 Trail	Mod	26,300
BRMA_14	Cow Flat Creek Trail	Mod	34,500
BRMA_15	Adit 4 & 5	Mod	10,000
BRMA_16	Conduit No. 3 Trail	Mod	31,268
BRMA_17	Adit 2 & 3	Mod	5,000
BRMA_18	Democrat Gage Trail	Mod	76,879
BRMA_19	Flume No. 1	Low	105,074
BRMA_20	Powerline Road	Mod	19,828
BRMA_21	Willow Spring Creek Road (also referred to as Democrat Dam Road)	Mod	17,978,220
BRMA_22	Democrat Dam Impoundment	Low	742,231
BRMA_23	Democrat Dam Impoundment	Low	621,348
ONAC_BRTE_BRMA_POMO_VETH_01[3]	Democrat Dam Impoundment	Mod	70,000
		Total Size	**21,755,614 sq ft (499.4 acres)**

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Final Map ID[1]	Facility	Level of Infestation[2]	Population Size (sq ft)
Cheatgrass *(Bromus tectorum)* – Cal-IPC High			
BRTE_01	Stark Creek Road	Low	3,000
BRTE_02	Stark Creek Road	Low	450
BRTE_03	Dougherty Creek Road	Low	600
BRTE_04	Dougherty Creek Trail	Low	25
BRTE_05	Democrat Gage Trail	Low	75
BRTE_06	Willow Spring Creek Road (also referred to as Democrat Dam Road)	Low	1
BRTE_07	Democrat Gage Trail	Low	10,000
BRTE_08	Willow Spring Creek Road (also referred to as Democrat Dam Road)	Low	30
BRTE_09	Democrat Dam Impoundment	Low	5
ONAC_BRTE_BRMA_POMO_VETH_01[3]	Democrat Dam Impoundment	Low	70,000
		Total Size	**84,186 sq ft (1.9 acres)**
Scotch thistle *(Onopordum acanthium)* – Cal-IPC High			
ONAC_01	Forebay Operations Area Road	Low	750
ONAC_02	Water Tank	Low	200
ONAC_03	Kern River No. 1 Powerhouse and Switchyard	Mod	1,000
ONAC_04	Forebay Overflow Spillway	Low	1
ONAC_05	Overflow Spillway Trail	Low	20
ONAC_06	Overflow Spillway Trail	Low	4
ONAC_07	Forebay Overflow Spillway	Low	1
ONAC_08	Overflow Spillway Trail	Low	400
ONAC_09	Overflow Spillway Trail	Low	1
ONAC_10	Stark Creek Trail	Low	300
ONAC_11	Stark Creek Trail	Low	100
ONAC_12	Stark Creek Road	Low	1
ONAC_13	Stark Creek Road	Low	1
ONAC_14	Stark Creek Road	Low	400
ONAC_16	Cow Flat Creek to Conduit No. 6 Trail	Low	4
ONAC_17	Cow Flat Creek to Conduit No. 6 Trail	Low	100
ONAC_18	Cow Flat Creek Trail	Low	1
ONAC_19	Adit 4 & 5	Low	100

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Final Map ID[1]	Facility	Level of Infestation[2]	Population Size (sq ft)
ONAC_20	MIF Release Point	Low	1500
ONAC_21	Flume No. 1	Low	9
ONAC_22	Flume No. 1	Low	43,560
ONAC_23	Flume No. 1	Low	4
ONAC_24	Flume No. 1	Low	20
ONAC_25	Erskine 12 kV Distribution Line	Low	25
ONAC_26	Democrat Dam Impoundment	Low	6
ONAC_28	Willow Spring Creek Road (also referred to as Democrat Dam Road)	Low	25
ONAC_29	Democrat Dam Impoundment	Low	1
ONAC_30	Democrat Dam Impoundment	Low	200
ONAC_31	Democrat Dam Impoundment	Low	1
ONAC_32	Democrat Dam Impoundment	Low	300
ONAC_33	Democrat Dam Impoundment	Low	2
ONAC_34	Democrat Dam Impoundment	Low	2
ONAC_35	Democrat Dam Impoundment	Low	2
ONAC_36	Kern River No. 1 Powerhouse and Switchyard	Low	4
ONAC_37	Kern River No. 1 Powerhouse and Switchyard	Low	2
ONAC_BRTE_BRMA_POMO_VETH_01[3]	Democrat Dam Impoundment	Low	70,000
		Total Size	**119,049 sq ft (2.7 acres)**
Rabbitsfoot grass *(Polypogon monspeliensis)* – Cal-IPC Limited			
POMO_01	Kern River No. 1 Powerhouse and Switchyard	Low	150
POMO_02	Kern River No. 1 Powerhouse and Switchyard	Low	100
POMO_03	Democrat Dam Impoundment	Mod	400
POMO_04	Democrat Dam Impoundment	Low	30
POMO_05	Democrat Dam Impoundment	Low	225
POMO_06	Democrat Dam Impoundment	Low	180
POMO_07	Democrat Dam Impoundment	Low	4000
POMO_08	Democrat Dam Impoundment	Low	100
POMO_09	Democrat Dam Impoundment	Low	60

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Final Map ID[1]	Facility	Level of Infestation[2]	Population Size (sq ft)
POMO_10	Democrat Dam Impoundment	Low	660
POMO_11	Democrat Dam Impoundment	Low	100
POMO_12	Democrat Dam Impoundment	Low	160
POMO_13	Democrat Dam Impoundment	Low	2
POMO_14	Dougherty Creek Trail	Low	120
POMO_15	Kern River No. 1 Powerhouse and Switchyard	Low	160
POMO_VETH_01[4]	Democrat Dam Impoundment	Mod	75,000
POMO_VETH_02[4]	Democrat Dam Impoundment	Low	75,000
POMO_VETH_03[4]	Democrat Dam Impoundment	Mod	360
POMO_VETH_04[4]	Democrat Dam Impoundment	Low	1000
ONAC_BRTE_BRMA_POMO_VETH_01[3]	Democrat Dam Impoundment	Low	70,000
		Total Size	**227,807 sq ft (5.2 acre)**
Common mullein *(Verbascum thapsus)* – Cal-IPC Limited			
VETH_01	Democrat Gage Trail	Mod	1,200
VETH_02	Democrat Dam Impoundment	Low	50
VETH_03	Democrat Dam Impoundment	Low	90
VETH_04	Democrat Dam Impoundment	Low	25
POMO_VETH_01[4]	Democrat Dam Impoundment	Mod	75,000
POMO_VETH_02[4]	Democrat Dam Impoundment	Low	75,000
VETH_07	Democrat Dam Impoundment	Low	100
VETH_08	Democrat Dam Impoundment	Low	16
VETH_09	Democrat Dam Impoundment	Low	16
VETH_10	Democrat Dam Impoundment	Low	660
VETH_12	Democrat Dam Impoundment	Low	400
VETH_13	Democrat Dam Impoundment	Mod	360
VETH_14	Democrat Dam Impoundment	Low	40
VETH_15	Democrat Dam Impoundment	Low	6
POMO_VETH_03[4]	Democrat Dam Impoundment	Mod	15,000

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Final Map ID[1]	Facility	Level of Infestation[2]	Population Size (sq ft)
POMO_VETH_04[4]	Democrat Dam Impoundment	Low	1000
ONAC_BRTE_BRMA_POMO_VETH_01[3]	Democrat Dam Impoundment	Low	70,000
		Total Size	**238,963 sq ft (5.5 acres)**

Notes: [1] Refer to Map 7.5-2 for the location of each individual/population in the study area.
[2] Level of Infestation
[3] The polygon represents a population comprising five NNIP species. While the original field ID was designated as ONAC_27, it has since been updated to consolidate all species within a single polygon.
[4] This population includes both POMO and VETH groups within a single polygon. While the original polygons had distinct field IDs, these have been modified to form compiled polygons.
Key: sq ft = square feet

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Table 7.5-6. Special-Status Wildlife Species Known to Occur or Potentially Occurring in Kern River No. 1 Project Study Area

Scientific/Common Name	Federal Status	SQF Status	State Status	Habitat	Likelihood for Occurrence
Known to Occur in the Study Area					
Terrestrial Invertebrates					
Bombus crotchii Crotch's bumble bee	–	–	CC	Found primarily in the Mediterranean region, Pacific Coast, and Western Desert of California. Inhabits grasslands and shrublands, requiring a hotter and drier environment than most other bumble bee species. Can be found nesting underground in abandoned rodent dens.	**Known to Occur.** Three individual bumble bees belonging to the genus *Bombus* were observed during wildlife surveys in conjunction with the TERR 2 TM (SCE 2025b). These individuals could not be identified down to a species level. The CNDDB query yielded four records for this species within the study area (CNDDB 2025): • A 2021 observation of one female was observed on Cow Flat Road, northwest of Cow Flat and about 0.5 mile east of Flume No. 2 Cow Flat Creek; and • A 2023 observation of one female was observed along State Route 178 0.2 mile south of Kern River No. 1 Powerhouse; • A 2025 observation of one female was observed along State Route 178 near Willow Spring Creek Road (also referred to as Democrat Dam Road); and • A 2025 observation of one female was observed along State Route 178 about 0.3 mile southwest of Pechacho Creek.
Danaus plexippus monarch butterfly	FPT	–	–	Overwintering population in coastal California. In late-February or March, monarchs will disperse from wintering areas to interior California. Quality habitat includes milkweed (*Asclepias* spp.) which occur in short and tall grass prairies, livestock pastures, agricultural margins, roadsides, wetland and riparian areas, sandy areas, gardens, open forests, and woodlands.	**Known to Occur.** The host plant (milkweed species) was observed in the study area during the TERR 1 TM studies (SCE 2025a), This species was observed during studies for the TERR 2 TM (SCE 2025b), including: • One individual was observed on an island in the Democrat Dam Impoundment during the botanical surveys. • One individual was observed along the north shore of the of the Democrat Dam Impoundment during the riparian surveys.
Amphibians					
Batrachoseps simatus Kern Canyon slender salamander	FPT	FSCC	CT	Found in north-facing slopes in narrow canyons shaded by foothill woodland and riparian areas along creeks. Found under rocks, fallen limbs and leaf litter. Endemic to the Kern River Canyon from 1,500 to 4,000 feet in elevation.	**Known to occur.** Two observations of a Kern Canyon slender salamander were recorded during studies for the TERR 2 TM near the Stark Creek Trail (SCE 2025b). One additional 2024 observation of this species was recorded south of the Kern River No. 1 Powerhouse during SCE surveys along the non-Project transmission line corridor (SCE 2025b). The CNDDB query yielded nine additional records ranging from 1970 - 2010 for this species within the study area (CNDDB 2025). Proposed Critical Habitat for the Kern Canyon slender salamander is present along west- and northwest-facing slopes along the Kern River in the vicinity of Stark Creek and upstream to the Democrat Dam Impoundment.

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Scientific/Common Name	Federal Status	SQF Status	State Status	Habitat	Likelihood for Occurrence
Batrachoseps relictus relictual slender salamander	FPE	–	CSC	Found in seepages and springs in rocky areas with scanty tree cover, in a matrix of foothill woodland or riparian areas in creek bottoms. Rarely found far from surface water. Found at elevations ranging from 1,500 to 6,500 feet in elevation.	**Known to occur.** Relictual slender salamanders were not observed during studies for the TERR 2 TM (SCE 2025b). However, the NRIS query yielded two records within the FERC Project boundary (Forest Service 2022): • A 1960 detection in Lucas Creek adjacent to the Lucas Creek Trail; and • A 1955 detection in Cow Flat Creek, approximately 0.12 mile from the confluence to Kern River. Five additional occurrences were recorded in the CNDDB/NRIS within 1 mile of the Project (listed from south/southwest to north/northwest) (CNDDB 2025, Forest Service 2022): • A 1970 detection along SR 178 in a tributary to Kern River, approximately 500 feet east of the Willow Spring Creek Road (also referred to as Democrat Dam Road); • A 1967 detection in a drainage along SR 178 approximately 500 feet downslope of Adit 15 & 17; • A 1964 detection along SR 178, approximately 0.66 mile east of the Willow Spring Creek Road (also referred to as Democrat Dam Road); and • A 1960 detection along Stark Creek between Stark Creek Trail and Stark Creek Road. There is also a location-suppressed record of this species from the Breckenridge Mountain USGS 7.5-minute quadrangle dated from 2012 (CNDDB 2025). Proposed Critical Habitat for the Kern Canyon slender salamander is present along west- and northwest-facing slopes along the Kern River upstream of the Forebay to the Democrat Dam Impoundment and along Lucas Creek.
Ensatina eschscholtzii croceator yellow-blotched ensatina	–	FSCC	WL	Found in tributaries of lower elevation canyons. Found close to streams and under rocks and logs and become active after precipitation events between January to April. Generally found around seeps and drainages and under the canopy of trees (Germano 2006).	**Known to occur.** One individual was found during the TERR 2 TM VES adjacent to Flume No. 1 in the Democrat Dam area. Additionally there is a recorded occurrence in Dougherty Canyon, a tributary just above Upper Richbar Day Use Area (FERC 1998).
Reptiles					
Phrynosoma blainvillii coast horned lizard	–	–	CSC	Found in open areas of sandy soil in valleys, foothills, and semi-arid mountains. Prefers areas of low vegetation within grasslands, forests, woodlands, and chaparral. Commonly found along sandy washes and dirt roads. The elevational range extends up to 4,000 feet in the Sierra Nevada foothills and up to 6,000 feet in the mountains of southern California.	**Known to occur.** California horned lizard scat was observed at numerous locations in the vicinity of the Project, indicating that the species is likely present in sizable numbers (SCE 2012). *GIS data not available for these occurrences.*
Aniella spp. California legless lizard	–	–	CSC	Found in loose soil in sparsely vegetated areas, commonly in sandy washes, oak woodland, mixed conifer forest, and stream terraces.	**Known to occur.** Three individuals in two locations were observed in the study area during studies for the TERR 2 TM VES. There is one CNDDB record approximately 0.75 mile upstream of the Democrat Dam Impoundment from 1992 (CNDDB 2025).

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Scientific/Common Name	Federal Status	SQF Status	State Status	Habitat	Likelihood for Occurrence
Birds					
Aquila chrysaetos golden eagle	BCC Eagle Act	–	CFP (nesting and wintering), WL	Grasslands and early successional stages of forest and shrub habitats for foraging at elevations up to 11,500 feet. Secluded cliffs with overhanging ledges or large trees in open areas with unobstructed view for nesting.	**Known to occur.** Project contains suitable habitat for this species. • Golden eagles were observed flying over the access platform in the Stark Creek Trail area during studies for the TERR 2 TM (SCE 2025b). • A pair of golden eagles were also observed in 2021 near the Kern River No. 1 Powerhouse (JNA-Consulting 2021). A NRIS query yielded one record for this species within 1 mile of the Project, a 1987 detection along Cow Flat Creek, approximately 0.75 mile from the Kern River (Forest Service 2022).
Haliaeetus leucocephalus bald eagle	Eagle Act, FD	FSCC	CE, CFP	Year-round resident in ice-free regions of California. Foraging areas include regulated and unregulated rivers, reservoirs, lakes, estuaries, and coastal marine ecosystems. Majority of bald eagles in California breed near reservoirs and nests are usually located within 1 mile of foraging habitat. Nests are typically placed in the branches of large conifer trees within dense stands of trees (Jackman and Jenkins 2004).	**Known to occur.** The Project provides suitable foraging habitat for this species. • An adult was observed circling over the Democrat Dam, Conduit No. 2 area during studies for the TERR 2 TM (SCE 2025b). • An adult bald eagle was incidentally observed along the Kern River near the Stark Creek Road during other relicensing studies (SCE 2025b). Lake Isabella regularly supports wintering eagles which have been observed flying up the North Fork Kern River and high above Kern River No. 1 Project (SCE 1994). A NRIS query yielded one record for this species within 1 mile of the Project, a 2002 detection adjacent to Kern River, approximately 4 miles upstream of the Kern River No. 1 Powerhouse (Forest Service 2022).
Buteo swainsoni Swainson's hawk	–	–	CT (nesting)	Uncommon breeding resident and migrant in the Central Valley, Klamath Basin, Northeastern Plateau, Lassen County, and Mojave Desert. Breeding habitat includes riparian woodland and trees adjacent to riparian systems. Riparian woodlands, juniper-sage flats, and oak woodlands for nesting. Open grasslands, pastures agricultural areas for foraging.	**Known to occur.** An individual was observed during the TERR 2 TM studies around the Stark Creek Trail (SCE 2025b).
Circus cyaneus northern harrier	BCC	–	CSC	A common winter visitor in southern California, but an increasingly rare breeding species in the region. Nests on the ground in marshes or grassy meadows. Feed on ground-dwelling mammals and other prey. They are migratory birds that spend winters in California.	**Known to occur.** An individual was observed during the TERR 2 TM studies around the Kern River No. 1 Powerhouse. The study area provides suitable foraging habitat for this species.
Falco peregrinus anatum American peregrine falcon	FD	–	CD	Very uncommon breeding resident and uncommon as a migrant. Breeds in woodlands, forests, coastal habitats, and riparian areas near wetlands, lakes, rivers, or other water on high cliffs, banks, dunes, or mounds. Active nesting sites are known along the coast, in the Sierra Nevada, and in the mountains of northern California. Migrants occur along the coast and the western Sierra Nevada in spring and fall.	**Known to occur.** An individual was observed during the TERR 2 TM studies along the Kern River upstream of Conduit No. 3. The study area provides suitable nesting and foraging habitat for this species.
Gymnogyps californianus California condor	FE	–	CE, CFP	Endangered, permanent resident of the semi-arid, rugged mountain ranges surrounding the southern San Joaquin Valley, including the Coast Ranges from Santa Clara County south to Los Angeles County, the Transverse Ranges, Tehachapi Mountains, and southern Sierra Nevada. Forages over wide areas of open rangelands, roosts on cliffs and in large trees and snags. Found mostly below 9,000 feet. Nests in caves, crevices, or sandstone ledges, typically at elevations below 6,500 feet.	**Known to occur.** A nesting pair is known to be present in Sequoia National Forest, in the vicinity of the Forebay (Forest Service 2018).

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Scientific/Common Name	Federal Status	SQF Status	State Status	Habitat	Likelihood for Occurrence
Dryobates albolarvatus White-headed woodpecker	BCC	–	–	Unusual resident restricted to mountainous pine forests in the western U.S. Feed heavily on large pine seeds and are mostly associated with old-growth ponderosa pine and sugar pine forests. They also often use recently burned areas.	**Known to occur.** One individual was observed in a foothill pine along Willow Spring Creek Road (Democrat Dam Road) during studies for the TERR 2 TM (SCE 2025b).
Passerculus sandwichensis Savannah sparrow	BCC	–	–	Found in open fields and meadows, pastures, meadows, salt marshes, prairies, dunes, and shores. Breeds in open areas with low vegetation such as grassland, marsh, and farmland. In winter they can be found on the ground, in low vegetation, and in open areas along road edges or farm adjacent.	**Known to occur.** Four adults were observed along Stark Creek Road during studies for the TERR 2 TM (SCE 2025b).
Baeolophus inornatus Oak titmouse	BCC	–	–	Generally found in oak woods, pinyon-juniper, river woods, shade trees. Most commonly occurs in oak woodland, including areas where oaks meet streamside trees or pines. They can also be found in well-wooded suburbs and rarely in coniferous forest in mountains. In the interior, also occurs in some woodlands dominated by pine, mixed oak-pine, or juniper.	**Known to occur.** An individual was observed along Stark Creek Road during studies for the TERR 2 TM (SCE 2025b).
Icterus bullockii Bullock's oriole	BCC	–	–	Common summer resident in the west where it is found in forest edges, farmyards, leafy suburbs, isolated groves, oak or mesquite woodlands, and streamside woods, especially in cottonwood trees It can also be found in shrublands, savannahs, and thickets. Winters mostly in the tropics.	**Known to occur.** This species was observed on six different occasions during studies for the TERR 2 TM (SCE 2025b). • One female along the trail to Adit 14 & 15 was observed carrying nesting material into crevasse of a tree and emerged without materials. • A pair was seen along the trail to Adit 14 & 15 displaying nesting behavior. • Three mated pairs were seen along Dougherty Creek Trail showing nesting behavior and defending certain trees from other pairs. • One adult was seen near Conduit No. 8. • One adult was seen near Adit 12 & 13. • One adult was seen in the Democrat Dam Impoundment area along the north shore across from the island.
Spinus lawrencei Lawrence's goldfinch	BCC	–	–	Nests in oak woodlands with scattered meadows, weedy fields, or chaparral with a nearby water source. Non-breeding birds are found in coastal scrub, pinyon pine–juniper woodlands, thickets, desert arroyos, cultivated fields, orchards, gardens, and parks.	**Known to occur.** This species was observed during studies for the TERR 2 TM near Lucas Creek Flume No. 4 (SCE 2025b).
Mammals					
Antrozous pallidus pallid bat	–	–	CSC	Grasslands, shrublands, woodlands, and forests from sea level to 10,000 feet in elevation. Typically, day roosts in caves, crevices, or mines. Night roosts are in more open areas. Requires open habitat for foraging. Pallid bat hibernates in winter. The maternity season is April – July.	**Known to occur.** The species was detected near Adit 13 & 14 utilizing acoustic recording equipment during studies for the TERR 2 TM in July and October (SCE 2025b).
Corynorhinus townsendii Townsend's big-eared bat	–	FSCC	CSC	Found in all but alpine and subalpine habitats; most abundant in mesic habitats up to 6,000 feet in elevation. Requires caves, mines, tunnels, buildings, or other man-made structures for roosting. Hibernates October through April. Locally migratory only. Extremely sensitive to disturbance and may abandon a roost if disturbed.	**Known to occur.** A NRIS query yielded detections at three mines shown on **Map 7.5-3**, including one mine located just east of the Willow Spring Creek Road (also referred to as the Democrat Dam Road) (Forest Service 2022, FERC 1998). CNDDB also reports a 1993 observation within the mine (CNDDB 2025).

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Scientific/Common Name	Federal Status	SQF Status	State Status	Habitat	Likelihood for Occurrence
Eumops perotis californicus western mastiff bat	–	–	CSC	Found in variety of habitats including desert scrub, chaparral, oak woodland, ponderosa pine, meadows and mixed conifer forests up to 4,600 feet in elevation. Distribution is likely limited by availability of significant rock features offering suitable roosting habitat.	**Known to occur.** A large roost colony was observed near the intake at Democrat Dam during the TERR 2 TM studies (SCE 2025b). The roost site is accessed through SCE's locked gate to the intake. The species was also detected near the Kern River No. 1 Powerhouse, Adit 13 & 14, and the Democrat Dam utilizing acoustic recording equipment and at the gaging station by Cow Flat Creek through guano analysis during studies for the TERR 2 TM in July and October (SCE 2025b). A CNDDB query yielded two additional records for this species within the study area (CNDDB 2025): • A 1963 detection near the confluence of Cow Flat Creek and Kern River; • A 1992 detection (updated 2006) of a roost located at the Democrat Dam Hotspring; and • A 1992 detection approximately 0.5 mile downstream of Democrat Dam.
Lasiurus frantzii western red bat	–	–	CSC	Roosts in forests and woodlands from seal level up through mixed mesic conifer forests in coastal ranges and the Sierra Nevada. Forages in a variety of habitats including croplands, grasslands, shrublands, and open woodlands and forests. Prefers solitary roosts in trees and occasionally shrubs.	**Known to occur.** The species was detected near the Kern River No. 1 Powerhouse, Adit 13 & 14, and the Democrat Dam area utilizing acoustic recording equipment during studies for the TERR 2 TM in July and October (SCE 2025b).
Myotis thysanodes fringed myotis	–	FSCC	CSC	Optimal habitats are pinyon-juniper, valley foothill hardwood, and hardwood-conifer, generally at elevations of 4,000 to 7,000 feet in elevation. Roosts in caves, mines, buildings, and crevices. Separate day and night roosts may be used. Uses open habitats, early successional stages, streams, lakes, and ponds as foraging areas. Migratory species, making relatively short, local movements to suitable hibernacula.	**Known to occur.** This species was detected near Adit 13 & 14 utilizing acoustic recording equipment during the studies for the TERR 2 TM in October (SCE 2025b). A CNDDB query yielded one record, a 1992 detection, at the mine located just east of the Willow Spring Creek Road (also referred to as the Democrat Dam Road) (see Townsend's big-eared bat, above) (CNDDB 2025).
May Potentially Occur in the Study Area					
Terrestrial Invertebrates					
Bombus occidentalis Western bumble bee	–	–	CC	The historical range of the western bumble bee (*Bombus occidentalis*) includes most of western North America. This species is dependent on continuous access to meadows with floral resources from spring through late summer within 0.3 to 0.5 mile of burrowing nests.	**May potentially occur.** Three individual bumble bees belonging to the genus *Bombus* were observed during wildlife surveys in conjunction with the TERR 2 TM (SCE 2025b). These individuals could not be identified down to a species level. The study area contains suitable habitat for this species.
Amphibians					
Spea hammondii western spadefoot	FPT	–	CSC	Prefers open areas with sandy or gravelly soils, in a variety of habitats such as mixed woodlands, grasslands, coastal sage scrub, chaparral, sandy washes, lowlands, river floodplains, alluvial fans, playas, alkali flats, and mountains. Requires ephemeral rainpools without non-native predators for breeding. Up to 4,500 feet in the southern Sierra foothills.	**May potentially occur.** The study area contains suitable habitat for this species.
Reptiles					
Arizona elegans occidentalis California glossy snake	–	–	CSC	Found in arid scrubby areas, rocky washes, grasslands, and chaparral in southern Sierra Nevada foothills and coast ranges. Ranges from the eastern San Francisco Bay area south to Baja California.	**May potentially occur.** The study area contains suitable habitat for this species.
Masticophis flagellum ruddocki San Joaquin whipsnake	–	–	CSC	Found in open, dry, treeless areas with little or no cover, including valley grasslands and saltbush scrub. Hides in rodent burrows, shaded vegetation, and under surface objects.	**May potentially occur.** The study area contains suitable habitat for this species.

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Scientific/Common Name	Federal Status	SQF Status	State Status	Habitat	Likelihood for Occurrence
Xantusia vigilis sierrae Sierra night lizard	–	–	CSC	Found in the Greenhorn mountains in the southwest Sierra Nevada. It is found in association with yucca, foothill pine, chamise, pinyon pine, and juniper. Can be found under yucca logs and other cover. Occurs at elevations of 990 to 6,800 feet. Activity may begin in early April at low elevations and last until early fall, while emergence may be retarded until late springs at higher elevations.	**May potentially occur.** The study area contains suitable habitat for this species.
Birds					
Agelaius tricolor tricolored blackbird	BCC	FSCC	CT	Breeding habitat includes dense riparian vegetation with nearby accessible water and suitable foraging space for insect prey within a few kilometers of the nesting colony. Often forms large breeding colonies. Wintering habitat includes grasslands and agricultural fields with low-growing vegetation.	**May potentially occur.** Suitable emergent wetland nesting habitat is not present in the study area. Suitable grassland wintering habitat is present.
Ammodramus savannarum grasshopper sparrow	–	–	CSC	Grassland habitats with dense escape cover and tall herbaceous plants for perches.	**May potentially occur.** The study area contains suitable habitat for this species.
Asio otus Long-eared owl	BCC	–	CSC	Requires a combination of grassland or other open habitat for foraging, and dense tall shrubs or trees for nesting and roosting. Winter roosting owls can be found in pine stands or shelterbelts near grassland or pasture.	**May potentially occur.** The study area contains suitable habitat for this species.
Chaetura vauxi Vaux's swift	–	–	CT	Fairly common in the coast ranges north of Sonoma County, in the Sierra Nevada, and Cascade Range. Nests in redwood and Douglas-fir habitats in large hollow trees and snags. Forages in open areas and over water.	**May potentially occur.** The study area contains suitable foraging habitat for this species.
Empidonax traillii extimus southwestern willow flycatcher	FE	–	CE	Found only in southern California, this species breeds in dense riparian tree and shrubs associated with rivers, swamps, wetlands, lakes, and other large water bodies at elevations ranging from 2,000 to 8,500 feet. Riparian habitat must be at least 0.25 acre in size and 30 feet wide to support nesting.	**May potentially occur.** The study area contains suitable foraging habitat for this species. The study area does not contain suitable nesting habitat. Known to breed at the Audubon Reserve at Lake Isabella (SCE 2012).
Falco mexicanus prairie falcon	–	–	WL	Nests on high cliff faces and requires open terrain for foraging. Occurs in annual grasslands, alpine meadows, but primarily associated with perennial grasslands, savannahs, rangeland, agricultural fields, and desert scrub. Not found in upper elevations of Sierra Nevada.	**May potentially occur.** The study area contains suitable foraging habitat. A nest site was observed in upper Stark Canyon in 1992 (SCE 1994).
Icteria virens yellow-breasted chat	–	–	CSC	An uncommon summer resident and migrant in coastal California and the foothills of the Sierra Nevada. Breeds in valley foothill riparian and desert riparian habitats. Requires riparian thickets of willow and brushy tangles near watercourses for cover. Found at elevations up to 4,800 feet in valley foothill riparian habitats and up to 6,500 feet in the eastern Sierra Nevada.	**May potentially occur.** The study area contains suitable nesting and foraging habitat for this species.
Lanius ludovicianus loggerhead shrike	–	–	CSC	Prefers open habitats with scattered shrubs, trees, posts, fences, utility lines, or other perches in the lowlands and foothills throughout California.	**May potentially occur.** The study area contains suitable nesting and foraging habitat for this species.
Progne subis purple martin	–	–	CSC	An uncommon, local summer resident in wooded low- to mid-elevation habitats. Found in valley foothill, montane hardwood, montane hardwood-conifer, and riparian habitats. Nests in tall, old trees near an open body of water, and occasionally in residential areas.	**May potentially occur.** The study area contains suitable nesting and foraging habitat for this species.
Setophaga petechica yellow warbler	–	–	CSC	Breeds in riparian woodlands from coastal and desert lowlands at elevations up to 8,000 feet in the Sierra Nevada. Also breeds in montane chaparral, open ponderosa pine, and mixed conifer habitats with substantial amounts of brush.	**May potentially occur.** The study area contains suitable nesting and foraging habitat for this species.

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Scientific/Common Name	Federal Status	SQF Status	State Status	Habitat	Likelihood for Occurrence
Strix occidentalis occidentalis California spotted owl	FPT	–	CSC	Dense, old-growth, multi-layered mixed conifer, redwood, Douglas-fir, and oak woodland habitats in the western slope of the Sierra Nevada, from sea level to elevations of approximately 7,600 feet.	**May potentially occur.** The FERC Project boundary does not contain suitable nesting habitat. Suitable foraging habitat is present in the study area. A NRIS query yielded 11 records for this species within 1 mile of the Project: • Three detections south of the confluence of Dougherty Creek and Kern River, with one occurring in 1990 and two in 1991; • Five detections northwest of the confluence of Dougherty Creek and Kern River, occurring in 1975, 1983, 1985, 1986, and 1987; • A 1991 detection located approximately 0.25 mile east of the confluence of Lucas Creek and Kern River; • A 1990 detection located approximately 0.5 mile southeast of the confluence of Cow Flat Creek and Kern River; and • A PAC located approximately 0.75 mile north of Democrat Dam.
Mammals					
Bassariscus astutus Ringtail	–	–	CFP	Found in most forest and shrub habitats in close association with rocky and/or riparian areas, usually not more than 0.6 mile from water. Dens in hollow trees, snags, or other cavities.	**May potentially occur.** The study area supports potential habitat for this species.
Euderma maculatum spotted bat	–	–	CSC	A widespread, but rare species throughout the western United States. Found in habitats that range from deserts to yellow pine forest. Roosts in caves, rocky crevices and snags and requires open water.	**May potentially occur.** The study area supports potential roosting and foraging habitat.
Onychomys torridus tularensis Tulare grasshopper mouse	–	–	CSC	Habitats include compact soils with a sparse growth of perennial grasses; blue oak savannas; desert scrub associations composed of grasses and shrubs; valley sink and saltbush scrub communities on the valley floor; and valley grassland. The historic range of the Tulare grasshopper mouse extended along the foothills and floor of the southern San Joaquin Valley from western Merced and eastern San Benito counties, east to Madera County, and south to the foothills of the Tehachapi and San Emigdio mountains. It also occurs on the Carrizo Plain in eastern San Luis Obispo County, Cuyama Valley, Caliente Creek Wash in southern Kern County, Weldon and Kelso Valley in northeastern Kern County, the Tulare Basin, and the Panoche Valley. Elevation range is between 279 to 2,650 feet.	**May potentially occur.** The study area contains suitable grassland habitat for this species.
Taxidea taxus American badger	–	–	CSC	This species is considered a furbearing mammal under the California Fish and Wildlife Code. Occurs throughout most of the state in areas with dry, friable soils. It is most abundant in drier open stages of most shrub, forest, and herbaceous habitats up to 12,000 feet in elevation.	**May potentially occur.** The study area contains suitable grassland habitat for this species.
Vulpes macrotis mutica San Joaquin kit fox	FE	–	CT	Grasslands and shrubland areas in the San Joaquin Valley with friable soils for building underground dens. Denning begins around September, mating occurs from December to March, and pups are born February through April. Critical Habitat has not been designated for this species.	**May potentially occur.** The study area contains suitable habitat for this species.
Unlikely to Occur in the Study Area					
Terrestrial Invertebrates					
Desmocerus californicus dimorphus valley elderberry longhorn beetle	FT	–	–	Central valley riparian forests and adjacent upland vegetation along river corridors, in close association with elderberry (*Sambucus* spp.) plants.	**Unlikely to occur.** The study area supports appropriate habitat for this species. However, on September 17, 2014, USFWS revised the range for this species to exclude Kings, Kern, and Tulare counties.

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Scientific/Common Name	Federal Status	SQF Status	State Status	Habitat	Likelihood for Occurrence
Euproserpinus euterpe Kern primrose sphinx moth	FT	–	–	Presently known only from the Walker Basin area (4,500 feet elevation), where it occurs on sandy soils wherever its larval foodplant, *Camissonia contorta epilobiodes* grows. This plant grows in dry, disturbed, or gravelly cismontane areas below 5,000 feet elevation and has been associated with several plant communities and ranges from Baja to central California (SCE 1994).	**Unlikely to occur.** SCE conducted field surveys for the moth's larval foodplant to support the previous license application. No *Camissonia contorta epilobiodes* populations were identified in the study area (SCE 1994).
Apodemia virgulti davenporti Behr's metalmark	–	FSCC	–	Known only from the southern Sierra Nevada. Found along the Kern River in Tulare County, Southern Greenhorn Mountains, and Piute Mountains in Kern County between 4,000 to 6,000 feet in elevation. Larvae feed on *Eriogonum fasciculatum* host plants.	**Unlikely to occur.** The study area is outside the elevation range of this species.
Plebejus icarioides evius Evius blue	–	FSCC	–	Found in forest clearings, meadows, stream margins, and edge habitat with lupine host plants. Generally found in montane areas at intermediate elevations. Known from the Greenhorn Mountains at Shirley Meadows in Kern County.	**Unlikely to occur.** The study area is outside the geographic range of this species and does not contain suitable habitat.
Plebejus saepiolus aehaja greenish blue	–	FSCC	–	Found in wet meadow habitats on the Kern Plateau and the Greenhorn Mountains. Uses *Trifolium* spp. as host plants.	**Unlikely to occur.** The study area is outside the geographic range of this species and does not contain suitable habitat.
Speyeria egleis tehachapina Tehachapi Mountain silverspot	–	FSCC	–	Found only in Kern County in the Tehachapi and Piute Mountains at elevations between 7,000 and 8,400 feet in elevation. Found in montane meadows, forest openings, and rocky outcrops where host *Viola* spp. occurs.	**Unlikely to occur.** The study area is outside the geographic range of this species.
Aquatic Invertebrates					
Branchinecta lynchi vernal pool fairy shrimp	FT	–	–	Vernal pool ecosystems that hold water for a minimum of 18 days, but not permanently flooded emergent wetlands.	**Unlikely to occur.** Suitable vernal pool habitat is not present within the study area. The study area is outside of designated Critical Habitat.
Amphibians					
Batrachoseps bramei fairview slender salamander	–	FSCC	–	Occurs in north-facing talus-covered slopes in narrow canyons where areas are moist and cool in the spring. Endemic to California.	**Unlikely to occur.** The study area is outside the geographic range of this species.
Batrachoseps robustus Kern Plateau salamander	–	FSCC	–	Occurs in moist habitats of pine and fir forests. In drier habitats, occur in pinon pine, sagebrush, and oaks. Found under leaf litter, logs, rocks near springs and streams.	**Unlikely to occur.** The study area is outside the geographic range of this species.
Reptiles					
Anniella grinnelli Bakersfield legless lizard	–	–	CSC	Found in loose soil within sparsely vegetated areas of beach dunes, chaparral, woodlands, desert scrub, sandy washes, and stream terraces. Restricted to the southern San Joaquin Valley and the eastern Carrizo Plain.	**Unlikely to occur**. The study area is outside the geographic range for this species.
Gambelia silus blunt-nosed leopard lizard	FE	–	CE, CFP	Found in flat, open, sparsely vegetated alkali scrub and desert habitats below 2,400 feet in elevation, within the San Joaquin Valley and adjacent foothills. USFWS has not designated Critical Habitat for this species.	**Unlikely to occur.** The study area does not contain suitable habitat for this species.
Thamnophis gigas giant garter snake	FT	–	CT	Uses a wide variety of habitats within the Californian Central Valley including forests, mixed woodlands, grasslands, chaparral, and agricultural lands. Often occurs near aquatic habitat including ponds, marshes, and streams where it freely retreats to when alarmed.	**Unlikely to occur.** The study area does not contain suitable habitat for this species.
Birds					
Agelaius phoeniceus aciculatus Kern red-winged blackbird	–	FSCC	CSC	Known from east central Kern County, in the Walker Basin and on the South Fork of the Kern River in marshes on the east end of Lake Isabella. Prefers marshy meadows, emergent wetlands, and lagoons with large growths of cattails and sedges.	**Unlikely to occur.** The study area does not contain suitable emergent wetland habitat for this species.

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Scientific/Common Name	Federal Status	SQF Status	State Status	Habitat	Likelihood for Occurrence
Astur atricapillus American goshawk	–	FSCC	CSC	Middle to high elevation, mature, dense conifer forests for foraging and nesting. Casual in foothills during winter, northern deserts in pinyon-juniper woodland, and low-elevation riparian habitats.	**Unlikely to occur.** The study area does not contain suitable habitat for this species.
Athene cunicularia burrowing owl	–	–	CSC	Breeding habitat includes rodent burrows in sparse grassland, desert, and agricultural habitats. They require open, sparsely vegetated areas on mostly level terrain with an abundance of active small mammal burrow. Found in lowlands throughout California.	**Unlikely to occur.** The study area does not contain suitable habitat (level terrain) for this species.
Strix nebulosa great gray owl	–	FSCC	CE	Nests in old-growth coniferous forests and forages in montane meadows. Distribution includes high elevations of the Sierra Nevada and Cascade ranges, from 4,500 to 7,500 feet in elevation.	**Unlikely to occur**. The study area is outside the elevation range of this species.
Dendragapus fuliginosus howardi Mount Pinos sooty grouse	–	FSCC	CSC	Found in high-elevation conifer forest in the spring for hooting sites that contain open pine/fir forests at elevations of 6,000 to 10,000 feet.	**Unlikely to occur.** The study area is outside the elevation range of this species.
Contopus cooperi olive-sided flycatcher	BCC	–	CSC	Uncommon to common, summer resident in a wide variety of forest and woodland habitats. Nesting habitats include mixed conifer, montane hardwood-conifer, Douglas-fir, redwood, red fir, and lodgepole pine forests from 3,000 to 9,000 feet in elevation.	**Unlikely to occur.** The study area does not contain suitable habitat for this species.
Empidonax traillii adastus willow flycatcher	–	FSCC	CE	Found in the Great Basin and central Rocky Mountains south to Utah and Colorado. Found in a variety of shrubby habitats, but particularly montane riparian habitat with extensive growth of willows.	**Unlikely to occur.** The study area is outside the geographic range of this species.
Empidonax traillii brewsteri little willow flycatcher	–	–	–	Summer resident in wet meadow and montane riparian habitats at 2,000 to 8,000 feet in the Sierra Nevada. Most often occurs in broad, open river valleys or large mountain meadows with lush growth of shrubby willows. Requires meadows at least 1 acre in size for breeding, prefers meadows larger than 10 acres (Green et al. 2003).	**Unlikely to occur.** The study area does not contain suitable wet meadow habitat for this species.
Melospiza melodia graminea *Channel Island song sparrow* *(Santa Barbara song sparrow)*	BCC	–	CSC	Limited to San Miguel and Santa Rosa Island. It is also a transient visitor in the spring and fall to Anacapa Island. It was a former resident of Santa Barbara Island where it was driven to extinction. Sparrow most often inhabiting shrubs on moist ground near freshwater, saltwater or coastline. On San Miguel and Santa Rosa, they have been found to be most abundant in areas with dense shrubs, and unlike on the mainland, were found in areas well-removed from water. They strongly prefer coastal sage scrub and grassland, while avoiding chaparral, woodland and pine habitats.	**Unlikely to occur.** The study area is outside the geographic range of this species.
Vireo bellii pusillus Least Bell's vireo	FE	–	CE	Breeds in riparian habitats (typically in dense willows) in the southwestern U.S. Winters in Baja California. Its distribution includes cismontane southern California (most breeding pairs occur in San Diego County) extending north up to the Owens Valley and east into Death Valley National Park.	**Unlikely to occur.** The study area is outside the geographic range and does not contain suitable riparian habitat for this species.
Mammals					
Dipodomys nitratoides nitratoides Tipton kangaroo rat	FE	–	CE	Tipton kangaroo rats are limited to arid-land communities occupying the Valley floor of the Tulare Basin in level or nearly level terrain. They are currently found in scattered, isolated areas clustered in low-elevation valleys of Tulare and Kern County. USFWS has not designated Critical Habitat for this species.	**Unlikely to occur.** The study area is outside the geographic range for this species and does not contain suitable habitat.
Dipodomys ingens giant kangaroo rat	FE	–	CE	Found in dry, sandy grasslands. Found only in isolated areas west of the San Joaquin Valley, including the Carrizo Plain, Elkhorn Plain, and Kettleman Hills.	**Unlikely to occur.** The study area is outside the geographic range for this species.

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Scientific/Common Name	Federal Status	SQF Status	State Status	Habitat	Likelihood for Occurrence
Ammospermophilus nelsoni Nelson's (=San Joaquin) antelope ground squirrel	–	–	CT	Found in the western San Joaquin Valley from southern Merced County south to Kern County. Historical populations in eastern Kern County foothills are thought to be extirpated. Prefers areas with sandy loam soils, alkali scrub vegetation, and dry washes, at elevations of 200 to 1,200 feet.	**Unlikely to occur.** The study area is outside the geographic range of this species.
Martes caurina sierrae Sierra marten	–	FSCC	–	Martens are known from the high-elevation forested plant communities. Optimal habitats are various mixed evergreen forests with more than 40% crown closure and large trees and snags for den sites. Most commonly found in red fir and lodgepole pine forests between 4,000 and 10,600 feet elevation.	**Unlikely to occur.** The study area is outside the elevation range of this species.
Pekania pennanti fisher — Southern Sierra Nevada DPS	FE	–	CT, CSC	Large areas of mature, dense forest red fir, lodgepole pine, ponderosa pine, mixed conifer, and Jeffery pine forests with snags and greater than 50% canopy closure. Known from elevations of 4,000 to 8,000 feet.	**Unlikely to occur.** The study area is outside the elevation range and lacks suitable habitat for this species.

Federal Status
BCC = Bird of Conservation Concern
Eagle Act = Bald and Golden Eagle Protection Act
FC = Federal Candidate
FD = Federally Delisted
FE = Federal Endangered
FPT = Federally Proposed Threatened
FT = Federal Threatened

State Status
CFP = California Fully Protected
CSC = California Species of Concern
CC = California Candidate
CT = California Threatened
CE = California Endangered
CD = California Delisted
WL = Watch List

SQF Status
FSCC = Sequoia National Forest Species of Conservation Concern

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Table 7.5-7. Summary of Special-Status and Common Bat Species and Associated Detection Methods

Common Name (Abbreviation on Map 7.5-9)	Scientific Name	Status	Facility Where Bat was Detected1	Survey Method/Detection Type					
				Roost Type			Reproductive Acoustic Detection(s)	Guano Detection(s)	Seasonal Acoustic Detection(s)
				Maternal	Day	Night			
Special-Status Bat Species									
Pallid bat (ANPA)	*Antrozous pallidus*	CSC	Stark Creek Area Acoustic Device				X		X
Western mastiff bat (EUPE)	*Eumops perotis*	CSC	Democrat Dam Area Acoustic Device				X		X
			Democrat Dam Access Walkway		X	X			
			Cow Flat Creek - Gaging Station			X		X	
			Stark Creek Area Acoustic Device				X		X
			Kern River No. 1 Powerhouse Area Acoustic Device				X		X
Western red bat (LAFR)	*Lasiurus frantzii* – (formerly *blossevillii*)	CSC	Democrat Dam Area Acoustic Device				X		
			Stark Creek Area Acoustic Device				X		X
			Kern River No. 1 Powerhouse Area Acoustic Device				X		X
Fringed myotis (MYTH)	*Myotis thysanodes*	FSCC	Stark Creek Area Acoustic Device						X
			Stark Creek - Adit 13 & 14		X*	X*		X*	X
Common Bat Species									
Big brown bat (EPFU)	*Eptesicus fuscus*	–	Democrat Dam Area Acoustic Device				X		
			Kern River No. 1 Powerhouse Area Acoustic Device				X		
			Kern River No. 1 Powerhouse	X	X	X			
Hoary bat (LACI)	*Lasiurus cinereus*	–	Democrat Dam Area Acoustic Device				X		
Hoary bat (LACI)	*Lasiurus cinereus*	–	Stark Creek Area Acoustic Device				X		X
		–	Kern River No. 1 Powerhouse Area Acoustic Device						X
Silver-haired bat (LANO)	*Lasionycteris noctivagans*	–	Kern River No. 1 Powerhouse Area Acoustic Device				X		
California myotis (MYCA)	*Myotis californicus*	–	Democrat Dam Area Acoustic Device				X		
			Democrat Dam Access Walkway			X		X	
			Lucas Creek - Flume No. 4			X		X	
			Stark Creek Area Acoustic Device				X		X
			Kern River No. 1 Powerhouse Area Acoustic Device				X		X
Small-footed myotis (MYCI)	*Myotis ciliolabrum*	–	Democrat Dam Area Acoustic Device				X		
			Stark Creek Area Acoustic Device				X		
Long-eared myotis (MYEV)	*Myotis evotis*	–	Stark Creek Area Acoustic Device				X		
			Stark Creek - Adit 13 & 14		X*	X*		X*	

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Common Name (Abbreviation on Map 7.5-9)	Scientific Name	Status	Facility Where Bat was Detected1	Survey Method/Detection Type					
				Roost Type			Reproductive Acoustic Detection(s)	Guano Detection(s)	Seasonal Acoustic Detection(s)
				Maternal	Day	Night			
Little brown bat (MYLU)	*Myotis lucifugus*	–	Stark Creek - Adit 13 & 14		X*	X*		X*	
Long-legged myotis (MYVO)	*Myotis volans*	–	Lucas Creek - Flume No. 4			X		X	
Yuma myotis (MYYU)	*Myotis yumanensis*	–	Democrat Dam Area Acoustic Device				X		
			Democrat Dam - Intake Gatehouse			X		X	
			Cow Flat Creek - Gaging Station			X		X	
			Lucas Creek - Flume No. 4			X		X	
			Stark Creek Area Acoustic Device				X		X
			Kern River No. 1 Powerhouse Area Acoustic Device				X		X
			Kern River No. 1 Powerhouse	X	X	X		X	
Canyon bat (PAHE)	*Parastrellus hesperus*	–	Democrat Dam Area Acoustic Device				X		
			Stark Creek Area Acoustic Device				X		X
			Kern River No. 1 Powerhouse Area Acoustic Device				X		X
Mexican free-tailed bat (TABR)	*Tadarida brasiliensis*	–	Democrat Dam Area Acoustic Device				X		
			Stark Creek Area Acoustic Device				X		X
			Kern River No. 1 Powerhouse Area Acoustic Device						X

Notes: [1] The acoustic devices at the Powerhouse and Democrat Dam covered multiple Project facilities.
Key: * = Indicates that the guano analysis indicated more than one potential species.

Democrat Dam Area Acoustic Device
Democrat Dam (partial)
Intake Gatehouse
Drainage Tower
Conduit No. 1
Drainage Tunnel Outlet
Democrat Dam Access Walkway
Flume No. 1 (partial)

Kern River No. 1 Powerhouse Area Acoustic Device
Kern River No. 1 Powerhouse
Kern River No. 1 Switchyard
Machine Shop
Restroom
Garage No. 1
Garage No. 2
Old Admin Building
Old Ice House
Aerial Tram Hoist House

State Status
CSC = California Species of Concern

SQF Status
FSCC = Sequoia National Forest Species of Conservation Concern

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Table 7.5-8. Game Species Potentially Occurring in the Vicinity of the Kern River No. 1 Hydroelectric Project

Species	Status	Habitat	General Season	Bag Limit	Possession Limit	Hunting Restrictions
Resident Game Birds						
Phasianus colchicus Ring-necked pheasant	–	Common to uncommon introduced species. Occurs in scattered locations throughout the state, centered in the Central Valley. Dependent on crop lands with adjacent herbaceous and woody cover; also in perennial grasslands with sufficient cover.	November 12–December 25	2 males per day for first two days of the season; 3 males per day after the first two days of the season.	Triple the daily bag limit	Hunting license is required.
Meleagris gallopavo Wild turkey	–	Found mostly in deciduous riparian, oak, and conifer-oak woodlands. Prefers rugged, hilly terrain with low to intermediate canopy, interspersed with numerous grass/forb openings, near water.	Fall season: November 12–December 11 Spring Season: the last Saturday in March extending for 37 consecutive days	Fall Season: 1 either-sex turkey per day. Spring Season: 1 bearded turkey per day	Fall Season: 2 per season Spring Season: 3 per season	Hunting license is required. No use of motor vehicles to drive birds toward target. No use of mammal (or imitation) as blind. No take of nests or eggs. No use of practice dogs on birds outside of season. Must use ten-gauge shotgun or smaller, and no shot size larger than No. 2.
Oreotyx pictus Mountain quail	–	Common to uncommon resident, found typically in most major montane habitats of the state. Found seasonally in open, brushy stands of conifer and deciduous forest, woodland, and chaparral.	Zones Q3: October 15–January 29	10 per day	Triple the daily bag limit	Hunting license is required. No use of motor vehicles to drive birds toward target. No use of mammal (or imitation) as blind. No take of nests or eggs. No use practice dogs on birds outside of season. Must use ten-gauge shotgun or smaller, and no shot size larger than BB.
Callipepla californica California quail	–	Common, permanent resident of low and middle elevations. Found in shrub, scrub, and brush, open stages of conifer and deciduous habitats, and margins of grasslands and croplands.	Zones Q3: October 15–January 29	10 per day	Triple the daily bag limit	
Migratory Game Birds						
Gallinago delicata Wilson's snipe	–	Fairly common winter visitor from October to April on wet meadow and short, emergent wetland habitats throughout much of California.	The third Saturday in October extending for 107 days	8 per day	Triple the daily bag limit	Hunting license and state duck tag are required. No use of motor vehicles to drive birds toward target. No use of mammal (or imitation) as blind. No take of nests or eggs. No use practice dogs on birds outside of season. Must use ten-gauge shotgun or smaller, and no shot size larger than BB.
Columba fasciata Band-tailed pigeon	–	Common resident in hardwood and hardwood-conifer habitats. Inhabits lower slopes of major mountain ranges of the state.	The third Saturday in December extending for 9 consecutive days	2 per day	Triple the daily bag limit	Hunting license and state duck tag are required. No use of motor vehicles to drive birds toward target. No use of mammal (or imitation) as blind. No take of nests or eggs. No use of practice dogs on birds outside of season. Must use ten-gauge shotgun or smaller, and no shot size larger than BB.
Zenaida macroura Mourning dove	–	Open woodlands, grasslands, croplands, open hardwood, hardwood-conifer, riparian, low-elevation conifer, and deserts all provide adequate habitat. Requires a nearby water source.	September 1–15 and November 12–December 26	15 doves, up to 10 may be white winged	Triple the daily bag limit	Hunting license and state duck tag are required. No use of motor vehicles to drive birds toward target. No use of mammal (or imitation) as blind. No take of nests or eggs. No use of practice dogs on birds outside of season. Must use ten-gauge shotgun or smaller, and no shot size larger than BB.

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Species	Status	Habitat	General Season	Bag Limit	Possession Limit	Hunting Restrictions
Mammals						
Mustela frenata Long-tailed weasel	–	This species is considered a nongame mammal under the California Fish and Wildlife Code. Common to uncommon, permanent resident of most habitats, except xeric brush, shrub, and scrub in the Mojave and Colorado deserts. Mostly uses intermediate cover stages of conifer and deciduous habitats, interspersed with lower seral stages and open forest, woodland areas and shrubs, from sea level to alpine meadows.	All Year	No limit	No limit	Hunting license is required. May use firearms, bow and arrow, poison under special permit, and approved traps with trapping permit. Dogs permitted.
Sus scrufa Wild pig	–	This species is considered a big game mammal under the California Fish and Wildlife Code. Wild pigs currently exist in 56 of the state's 58 counties and can be found in a variety of habitats ranging from woodland, chaparral, meadow and grasslands. Wild pigs are omnivorous, consuming both plant and animal matter. In general, wild pigs feed on: grasses and forbs in the spring; mast and fruits in the summer and fall; and roots, tubers and invertebrates throughout the year.	All Year	No limit	No limit	Requires hunting license and hunting tags.
Ursus americanus Black bear	–	This species is considered a big game mammal under the California Fish and Wildlife Code. Widespread, common to uncommon resident occurring from sea level to high mountain regions. Occurs in fairly dense, mature stands of many forest habitats, and feeds in a variety of habitats including brushy stands of forest, valley foothill riparian, and wet meadow.	Opening day of deer season extends through December 25. General bear season closes on last Sunday in December or earlier, if the Department determines that 1,700 bears have been reported taken. This includes bears harvested during the archery season.	1 adult/season/tag	1 adult/season/tag	Requires hunting license and hunting tags. May use approved rifles, bow and arrow, and approved shotguns. Cubs and females accompanied by cubs may not be taken.
Odocoileus hemionus Mule deer	–	This species is considered a big game mammal under the California Fish and Wildlife Code. Common to abundant, yearlong resident or elevational migrant with a widespread distribution throughout most of California, except in deserts and intensively farmed areas without cover. Prefer a mosaic of vegetation, providing an interspersion of herbaceous openings, dense brush or tree thickets, riparian areas, and abundant edge.	The season in Zone D-8 and Zone D-9 shall open on the fourth Saturday in September and extend for 30 consecutive days.	1 buck/ tag	1 buck/ tag	Requires hunting license and hunting tags. May use approved rifles, bow and arrow, approved shotguns, and crossbows. Only bucks with antlers with demonstrable forks (or greater) may be taken.

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Species	Status	Habitat	General Season	Bag Limit	Possession Limit	Hunting Restrictions
Urocyon cinereoargenteus Gray fox	–	This species is considered a furbearing mammal under the California Fish and Wildlife Code. Uncommon to common permanent resident of low to middle elevations throughout most of the state. Frequents most shrublands, valley foothill riparian, montane riparian, and brush stages of many deciduous and conifer forest and woodland habitats. Also found in meadows and cropland areas. Suitable habitat consists of shrublands, brushy and open-canopied forests, interspersed with riparian areas, providing water.	November 24–the last day of February	No limit	No limit	Hunting license is required. May use firearms, bow and arrow, poison under special permit, and approved traps with trapping permit. Dogs permitted.
Procyon lotor Raccoon	–	This species is considered a furbearing mammal under the California Fish and Wildlife Code. Widespread, common to uncommon permanent resident throughout most of the state. Occurs in all habitats except alpine, and desert types without water; marginal in Great Basin shrub types. Most abundant in riparian and wetland areas at low to middle elevations.	November 16–March 31	No limit	No limit	Hunting license is required. May use firearms, bow and arrow, poison under special permit, and approved traps with trapping permit. Dogs permitted. When taking raccoon after dark, pistols and rifles not larger than.22 caliber rimfire and shotguns using shot no larger than No. BB may be used.
Mustela vison American mink	–	This species is considered a furbearing mammal under the California Fish and Wildlife Code. Uncommon permanent resident, generally occurring in the northern half of the state. Semiaquatic, inhabiting most aquatic habitats, including some coastal areas. Occurs at elevations up to about 2,700 m (9,000 ft).	November 16–March 31	No limit	No limit	Hunting license is required. May use firearms, bow and arrow, poison under special permit, and approved traps with trapping permit. Dogs permitted.
Sciurus griseus Western gray squirrel	–	This species is considered resident small game under the California Fish and Wildlife Code. Fairly common locally in mature stands of most conifer, hardwood, and mixed hardwood-conifer habitats in the Klamath, Cascade, Transverse, Peninsular, and Sierra Nevada Ranges. Dependent upon mature stands of mixed conifer and oak habitats. Closely associated with oaks. Require large trees, mast, and snags.	The second Saturday in September though the last Sunday in January	4 per day	4 in possession	Hunting license is required. Must use ten-gauge shotgun or smaller, and no shot size larger than BB, can use muzzle-loading shotguns, bow and arrow, rifles and pistols, falconry, and crossbows. Dogs permitted.

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Table 7.5-9. Evaluation of Project Powerline Pole Configurations for Consistency with Avian Powerline Interaction Committee Guidelines

Powerline Name	Example Pole ID	Pole Configuration Type[a]	Evaluation Criteria					
			No Avian Electrocution Risk			Potential Risk for Avian Electrocution		
			Communication Lines are Insulated	Powerlines are Insulated	Communication/ Powerlines are Underground	Distance Between Conductors Is Less than 60 Inches	Distance Between Energized and Grounded Equipment on Equipment Poles Is Less than 60 Inches	Metal Guy Wires in Close Proximity to Energized Wires
Erskine 12 kV Distribution Line	DPP – 1	Configuration 1: Single-Phase Single Circuit with Side-Mounting Configuration and Box – End Pole • Lines run from box near the base to pole top, loose wires twined into one line. • Pole top perch available • No crossarms • No phase cover	X	X	–	–	–	–
Erskine 12 kV Distribution Line	DPP – 2	Configuration 2: Single-Phase to Three-Phase with Transformer and Underbuild Construction • Two wooden crossarms • Phase cover • No perch guard.	–	–	–	X	–	–
Erskine 12 kV Distribution Line	DPP – 3	Configuration 3: Three-Phase Single-Circuit with Two Transformers and Underbuild Construction • Pole top perch available • Two wooden crossarms • No phase cover	–	–	–	X	–	–
Erskine 12 kV Distribution Line	DPP – 4	Configuration 4: Three-Phase Single-Circuit Overmount • Single wooden crossarms • No phase covers • No perch guard	–	–	–	X	–	–
Erskine 12 kV Distribution Line	DPP – 5	Configuration 5: Single-Phase Single-Circuit With Top Line • Single pole with single-phase line connected on the top. • Side mount • No loose wires.	X	X	–	–	–	–
Erskine 12 kV Distribution Line	DPP – 6	Configuration 6: Three-Phase Single-Circuit Overmount with Two Close Crossbars • Two wooden crossarms • Phase cover on central line • No phase covers on end caps • No perch guard	–	–	–	X	–	–

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Powerline Name	Example Pole ID	Pole Configuration Type[a]	Evaluation Criteria					
			No Avian Electrocution Risk			Potential Risk for Avian Electrocution		
			Communication Lines are Insulated	Powerlines are Insulated	Communication/ Powerlines are Underground	Distance Between Conductors Is Less than 60 Inches	Distance Between Energized and Grounded Equipment on Equipment Poles Is Less than 60 Inches	Metal Guy Wires in Close Proximity to Energized Wires
Erskine 12 kV Distribution Line	DPP – 7 (+ 9 & 11)	Configuration 7: Three-Phase Single-Circuit Crossarm • One wooden crossarm • Phase cover on center line • No phase covers on end caps • No loose wires	–	–	–	X	–	–
Erskine 12 kV Distribution Line	DPP – 8	Configuration 8: Three-Phase Single-Circuit Underline • Dual wooden crossarms • Pole top perch available • Wires undermount • No phase cover • No loose wires	–	–	–	X	–	–
Erskine 12 kV Distribution Line	DPP – 10	Configuration 9: Three-Phase Single-Circuit Crossarm • Single wooden crossarm • Triangle deterrent between two close wires • No phase cover • No loose wires	–	–	–	X	–	–
Erskine 12 kV Distribution Line	DPP – 12	Configuration 10: Three-Phase Distribution Corner • Two dual wooden crossarms allowing 90-degree directional turn • Phase covers • No loose wires	–	–	–	X	–	–
Erskine 12 kV Distribution Line	DPP – 13	Configuration 11: Three-Phase Transformer Bank • Wooden crossarms • Transformers present • Phase covers • No loose wires	–	–	–	X	X	–
Erskine 12 kV Distribution Line	DPP – 14	Configuration 12: Single-Phase Single-Circuit with Side-Mount • Pole top perch available • Side mount • No loose wires	X	X	–	–	–	–
Erskine 12 kV Distribution Line	DPP – 16 (+ 17)	Configuration 13: Dual-Phase Single-Pole Side Mount • Pole top perch available • Loose wires • Insulated twined with uninsulated wires • Loose or looped wires	–	–	–	–	–	–

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Powerline Name	Example Pole ID	Pole Configuration Type[a]	Evaluation Criteria					
			No Avian Electrocution Risk			Potential Risk for Avian Electrocution		
			Communication Lines are Insulated	Powerlines are Insulated	Communication/ Powerlines are Underground	Distance Between Conductors Is Less than 60 Inches	Distance Between Energized and Grounded Equipment on Equipment Poles Is Less than 60 Inches	Metal Guy Wires in Close Proximity to Energized Wires
Camp 2.4 kV Distribution / Communication Line	PC – 1	Configuration 1: Two-Phase Transformer Bank • Dual wooden crossarms. • Some phase covers • Some wires insulated	–	–	–	X	X	X
Camp 2.4 kV Distribution / Communication Line	PC – 2 (+ 3, 5, & 6)	Configuration 2: Three-Phase Single-Circuit Crossarm • One wooden crossarm • Phase cover on center line • No phase cover on endcaps • No loose wires	–	–	–	X	–	–
Camp 2.4 kV Distribution / Communication Line	PC – 4	Configuration 3: Single-Phase Three-Circuit to Single-Circuit Crossarm • Two wooden crossarms in 90-degree relation • No phase covers • Secondary pole and lines next to main overhead line	–	–	–	X	–	X
Camp 2.4 kV Distribution / Communication Line	PC – 7	Configuration 4: Three-Phase Single-Circuit Dual Crossarm • Dual crossarms (unconfirmed material) • Wires overmounted on uphill side and undermounted on downhill side • Phases covered on center line	–	–	–	X	X	–
Camp 2.4 kV Distribution / Communication Line	PC – 9 (+ 10, 11, 12, 14, 16, 17, 18, & 20)	Configuration 5: Three-Phase Single-Circuit Low Crossarm • Pole top perch available but close to energized wire due to slope • One wooden crossarm or material undetermined crossarm • Phase cover on center line • No phase cover on endcaps	–	–	–	X	–	–
Camp 2.4 kV Distribution / Communication Line	PC – 11 (+ 13 & 15)	Configuration 6: Three-Phase Single-Circuit High Crossarm • Pole top perch available but close to energized wire due to slope • One wooden crossarm • No phase covers	–	–	–	X	–	–
Camp 2.4 kV Distribution / Communication Line	PC – 19	Configuration 7: Three-Phase Single-Circuit Distribution Corner with Multi-Directional Distribution • Dual wooden crossarms and single crossarm (material unconfirmed) • Jumper wires • One phase cover and nine uncovered phases	–	–	–	X	X	X

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Powerline Name	Example Pole ID	Pole Configuration Type[a]	Evaluation Criteria					
			No Avian Electrocution Risk			Potential Risk for Avian Electrocution		
			Communication Lines are Insulated	Powerlines are Insulated	Communication/ Powerlines are Underground	Distance Between Conductors Is Less than 60 Inches	Distance Between Energized and Grounded Equipment on Equipment Poles Is Less than 60 Inches	Metal Guy Wires in Close Proximity to Energized Wires
Camp 2.4 kV Distribution / Communication Line	PC – 21	Configuration 8: Three-Phase Single-Circuit Undermount • Two wooden crossarms • No phase covers • Some uninsulated. • Insulated lines running through piping along pole	–	–	–	X	X	–
Camp 2.4 kV Distribution / Communication Line	PC – 23	Configuration 9: Single-Circuit Three-Phase Corner Distribution with Three Crossarms • Three wooden crossarms • Upper crossarm contains circuits connecting to additional poles • Middle crossarm connects to the line from the adjacent pole and leads to the top crossarm • Lower crossarm contains lines connecting from the middle line to the insulated lines leading to the piping along the pole to the ground. • Insulated lines leading to the ground all other lines uninsulated	–	–	–	X	–	X
Camp 2.4 kV Distribution / Communication Line	PC – 24	Configuration 10: Three-Phase Single-Circuit with Two Transformers • Dual wooden crossarms on top of pole • Two transformers • Some phase covers	–	–	–	X	–	–
Camp 2.4 kV Distribution / Communication Line	PC – 25	Configuration 11: Three-Phase Single-Circuit with Transformer • Single wooden crossarm on top of pole • One transformer • Some phase covers	–	–	–	X	–	–
Kern River No. 1 Switchyard	SY – 1	Configuration 1: Switchyard • Live high-voltage electrical current • No phase covers • Crossbars over switchyard may prohibit larger raptors from entering or serve as safe perches	–	–	–	X	–	–

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Table 7.5-10. Evaluation of Open-Air Segments of the Project Water Conveyance System

Project Facility	Photo #	Evaluation (X = Feature is Present)			Notes
		Fenced	Elevated	Covered	
Democrat Dam Area – Map 7.5-4a					
Sandbox		X	X		• Not accessible to wildlife. • The sandbox is a concrete structure, approximately 90 feet long and 18 feet wide. • It is elevated above the ground by approximately 15 feet. • Portions of the facility are fenced. • Facility may be accessible by mid-size wildlife.
Conduit No. 1				X	• Not accessible to wildlife. • The majority of the conduit is underground. • One above-ground concrete section (approximately 2 feet) is covered with metal grating.
Flume No. 1/Conduit No. 2		X	X	X	• Not accessible to wildlife. • The entirety of the flume (approximately 890 feet long) is elevated and inaccessible. • Small section of conduit at ground-level has been covered and fenced to prevent access.
Democrat Spring Area – Map 7.5-4b					
Conduit No. 3				X	• Not accessible to wildlife. • The open portion of this flume is covered with a metal plate.
Cow Flat Creek Area – Map 7.5-4c					
Flume No. 2 Cow Flat Creek			X		• Potentially accessible to wildlife. • The open portion of this flume is elevated approximately 50 feet above ground level. • However, facility is not covered and could potentially be accessed from surrounding landscape at exit/entry points into tunnel.

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Project Facility	Photo #	Evaluation (X = Feature is Present)			Notes
		Fenced	Elevated	Covered	
Flume No. 3			X		• Potentially accessible to wildlife. • The open portion of this flume is elevated approximately 10 feet above ground level. • However, facility is not covered and could potentially be accessed from surrounding landscape at exit/entry points into tunnel.
Conduit No. 6				X	• Not accessible to wildlife. • Facility is completely covered/underground.
Lucas Creek Area – Map 7.5-4d					
Flume No. 4 Lucas Creek			X		• Potentially accessible to wildlife. • The open portion of this flume spans a small canyon and is elevated a minimum of approximately 8 feet above ground level. • However, facility is not covered and could potentially be accessed from surrounding landscape at exit/entry points into tunnel.
Stark Creek Area – Map 7.5-4e					
Flume No. 5 Dougherty Creek			X		• Potentially accessible to wildlife. • The open portion of this flume is elevated approximately 8 feet above ground level. • Facility is not covered and could potentially be accessed from surrounding landscape at exit/entry points into tunnel.
Flume No. 6 Stark Creek			X		• Potentially accessible to wildlife. • The open portion of this flume is elevated approximately 10 feet above ground level. • Facility is not covered and could potentially be accessed from surrounding landscape at entry point into tunnel.

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Project Facility	Photo #	Evaluation (X = Feature is Present)			Notes
		Fenced	Elevated	Covered	
Kern River No. 1 Powerhouse Area – Map 7.5-4g					
Conduit No. 9				X	• Not accessible to wildlife. • The majority of the conduit is underground. • One above-ground concrete section (approximately 90 feet) is covered with metal plate to prevent access.
Forebay		X			• Not accessible to wildlife. • Facility has a perimeter fence and is not accessible to mid to large wildlife.

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Table 7.5-11. Herbicide Application Locations within Suitable Habitat and Proposed Critical Habitat for Kern Canyon Slender Salamander and Relictual Slender Salamander

Herbicide Application Location		Kern Canyon Slender Salamander		Relictual Slender Salamander	
Facility	**Herbicide Application Notes**	**Suitable Habitat**	**Proposed Critical Habitat**	**Suitable Habitat**	**Proposed Critical Habitat**
Willow Spring Creek Road	Within barren areas along both sides of the road.	X	X	X	
Flume No. 1 Road	Within barren areas along both sides of the road.	X	X		X
Flume No.1	Within barren areas along and underneath the flume.	X	X	X	X
Stark Creek Road	Within barren areas along both sides of the road between Stark Creek Trail and Flume No. 6.	X		X	
Lower and Upper Powerhouse roads	Within barren areas along both sides of the roads.	X			
Kern No. 1 Forebay, Aerial Tram Upper Landing, and Communication Site	Within barren areas directly along these Project Facilities, along both sides of the Forebay Operations Area to Aerial Tram Upper Landing Trail connecting the forebay to the Aerial Tram Upper Landing and between the landing and communication site.	X			

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MAPS

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Map 7.5-1a–g. Special-Status Plants Within the FERC Project Boundary, Along Project Access Trails, and the Kern River No. 1 Project Bypass Reach (CONFIDENTIAL)

Map 7.5-1a–g will not be distributed to the general public. Documents containing Confidential Information may be requested by entities and organizations with jurisdiction over these resources. To request copies, please contact Meg Richardson, SCE Relicensing Project Manager at (626) 238-2902 / mary.m.richardson@sce.com; or Kadi Whiteside, SCE Relicensing Deputy Project Manager at (626) 807-3641 / karen.whiteside@sce.com.

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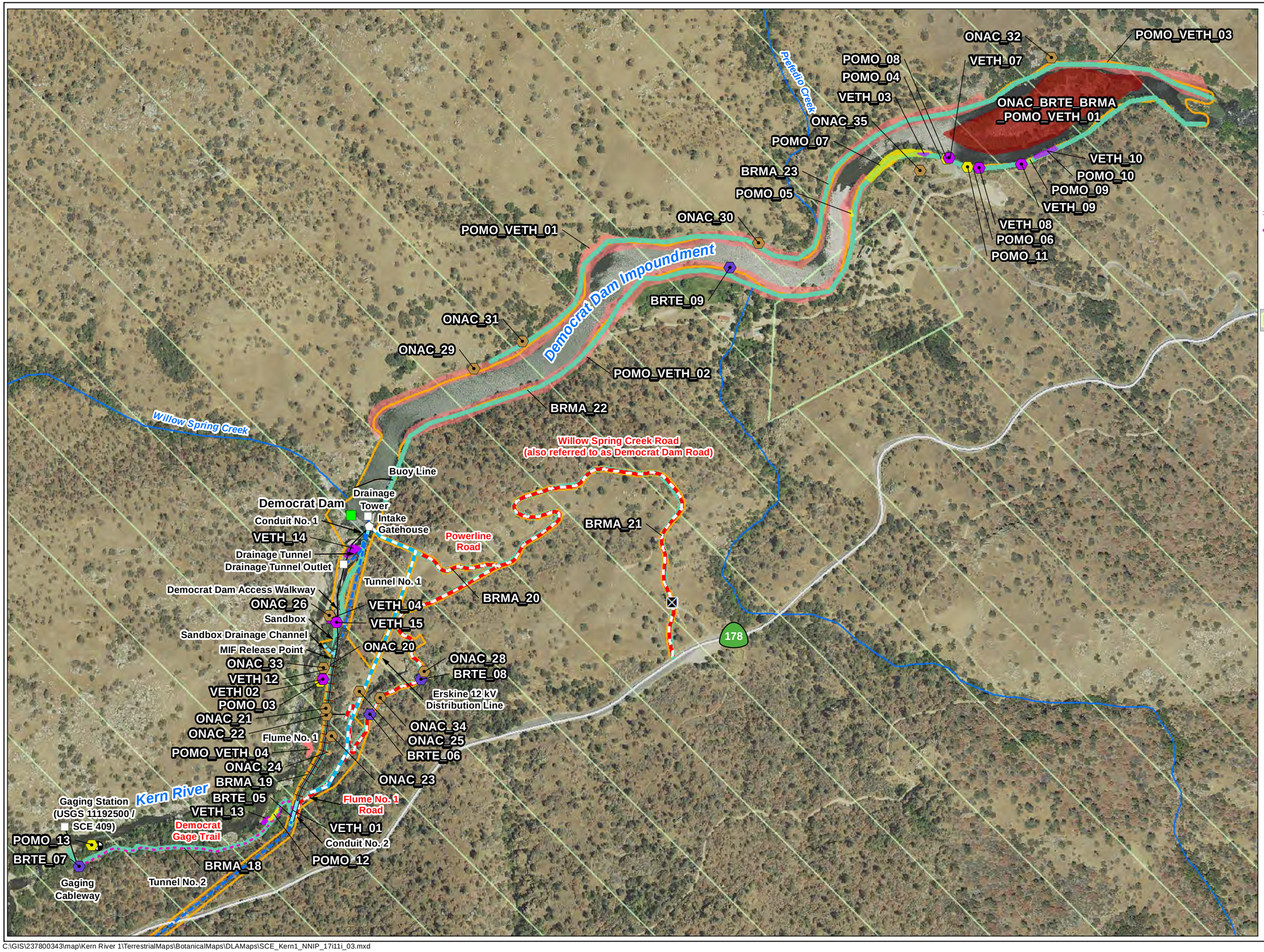


Facilities

- Dam
- Powerhouse
- Water Conveyence Feature
- Tunnel
- Flume
- Conduit
- Sandbox
- Penstock
- Spillway
- Tailrace
- Gage
- Ancillary Facility
- Ancillary Feature
- Powerline
- Communication/ Powerline
- FERC Boundary

Transportation

- Project Road
- Project Trail
- Other Road
- Gate

Other Features

- Watercourse

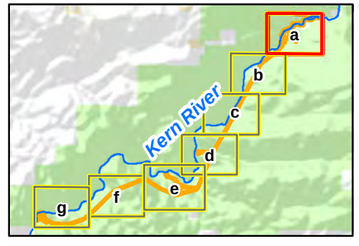
Land Jurisdiction*

- U.S. Forest Service

*SOURCE: BLM 2021

Non-Native Invasive Plants

- BRMAR, red brome
- BRTE, cheatgrass
- ONAC, scotch thistle
- POMO, rabbitsfoot grass
- VETH, common mullein
- POMO & VETH
- ONAC, BRTE, BRMAR, POMO & VETH



SOUTHERN CALIFORNIA EDISON
Energy for What's Ahead℠

Kern River No. 1 Hydroelectric Project
FERC Project No. 1930

Map 7.5-2a

Non-Native Invasive Plants Within the FERC Project Boundary, Along Project Access Trails, and Along the Kern No. 1 Project Bypass Reach.

0 250 500
Feet

Projection: UTM Zone 11
Datum: NAD 83

Date: 10/30/2025

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Tunnel No. 2
BRMA_17
Adit 2 & 3
178
Kern River
Saturday Spring Creek
Tunnel No. 3
Democrat Spring
BRMA_16
Conduit No. 3 Trail
Conduit No. 3 Tunnel No. 4
Tunnel No. 4

Facilities

- Dam
- Powerhouse
- Water Conveyence Feature
- Tunnel
- Flume
- Conduit
- Sandbox
- Penstock
- Spillway
- Tailrace
- Gage
- Ancillary Facility
- Ancillary Feature
- Powerline
- Communication/ Powerline
- FERC Boundary

Transportation

- Project Road
- Project Trail
- Other Road
- Gate

Other Features

- Watercourse

Land Jurisdiction*

- U.S. Forest Service

*SOURCE: BLM 2021

Non-Native Invasive Plants

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- POMO & VETH
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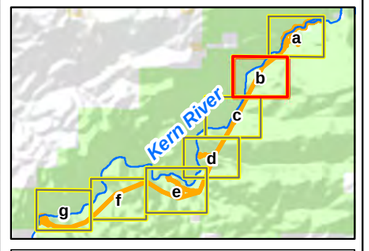

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Kern River No. 1 Hydroelectric Project
FERC Project No. 1930

Map 7.5-2b

Non-Native Invasive Plants Within the FERC Project Boundary, Along Project Access Trails, and Along the Kern No. 1 Project Bypass Reach.

0 250 500
Feet
Projection: UTM Zone 11
Datum: NAD 83

Date: 10/30/2025

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Facilities

- Dam
- Powerhouse
- Water Conveyence Feature
- Tunnel
- Flume
- Conduit
- Sandbox
- Penstock
- Spillway
- Tailrace
- Gage
- Ancillary Facility
- Ancillary Feature
- Powerline
- Communication/ Powerline
- FERC Boundary

Transportation

- Project Road
- Project Trail
- Other Road
- Gate

Other Features

- Watercourse

Land Jurisdiction*

- U.S. Forest Service

*SOURCE: BLM 2021

Non-Native Invasive Plants

- BRMAR, red brome
- BRTE, cheatgrass
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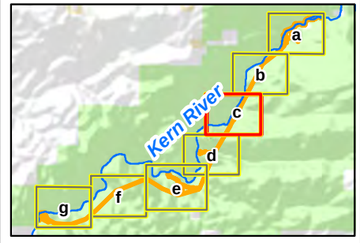
- POMO & VETH
- ONAC, BRTE, BRMAR, POMO & VETH



SOUTHERN CALIFORNIA EDISON
Energy for What's Ahead

Kern River No. 1 Hydroelectric Project
FERC Project No. 1930

Map 7.5-2c

Non-Native Invasive Plants Within the FERC Project Boundary, Along Project Access Trails, and Along the Kern No. 1 Project Bypass Reach.

0 250 500
Feet
Projection: UTM Zone 11
Datum: NAD 83

Date: 10/30/2025

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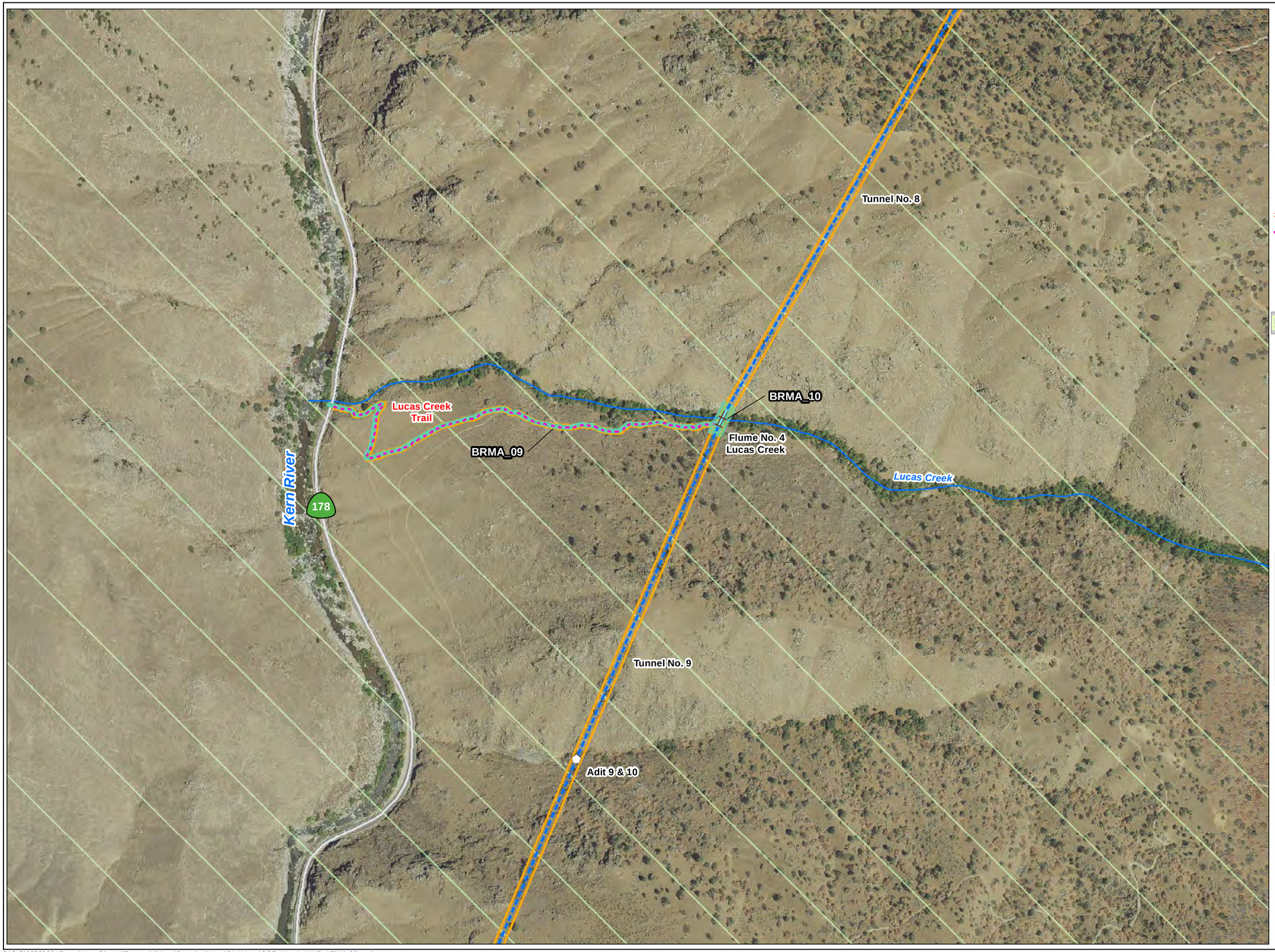

Facilities

- Dam
- Powerhouse
- Water Conveyence Feature
- Tunnel
- Flume
- Conduit
- Sandbox
- Penstock
- Spillway
- Tailrace
- Gage
- Ancillary Facility
- Ancillary Feature
- Powerline
- Communication/ Powerline
- FERC Boundary

Transportation

- Project Road
- Project Trail
- Other Road
- Gate

Other Features

- Watercourse

Land Jurisdiction*

- U.S. Forest Service

*SOURCE: BLM 2021

Non-Native Invasive Plants

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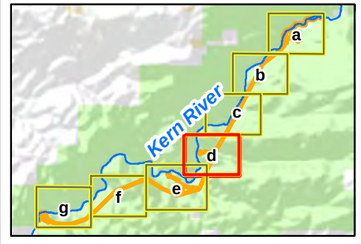
- VETH, common mullein
- POMO & VETH
- ONAC, BRTE, BRMAR, POMO & VETH



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Kern River No. 1 Hydroelectric Project
FERC Project No. 1930

Map 7.5-2d

Non-Native Invasive Plants Within the FERC Project Boundary, Along Project Access Trails, and Along the Kern No. 1 Project Bypass Reach.

0 250 500
Feet
Projection: UTM Zone 11
Datum: NAD 83

Date: 10/30/2025

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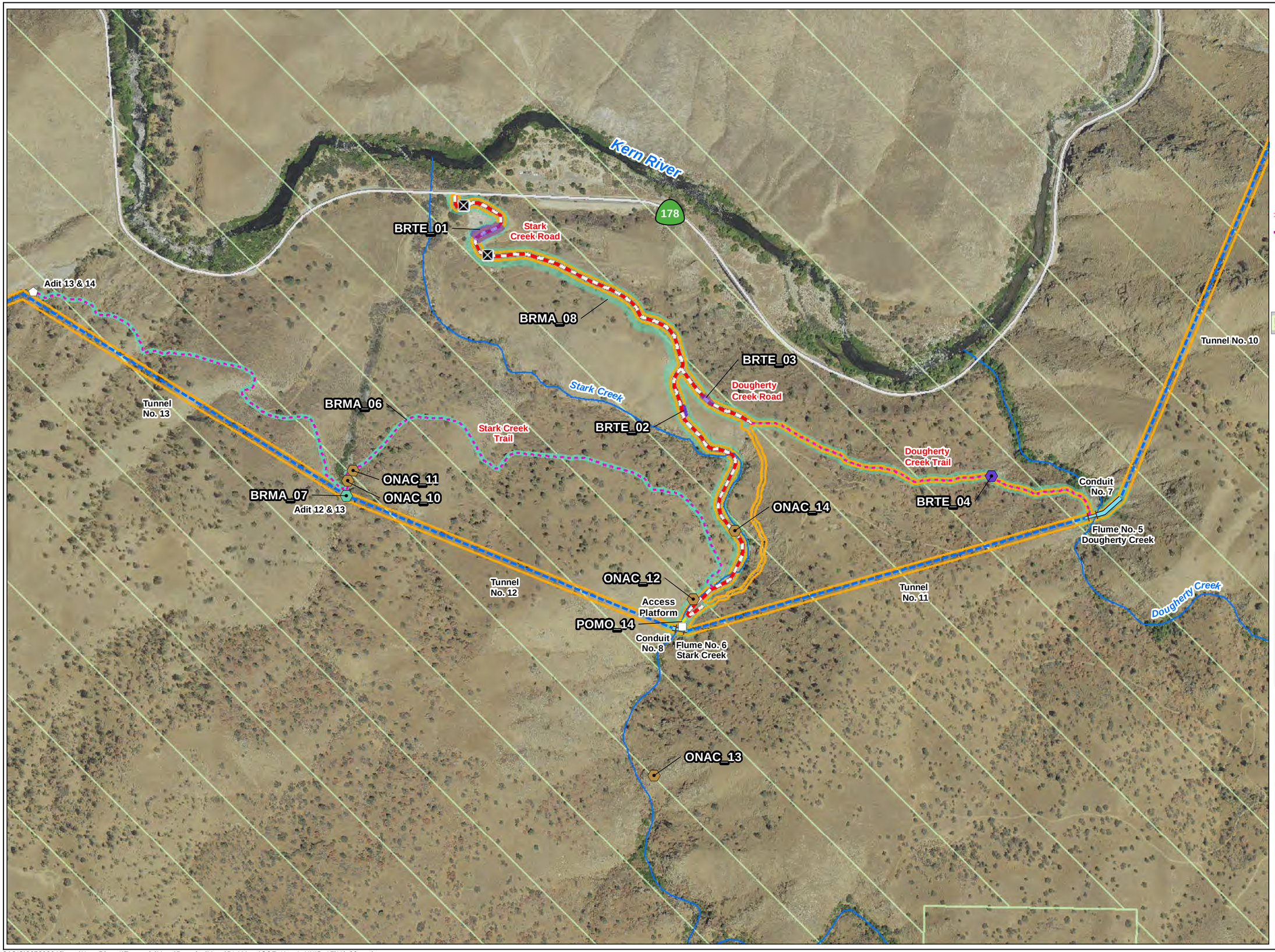

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Kern River
Pechacho Creek
178
BRMA_05
Adit 14 & 15
Tunnel No. 14
Tunnel No. 15
Adit 15 & 16

Facilities

- Dam
- Powerhouse
- Water Conveyence Feature
- Tunnel
- Flume
- Conduit
- Sandbox
- Penstock
- Spillway
- Tailrace
- Gage
- Ancillary Facility
- Ancillary Feature
- Powerline
- Communication/ Powerline
- FERC Boundary

Transportation

- Project Road
- Project Trail
- Other Road
- Gate

Other Features

- Watercourse

Land Jurisdiction*

- U.S. Forest Service

*SOURCE: BLM 2021

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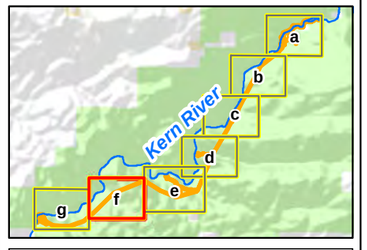

SOUTHERN CALIFORNIA EDISON
Energy for What's Ahead

Kern River No. 1 Hydroelectric Project
FERC Project No. 1930

Map 7.5-2f

Non-Native Invasive Plants Within the FERC Project Boundary, Along Project Access Trails, and Along the Kern No. 1 Project Bypass Reach.

0 250 500
Feet
Projection: UTM Zone 11
Datum: NAD 83

Date: 10/30/2025

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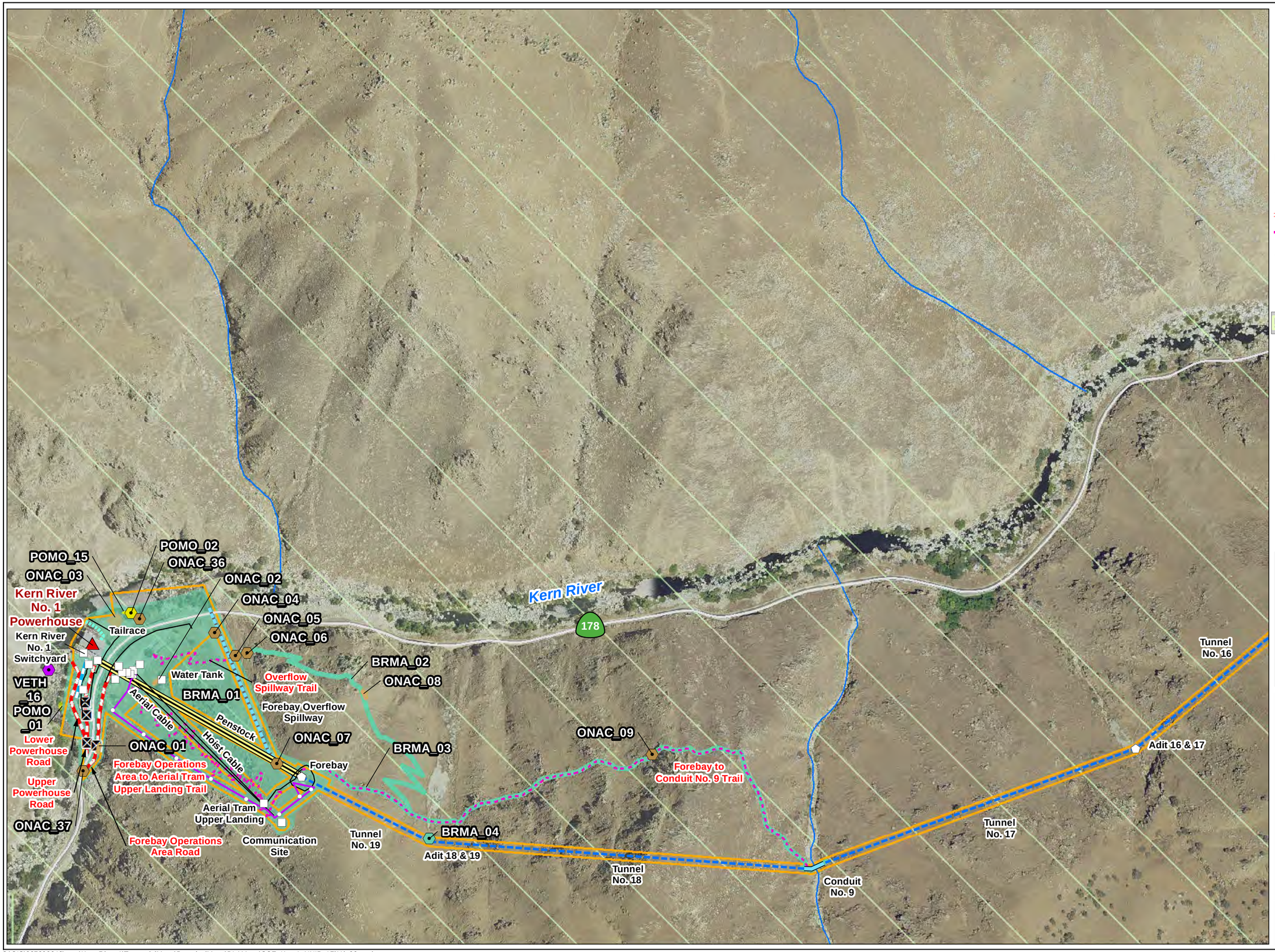


Facilities

- Dam
- Powerhouse
- Water Conveyence Feature
- Tunnel
- Flume
- Conduit
- Sandbox
- Penstock
- Spillway
- Tailrace
- Gage
- Ancillary Facility
- Ancillary Feature
- Powerline
- Communication/ Powerline
- FERC Boundary

Transportation

- Project Road
- Project Trail
- Other Road
- Gate

Other Features

- Watercourse

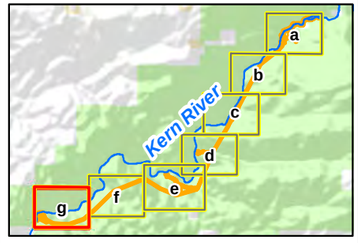
Land Jurisdiction*

- U.S. Forest Service

*SOURCE: BLM 2021

Non-Native Invasive Plants

- BRMAR, red brome
- BRTE, cheatgrass
- ONAC, scotch thistle
- POMO, rabbitsfoot grass
- VETH, common mullein
- POMO & VETH
- ONAC, BRTE, BRMAR, POMO & VETH



SOUTHERN CALIFORNIA EDISON
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Kern River No. 1 Hydroelectric Project
FERC Project No. 1930

Map 7.5-2g

Non-Native Invasive Plants Within the FERC Project Boundary, Along Project Access Trails, and Along the Kern No. 1 Project Bypass Reach.

0 250 500
Feet
Projection: UTM Zone 11
Datum: NAD 83

Date: 10/30/2025

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Map 7.5-3a–c. Records of Special-Status Wildlife Species from SCE, CNDDB and NRIS that are Known to Occur within the Study Area (CONFIDENTIAL)

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Map 7.5-4a–g. Suitable Habitat and Observations of Special-Status Species within the Study Area (CONFIDENTIAL)

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Map 7.5-5a–g. Kern Canyon Slender Salamander Habitat within the Study Area and Observations During the 2025 Visual Encounter Survey (CONFIDENTIAL)

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Map 7.5-6a–g. Relictual Slender Salamander Habitat within the Study Area (CONFIDENTIAL)

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Platanus racemosa - Quercus agrifolia Woodland Alliance
Baccharis salicifolia Shrubland Alliance
Salix lasiolepis Shrubland Alliance
Prefedio Creek
Salix exigua Shrubland Alliance
Salix lucida ssp. lasiandra Woodland Alliance
Salix exigua Shrubland Alliance
Democrat Dam Impoundment
Salix lucida ssp. lasiandra Woodland Alliance
Baccharis salicifolia Shrubland Alliance
Baccharis salicifolia Shrubland Alliance
Willow Spring Creek
Willow Spring Creek Road
(also referred to as Democrat Dam Road)
Buoy Line
Democrat Dam
Drainage Tower
Intake Gatehouse
Conduit No. 1
Drainage Tunnel
Drainage Tunnel Outlet
Democrat Dam Access Walkway
Tunnel No. 1
Sandbox
Sandbox Drainage Channel
MIF Release Point
Powerline Road
Erskin 12 kV Distribution Line
Flume No. 1
Platanus racemosa - Quercus agrifolia Woodland Alliance
Kern River
Gaging Station (USGS 11192500 / SCE 409)
Democrat Gage Trail
Flume No. 1 Road
Conduit No. 2
Gaging Cableway
Tunnel No. 2
178

Facilities

- Dam
- Powerhouse
- Water Conveyence Feature
- Tunnel
- Flume
- Conduit
- Sandbox
- Penstock
- Spillway
- Tailrace
- Gage
- Ancillary Facility
- Ancillary Feature
- Powerline
- Communication/ Powerline
- FERC Boundary

Transportation

- Project Road
- Project Trail
- Other Road
- Gate

Other Features

- Watercourse

Land Jurisdiction*

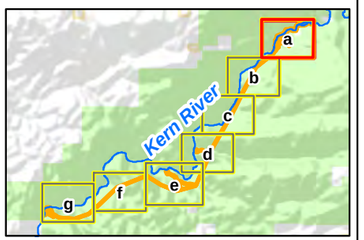
- U.S. Forest Service

*SOURCE: BLM 2021

Riparian Alliances

- Baccharis salicifolia Shrubland Alliance
- Platanus racemosa - Quercus agrifolia Woodland Alliance
- Salix exigua Shrubland Alliance
- Salix lasiolepis Shrubland Alliance
- Salix lucida ssp. lasiandra Woodland Alliance

Note: Other than Democrat Dam Impoundment and the Kern River, there were no Special Aquatic Features in the Study Area



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Energy for What's Ahead

Kern River No. 1 Hydroelectric Project
FERC Project No. 1930

Map 7.5-7a

Riparian Alliances and Special Aquatic Features Within the FERC Project Boundary, Along Project Access Trails, and Along the Kern No. 1 Project Bypass Reach

0 250 500
Feet
Projection: UTM Zone 11
Datum: NAD 83
Date: 10/3/2025

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Facilities

- Dam
- Powerhouse
- Water Conveyence Feature
- Tunnel
- Flume
- Conduit
- Sandbox
- Penstock
- Spillway
- Tailrace
- Gage
- Ancillary Facility
- Ancillary Feature
- Powerline
- Communication/ Powerline
- FERC Boundary

Transportation

- Project Road
- Project Trail
- Other Road
- Gate

Other Features

- Watercourse

Land Jurisdiction*

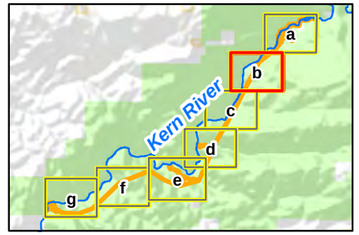
- U.S. Forest Service

*SOURCE: BLM 2021

Riparian Alliances

- Baccharis salicifolia Shrubland Alliance
- Platanus racemosa - Quercus agrifolia Woodland Alliance
- Salix exigua Shrubland Alliance
- Salix lasiolepis Shrubland Alliance
- Salix lucida ssp. lasiandra Woodland Alliance

Note: Other than Democrat Dam Impoundment and the Kern River, there were no Special Aquatic Features in the Study Area



SOUTHERN CALIFORNIA EDISON
Energy for What's Ahead

Kern River No. 1 Hydroelectric Project
FERC Project No. 1930

Map 7.5-7b

Riparian Alliances and Special Aquatic Features Within the FERC Project Boundary, Along Project Access Trails, and Along the Kern No. 1 Project Bypass Reach

0 250 500
Feet
Projection: UTM Zone 11
Datum: NAD 83

Date: 10/3/2025

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Facilities

- Dam
- Powerhouse
- Water Conveyence Feature
- Tunnel
- Flume
- Conduit
- Sandbox
- Penstock
- Spillway
- Tailrace
- Gage
- Ancillary Facility
- Ancillary Feature
- Powerline
- Communication/ Powerline
- FERC Boundary

Transportation

- Project Road
- Project Trail
- Other Road
- Gate

Other Features

- Watercourse

Land Jurisdiction*

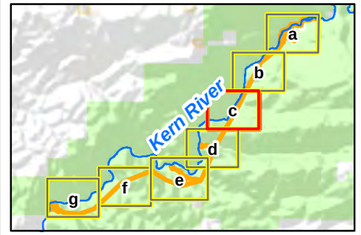
- U.S. Forest Service

*SOURCE: BLM 2021

Riparian Alliances

- Baccharis salicifolia Shrubland Alliance
- Platanus racemosa - Quercus agrifolia Woodland Alliance
- Salix exigua Shrubland Alliance
- Salix lasiolepis Shrubland Alliance
- Salix lucida ssp. lasiandra Woodland Alliance

Note: Other than Democrat Dam Impoundment and the Kern River, there were no Special Aquatic Features in the Study Area



SOUTHERN CALIFORNIA EDISON
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Kern River No. 1 Hydroelectric Project
FERC Project No. 1930

Map 7.5-7c

Riparian Alliances and Special Aquatic Features Within the FERC Project Boundary, Along Project Access Trails, and Along the Kern No. 1 Project Bypass Reach

0 250 500
Feet
Projection: UTM Zone 11
Datum: NAD 83

Date: 10/3/2025

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Platanus racemosa - Quercus agrifolia Woodland Alliance

Tunnel No. 8

Lucas Creek Trail

Flume No. 4 Lucas Creek

Platanus racemosa - Quercus agrifolia Woodland Alliance

Lucas Creek

Kern River

178

Platanus racemosa - Quercus agrifolia Woodland Alliance

Tunnel No. 9

Adit 9 & 10

Platanus racemosa - Quercus agrifolia Woodland Alliance

Facilities

- Dam
- Powerhouse
- Water Conveyence Feature
- Tunnel
- Flume
- Conduit
- Sandbox
- Penstock
- Spillway
- Tailrace
- Gage
- Ancillary Facility
- Ancillary Feature
- Powerline
- Communication/ Powerline
- FERC Boundary

Transportation

- Project Road
- Project Trail
- Other Road
- Gate

Other Features

- Watercourse

Land Jurisdiction*

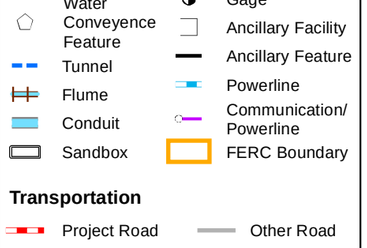
- U.S. Forest Service

*SOURCE: BLM 2021

Riparian Alliances

- Baccharis salicifolia Shrubland Alliance
- Platanus racemosa - Quercus agrifolia Woodland Alliance
- Salix exigua Shrubland Alliance
- Salix lasiolepis Shrubland Alliance
- Salix lucida ssp. lasiandra Woodland Alliance

Note: Other than Democrat Dam Impoundment and the Kern River, there were no Special Aquatic Features in the Study Area



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Kern River No. 1 Hydroelectric Project
FERC Project No. 1930

Map 7.5-7d

Riparian Alliances and Special Aquatic Features Within the FERC Project Boundary, Along Project Access Trails, and Along the Kern No. 1 Project Bypass Reach

0 250 500
Feet
Projection: UTM Zone 11
Datum: NAD 83

Date: 10/3/2025

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Platanus racemosa - Quercus agrifolia Woodland Alliance

Kern River

178

Stark Creek Road

Platanus racemosa - Quercus agrifolia Woodland Alliance

Salix lasiandra alliance

Adit 13 & 14

Salix lucida ssp. lasiandra Woodland Alliance

Baccharis salicifolia Shrubland Alliance

Tunnel No. 10

Stark Creek

Dougherty Creek Road

Tunnel No. 13

Stark Creek Trail

Dougherty Creek Trail

Conduit No. 7

Adit 12 & 13

Flume No. 5 Dougherty Creek

Tunnel No. 12

Tunnel No. 11

Dougherty Creek

Access Platform

Conduit No. 8

Flume No. 6 Stark Creek

Facilities

- Dam
- Powerhouse
- Water Conveyence Feature
- Tunnel
- Flume
- Conduit
- Sandbox
- Penstock
- Spillway
- Tailrace
- Gage
- Ancillary Facility
- Ancillary Feature
- Powerline
- Communication/ Powerline
- FERC Boundary

Transportation

- Project Road
- Project Trail
- Other Road
- Gate

Other Features

- Watercourse

Land Jurisdiction*

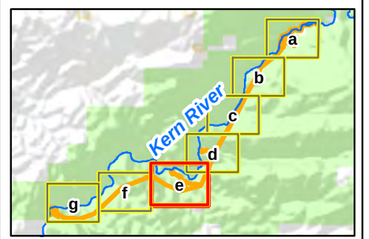
- U.S. Forest Service

*SOURCE: BLM 2021

Riparian Alliances

- Baccharis salicifolia Shrubland Alliance
- Platanus racemosa - Quercus agrifolia Woodland Alliance
- Salix exigua Shrubland Alliance
- Salix lasiolepis Shrubland Alliance
- Salix lucida ssp. lasiandra Woodland Alliance

Note: Other than Democrat Dam Impoundment and the Kern River, there were no Special Aquatic Features in the Study Area



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Kern River No. 1 Hydroelectric Project
FERC Project No. 1930

Map 7.5-7e

Riparian Alliances and Special Aquatic Features Within the FERC Project Boundary, Along Project Access Trails, and Along the Kern No. 1 Project Bypass Reach

0 250 500
Feet

Projection: UTM Zone 11
Datum: NAD 83

Date: 10/3/2025

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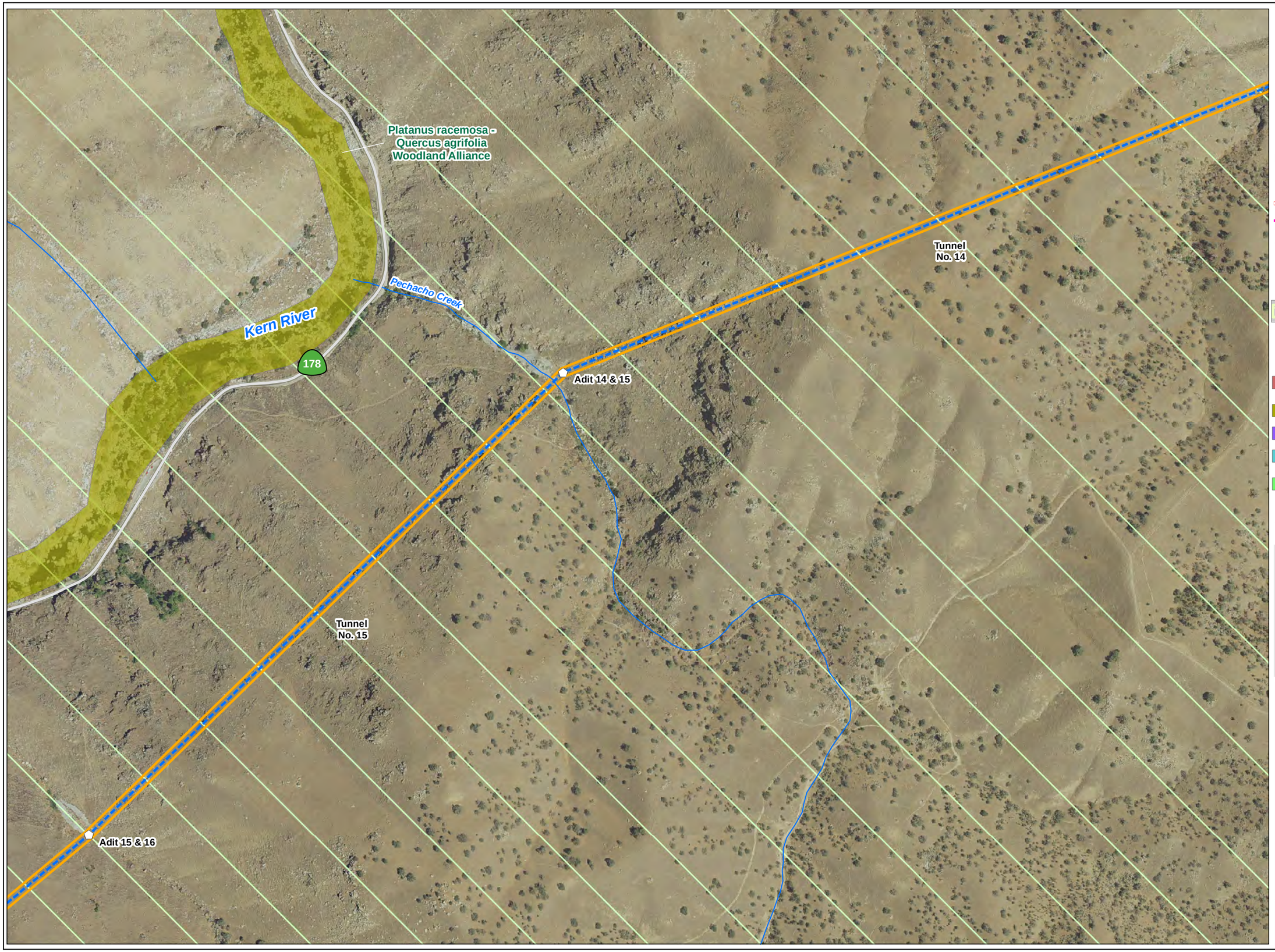


Facilities

- Dam
- Powerhouse
- Water Conveyence Feature
- Tunnel
- Flume
- Conduit
- Sandbox
- Penstock
- Spillway
- Tailrace
- Gage
- Ancillary Facility
- Ancillary Feature
- Powerline
- Communication/ Powerline
- FERC Boundary

Transportation

- Project Road
- Project Trail
- Other Road
- Gate

Other Features

- Watercourse

Land Jurisdiction*

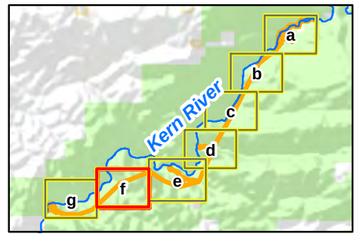
- U.S. Forest Service

*SOURCE: BLM 2021

Riparian Alliances

- Baccharis salicifolia Shrubland Alliance
- Platanus racemosa - Quercus agrifolia Woodland Alliance
- Salix exigua Shrubland Alliance
- Salix lasiolepis Shrubland Alliance
- Salix lucida ssp. lasiandra Woodland Alliance

Note: Other than Democrat Dam Impoundment and the Kern River, there were no Special Aquatic Features in the Study Area



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Kern River No. 1 Hydroelectric Project
FERC Project No. 1930

Map 7.5-7f

Riparian Alliances and Special Aquatic Features Within the FERC Project Boundary, Along Project Access Trails, and Along the Kern No. 1 Project Bypass Reach

0 250 500
Feet
Projection: UTM Zone 11
Datum: NAD 83

Date: 10/3/2025

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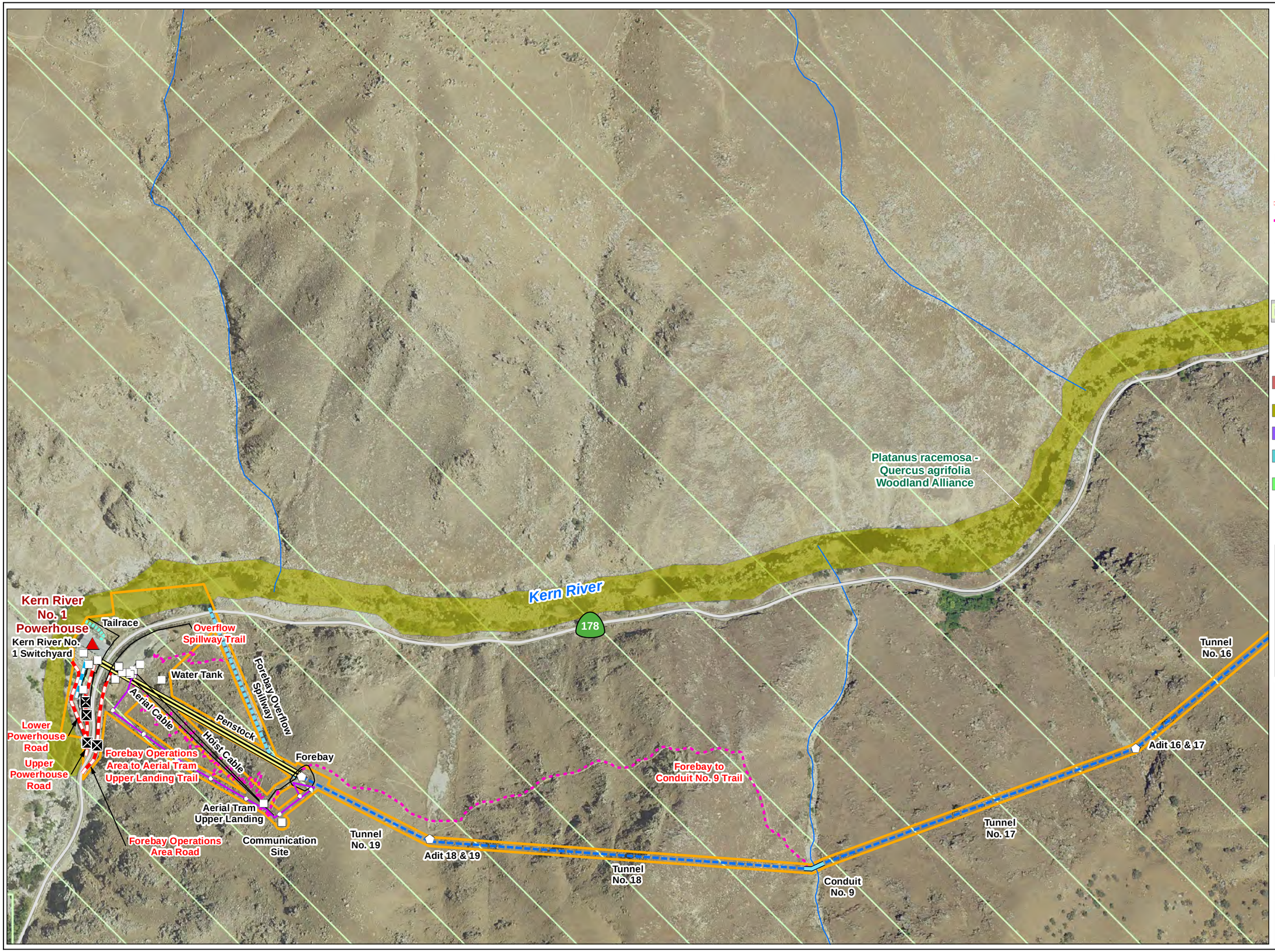


Facilities

- Dam
- Powerhouse
- Water Conveyence Feature
- Tunnel
- Flume
- Conduit
- Sandbox
- Penstock
- Spillway
- Tailrace
- Gage
- Ancillary Facility
- Ancillary Feature
- Powerline
- Communication/ Powerline
- FERC Boundary

Transportation

- Project Road
- Project Trail
- Other Road
- Gate

Other Features

- Watercourse

Land Jurisdiction*

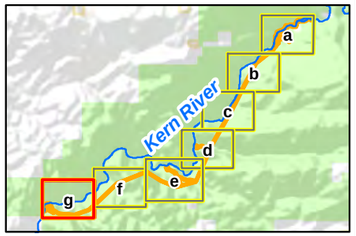
- U.S. Forest Service

*SOURCE: BLM 2021

Riparian Alliances

- Baccharis salicifolia Shrubland Alliance
- Platanus racemosa - Quercus agrifolia Woodland Alliance
- Salix exigua Shrubland Alliance
- Salix lasiolepis Shrubland Alliance
- Salix lucida ssp. lasiandra Woodland Alliance

Note: Other than Democrat Dam Impoundment and the Kern River, there were no Special Aquatic Features in the Study Area



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Kern River No. 1 Hydroelectric Project
FERC Project No. 1930

Map 7.5-7g

Riparian Alliances and Special Aquatic Features Within the FERC Project Boundary, Along Project Access Trails, and Along the Kern No. 1 Project Bypass Reach

0 250 500
Feet
Projection: UTM Zone 11
Datum: NAD 83

Date: 10/3/2025

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Map 7.5-8a–g. Yellow-Blotched Salamander Habitat within the Study Area and Observations During the 2025 Visual Encounter Survey (CONFIDENTIAL)

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Map 7.5-9. Results of Special-Status Bat Reproductive and Seasonal Use Surveys (CONFIDENTIAL)

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LIST OF ACRONYMS

AQ 1 TM	AQ 1 – Hydrology Technical Memorandum
CDC	California Department of Conservation
FERC	Federal Energy Regulatory Commission
Forest Service	United States Forest Service
LAND 1 TM	LAND 1 – Road and Trail Condition Assessment Technical Memorandum
LAND 2 TM	LAND 2 – Erosion and Sedimentation Technical Memorandum
msl	mean sea level
Mw	Moment magnitude
PM&E	protection, mitigation, and enhancement
Project	Kern River No. 1 Hydroelectric Project
SCE	Southern California Edison
SR-178	State Route 178
USACE	United States Army Corps of Engineers
USGS	United States Geological Survey
Watershed	Kern River Watershed

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7.6 GEOLOGY AND SOILS

This section describes the geology and soils in the Kern River Watershed (Watershed), as they pertain to Southern California Edison's (SCE) Kern River No. 1 Hydroelectric Project (Project). Information related to stream conditions in the bypass reach is included in Section 7.7, *Geomorphology*.

Section 7.6.1 describes the affected environment and resource conditions under current Project operation and maintenance (i.e., baseline condition). Section 7.6.2 identifies proposed environmental measures, management, and monitoring plans (collectively referred to as protection, mitigation, and enhancement [PM&E] measures) to be implemented under the Proposed Action (see Appendix E.1 for a full description of proposed PM&E measures). Section 7.6.3 includes an analysis of the potential environmental effects of the Proposed Action, including potential beneficial effects of proposed PM&E measures. Section 7.6.4 describes unavoidable adverse effects of the Proposed Action on geology and soils.

7.6.1 Affected Environment

7.6.1.1 Information Sources

This section was developed using existing, relevant, and reasonably available information from the following primary sources. Additional references are cited in the text, as appropriate.

- Federal Energy Regulatory Commission (FERC) Final Environmental Assessment for Hydropower License, Kern River No. 1 Hydroelectric Project (FERC 1998)
- United States Army Corps of Engineers (USACE), Isabella Lake Dam Safety Modification Project Environmental Impact Statement (USACE 2012)
- California Department of Conservation (CDC), Alquist-Priolo earthquake mapping (CDC 2015)
- United States Geological Survey (USGS) databases (USGS 2022, 2025)
- SCE Pre-Application Document for the Kern River No. 1 Hydroelectric Project (SCE 2023)
- SCE Technical Memoranda developed for the relicensing that are provided in Appendix E.2, including:
  - AQ 1 – Hydrology Technical Memorandum (AQ 1 TM) (SCE 2025a)
  - LAND 1 – Road and Trail Condition Assessment Technical Memorandum (LAND 1 TM) (SCE 2025b)
  - LAND 2 – Erosion and Sedimentation Technical Memorandum (LAND 2 TM) (SCE 2025c)

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7.6.1.2 Geologic Setting

The Project is situated along the western slope of the Sierra Nevada within the Kern River Valley, at elevations ranging from approximately 1,950 feet above mean sea level (msl) in the vicinity of Democrat Diversion Dam, to 950 msl at the Project powerhouse. The Kern River Watershed in the vicinity of the Project is characterized by steep canyons with narrow "V-shaped" valley bottoms and steep, deeply incised channels. Topography in the Project vicinity is shown on Map 7.6-1.

Bedrock Lithology

The Project vicinity is primarily underlain with Precambrian to Cenozoic plutonic rocks consisting of granodiorite of the Sierra Nevada batholith as shown on Map 7.6-2. A small body of mafic intrusive igneous rocks, primarily gabbro, is also present and associated with a pre-Quaternary fault that transects the Project in a northwest-southeast direction. A basic geologic time scale is provided in Table 7.6-1 for reference.

Structural Features

There are multiple plutons that make up the entire batholith that were uplifted and exposed at different times throughout the entire range of the Sierra Nevada. The Kern River at its northern reaches is made up of intrusive (granite) and extrusive (lava) material near the Golden Trout Volcanic field. Although intrusive material makes up the bulk of the rock throughout the entire reach of the river, there are also noticeable areas of metasedimentary rock outcrops and limestone dikes in the lower reaches south of the Project. Metasedimentary rock outcrops and limestone dikes are not found within the Project.

Unconsolidated Sediments

Unconsolidated sediments in the Project vicinity are generally limited to surface soils and recent alluvium deposited in the stream and river courses and associated terraces.

Mineral Resources

Historic and current mining activities within the Watershed, including the area surrounding the Project, are shown on Map 7.6-3. Historically, in the Watershed and Project vicinity, mining for gold and uranium and to a lesser extent copper and silver has occurred (USGS 2022). Gold occurs in quartz veins and in placer deposits. As shown on Map 7.6-3, several gold mining sites are in the vicinity of the Project, with their operational status either unknown or identified as a past producer.

7.6.1.3 Faulting and Seismicity

Map 7.6-4 displays fault age and seismicity date within a 100-mile radius of the Project. The nearest known active fault is the Kern Canyon Fault located approximately 8.5 to 10 miles east-northeast of the Project. It is a northeast-southwest trending fault that extends from the mouth of the Kern River Canyon, through Lake Isabella, towards the northeast for approximately 69 miles. Recent USACE field studies (2012) determined that the Kern Canyon Fault is active and capable of producing a 7.5-magnitude earthquake. The last known movement on the Kern Canyon Fault appears to have occurred during

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the past 2,500 to 4,000 years, with an average interval between large earthquakes of about 3,200 years (USACE 2012). A moderate to large earthquake on this fault would likely produce severe ground shaking in the vicinity of the Project.

As discussed in Section 7.6.1.2, an unnamed pre-Quaternary fault was mapped and transects the Project in a northwest-southeast direction (Map 7.6-4). The fault location is approximated as it transects the Project. Due to the age faulting (pre-Quaternary), the fault is not considered active (e.g., last 11,000 years).

There are no Alquist-Priolo Earthquake Fault Zones identified in the Project vicinity (CDC 2015). The closest known Alquist-Priolo Earthquake Fault Zone occurred as ground breaks and are located approximately 6.3 miles southwest of the Project powerhouse. These ground breaks occurred during the 1952 earthquake event that measured 7.2 on the moment magnitude (Mw) scale and occurred near Wheeler Ridge (Map 7.6-4). The 1952 event damaged the Isabella Dam while it was under construction (USACE 2012).

Map 7.6-4 also shows the known earthquakes that have occurred within 100 miles of the Project. The known occurrence or frequency of earthquakes (seismicity) ranges in date from 1800 to the present (USGS 2025). Earthquakes ranging from 4.0 Mw to 5.0 Mw have occurred within the vicinity of the Project, with larger but infrequent, earthquakes having occurred within 100 miles of the Project.

7.6.1.4 Soils

Soils found within 0.5 mile of the Project are shown on Map 7.6-5. Descriptions of each soil shown on the map, including taxonomy, parent rock, vegetation, and erodibility (K-Factor) are summarized in Table 7.6-2 and organized by the soil codes identified on Map 7.6-5 (California Soil Resource Lab 2025, Soil Survey Staff 2025a, Soil Survey Staff 2025b). Most of the soils within 0.5 mile of the Project are shallow materials that have formed from weathered granitic rock. The K-Factor of most of the soils in the area ranges from 0.24 to 0.28, indicating medium-textured soils with characteristics between sand and clay (i.e., loamy soils). These soils are moderately susceptible to detachment and tend to produce moderate runoff. In contrast, soils in the southern portion of the Project have a K-Factor of 0.17 and are classified as coarse-textured soils, such as sandy soils. Although these soils are easily detached, they typically generate low runoff. Soils located within the Kern River banks are classified as river wash.

7.6.1.5 Shorelines and Streambanks

Very little shoreline along the Democrat Impoundment or stream banks exists within the Project area due to the steep, V-shaped, and deeply incised channels. A description of the channel conditions in the river reaches downstream of Democrat Dam is provided in Section 7.7, *Geomorphology*.

7.6.1.6 Erosion and Sediment Sources Associated with Project Facilities

Hillslope Erosion

Hillslope erosion within the bypass reach primarily occurs through mass wasting processes and road maintenance activities, although overall erosion levels remain low. Mass wasting events, such as rock and mudslides, can cause large amounts of debris to enter the channel. Sediments, coarse rubble, and finer grained sediments have historically contributed to the bypass reach from road maintenance and slope erosion (FERC 1998).

There is a history of periodic debris flow, landslide, and rockfall events (usually associated with precipitation events) that have occurred in the canyon, often closing State Route 178 (SR-178) for extended periods of time. This was the case during warm atmospheric river storm events during the winter of 2022–2023 when heavy rain fell upon a record-breaking snowpack in the upper watersheds of the canyon. Additionally, there are several sub-vertical to vertical outcrops of bedrock at road cuts along SR-178. Such features have the potential for periodic rockfall events, which could block the highway. These events, although occurring in the vicinity of the Project, are not Project related.

The most significant documented erosion that occurred in the vicinity of the Project and that involved Project facilities occurred on September 10, 2013, when SCE filed an incident report with FERC of a landslide initiated by a forebay spill. The report stated that due to a storm event, the Project forebay spilled and the spillway pipe was plugged, causing erosion below the forebay and along the spillway pipe. Rock and debris crossed SR-178 and entered the Kern River. The State Regional Water Quality Control Board, California Department of Fish and Wildlife, and the United States Forest Service (Forest Service) were notified. SCE coordinated with the Forest Service to repair the damaged facilities. Since then, SCE implemented modifications to the flowline system to prevent future forebay spills.

A survey conducted in 2024 (SCE 2025c) found that there was no active erosion occurring at any Project facilities. Besides the aforementioned forebay spill, the only other area identified as a significant concern was a rockfall area on the opposite side of the river from the powerhouse (refer to Table 7.7-2, Locations of Potentially Significant Sources of Erosion and Sedimentation). A steel rockfall mitigation fence was installed to help protect the powerhouse (LAND 2 TM, Appendix A, Photos A-17 to A-19). The rockfall area is not caused by Project facilities.

Streambank Erosion

Streambank erosion is discussed in Section 7.7, *Geomorphology*.

Spoil Piles

There are several legacy spoil piles associated with historical drilling of the Project flowline, which are visible in areas adjacent to the bypass reach and at Project facilities. These piles were identified in the LAND 2 TM as locations of potential ongoing erosion and sedimentation. These spoil piles were visible in historical and recent aerial photos

and appear largely unchanged between 2002 and 2023. An aerial image (January 2025) of two of the spoil piles is provided in Figure 7.6-1. During field surveys, it was determined that the spoil piles are not a source of sediment mobilization.

Roads and Trails

The Project includes eight access roads totaling approximately 2.36 miles and eleven access trails totaling approximately 4.57 miles. These access roads and trails are used for routine operations and maintenance, as described in Section 5.0, *Proposed Action and Alternatives* and the LAND 1 TM. Their lengths and locations are detailed in Table 7.6-3 and illustrated on Maps 5-3a through 5-3g.

As described in LAND 1 TM, a survey was conducted by field personnel of all Project roads and trails. This survey documented road/trail conditions, usage and frequency and type of maintenance activities. A total of 31 road surface features (i.e., chipped asphalt, alligator cracking, potholing) were identified in the survey. Most locations experiencing erosion observed in the field were minor-to-moderate; field staff did not observe any erosion that could result in a road or trail becoming impassable.

During the survey, SCE staff confirmed that road and trail maintenance is performed on all Project roads and trails according to the maintenance regime described in Section 5.1.5.8, *Road Maintenance* and 5.1.5.9, *Trail Maintenance*.

Due to their location on Forest Service land, Forest Service maintenance levels were used to classify Project roads based on the level of service and maintenance required. There are five levels, ranging from Level 1 (closed to vehicles, minimal maintenance) to Level 5 (high comfort, typically paved). Trails are not subject to these classifications. Within the Project area, all access roads are classified as Maintenance Level 2 or 3. Level 3 roads support standard passenger vehicles and are subject to federal safety requirements (Highway Safety Act and Manual of Uniform Traffic Control Devices), while Level 2 roads accommodate high-clearance vehicles and are exempt from those requirements. Specifically, all Project access roads are classified as Level 3, except for Powerline Road and Dougherty Creek Road, which are less suitable for passenger vehicles and exhibit lower traffic volumes, consistent with Level 2 characteristics.

Road and trail conditions were categorized as “Good”, “Fair”, or “Poor” based on field observations, including erosion features, potholes, ruts, loose aggregate, missing aggregate, cracking debris, drainage feature classification, and excessive vegetation. The overall condition of the Project Access Roads and Trails are summarized in Table 7.6-4 and Table 7.6-5, respectively. Seven of the eight Project access roads were categorized as “Fair”, and one was categorized as “Good”. All roads are maintained in accordance with their respective Forest Service Maintenance Level. Seven of the Project access trails were categorized as “Good”, three as “Fair”, and one as “Poor”.

Culverts and other Drainage Features

As described in the LAND 1 TM, the survey identified a total of 41 drainage features in the Project area, including 15 culverts and 26 miscellaneous drainage features such as

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water bars, slope drains, low-water crossings, drain inlets, and gutters. Drainage concerns observed in the field included excess sediment/detritus in the inlet of culverts, sediment blockage at the outlet of culverts, and crushed/deteriorated corrugated metal pipe. A complete list of culverts and drainage features, along with their description and classification are provided in Table 7.6-6. Drainage feature conditions were categorized as follows:

- **No Apparent Concern** – The drainage feature appears to be functioning as designed. There are no major concerns related to water conveyance due to sediment/detritus build-up or overgrown vegetation. No signs of erosion (e.g., scouring) or structural issues (e.g., rusting, holes) that would impact functionality are observed.

- **Potential Concern** – The drainage feature shows some signs of not functioning as designed. Further monitoring and potential maintenance may be warranted due to sediment/detritus build-up, overgrown vegetation, erosion concerns, or observable structural issues.

- **Concern Likely** – The drainage feature is not functioning as designed and requires major maintenance or possible replacement. Issues include sediment/detritus blockage, erosion that redirects runoff away from the drainage feature, and other observable structural problems.

Five of the 41 drainage features surveyed were classified as “Concern Likely” and require major maintenance or replacement. An additional 10 features are classified as “Potential Concern.” The remaining 23 features were classified as “No Apparent Concern.”

Sediment Management

Discussion of SCE’s current sediment management activities for the Project is found in Section 7.7, *Geomorphology*.

7.6.2 Proposed Environmental Measures

Under the Proposed Action, SCE proposes to implement PM&E measures associated with ongoing Project operation and maintenance activities. PM&E measures are designed to protect, maintain, or enhance environmental and cultural resources over the term of the new license. SCE proposes implementing the following PM&E measures related to geology and soils resources:

- Project Access Roads and Trails Management Plan

- Vegetation Management Plan

Appendix E.1 provides complete descriptions of measures SCE is proposing as part of the license application and to include in any new license issued for the Project.

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7.6.3 Potential Project Effects

This section describes the potential effects to geology and soils that could occur because of continued operation and maintenance activities to be implemented under the Proposed Action. Potential effects are determined by analyzing the changes in geology and soils that may result from activities implemented under the Proposed Action (Section 5.2) compared to the No-Action Alternative (existing condition) (Section 5.1). Final effects determinations consider PM&E measures to be included under the Proposed Action (refer to Appendix E.1).

Under the Proposed Action, SCE would continue to operate and maintain the Project as described in Section 5.1, *No-Action Alternative*, with minor adjustments to Project operation and maintenance activities in response to implementing proposed PM&E measures. No new or upgraded facilities, structural changes, or operational changes to the Project are proposed.

Consistent with FERC's Scoping Document 2 (FERC 2023), this section evaluates potential effects of continued Project operation and maintenance on the following:

- Natural channel erosion and hillslope instability related to ongoing Project operations and maintenance activities, particularly:
  - Flowline leakage and spills from the forebay
  - Erosion from storm events
- Soil stability resulting from disturbance and erosion associated with road and trail maintenance activities.
- Soil contamination from implementation of vegetation management activities (herbicide use).

A description of potential effects on flows in the bypass reach under the Proposed Action is presented in Section 7.2, *Water Use and Hydrology*. Potential effects on channel morphology and sediment processes are discussed in Section 7.7, *Geomorphology*.

7.6.3.1 Potential Effects of Natural Channel Erosion and Hillslope Instability Related to Project Operation and Maintenance Activities

Under the Proposed Action, Project maintenance includes physical inspection of the water conveyance system (including the sandbox, tunnels, flumes, conduits, adits, forebay, forebay overflow spillway, and penstock) in addition to performing repairs, removing debris, testing valves and patching leaks. During periodic maintenance outages, SCE removes accumulated sediment from the forebay by opening the drain gate that goes into the spillway pipe. Once the forebay is completely drained, if needed, SCE removes any remaining sediment by hand. Flowline leakage and spills from the forebay have the potential to cause erosion or hillslope instability. Large storm events also have the potential to cause erosion and hillslope instability that could affect Project facilities.

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Flowline Leakage and Spills from the Forebay

While SCE is not proposing changes to Project operations and maintenance under the Proposed Action, there is the potential for flowline leakage and forebay spills to cause erosion. Under the Proposed Action, SCE would continue to conduct monthly physical inspections of the exterior portions of the water conveyance system, including the sandbox, tunnels, flumes, conduits, adits, forebay, forebay overflow spillway, and penstock. During these monthly inspections, SCE also tests valves along the water conveyance system to ensure they are operating properly and calibrates all gages. In addition to monthly inspections, the intake is inspected weekly. SCE also conducts physical inspections after large storm events, and FERC inspects the forebay annually. Minor repairs, including patching leaks, removal of debris, and repair of support structures are made on an as-needed basis. Physical inspection of the interior of the water conveyance system is typically conducted every 1 to 5 years and coincides with a full Project outage. SCE would also continue to implement sediment management at the forebay to minimize the potential for forebay overtopping.

Continuation of regular physical inspections, facility maintenance, and timely implementation of repairs would minimize the potential for flowline leakage and forebay spills to result in erosion and hillside instability. Since there is no change to Project operations and maintenance under the Proposed Action, flowline leakage and forebay spills would have no effect on erosion and hillside instability when compared to effects under the No-Action Alternative.

Erosion from Storm Events

The stability of channels and hillslopes in the vicinity of the Project is primarily governed by the area's geologic setting, historical geomorphic processes, and precipitation events. While natural mass wasting events, such as debris flows, rockfalls, and landslides can occur, they are infrequent and are not related to the operation or maintenance of Project infrastructure. Generally, these events do not affect Project facilities or operations, except as described below.

A rockfall area located across the Kern River from the powerhouse has the potential to affect Project facilities. A steel rockfall mitigation fence was installed to protect the powerhouse, and as a result, the risk to the Project is considered minimal.

During a storm event on September 10, 2013 (discussed in detail in Section 7.6.1.6) natural erosion processes resulted in sediment entering the flowline and plugging the overflow pipe. The storm event, combined with a blocked spillway pipe, caused the forebay to overflow, resulting in erosion below the forebay and along the spillway pipe. Following the September 2013 event, SCE implemented modifications to the flowline system to prevent future forebay spills. At Adit 17/18, the vent opening was reconfigured to redirect upslope runoff and debris flows over the opening, effectively preventing water, mud, or vegetation from entering the flowline. At the forebay, SCE removed the screen/rack at the overflow spill pipe intake to eliminate the risk of clogging, ensuring that any surge flow can safely enter the overflow system. These proactive measures have mitigated the risk of erosion and sedimentation under normal Project operations. Field

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observations confirmed that no active erosion was present at the site, indicating that the previous erosion was the result of a singular, extraordinary event (SCE 2025c).

Continuation of regular physical inspections, facility maintenance, and timely implementation of repairs would minimize the potential for erosion at Project facilities because of storm events. Since there is no change to Project operations and maintenance under the Proposed Action, and erosion events are governed by the existing geologic setting, historical geomorphic processes, and precipitation events, there would be no effect on erosion and hillside instability when compared to effects under the No-Action Alternative.

7.6.3.2 Potential Effects on Soil Stability Resulting from Disturbance and Erosion Associated with Road and Trail Maintenance

Under the Proposed Action, Project access roads and trails, including associated culverts and drainage features, would continue to be regularly inspected and maintained on an as-needed basis by SCE during normal operations. Minor road maintenance generally includes debris removal; basic repairs, including blading or grading of native roads within the existing road prism to ensure a smooth surface and adequate drainage; filling of potholes; maintenance of erosion control features such as culverts, drains, ditches, and water bars; repair, replacement, or installation of access control structures such as posts, cables, rails, gates, and barrier rock; and repair / replacement of signage. Major road maintenance generally includes placement or replacement of culverts and other drainage features; major grading, and/or road replacement. Trail maintenance generally includes debris and rock removal; basic repairs including minor brushing; maintenance of erosion control features such as water bars; repair, replacement, or installation of access control structures such as barrier rock; and repair / replacement of signage.

These activities are intended to ensure safe access to Project facilities, protect worker and public health and safety, and minimize erosion and sedimentation. SCE is not proposing to change road and trail maintenance activities under the Proposed Action, but is proposing implementation of a Project Access Roads and Trails Management Plan (Appendix E.1). The purpose of this plan is to outline SCE's long-term operation and maintenance responsibilities for Project access roads and trails on National Forest System lands. This plan also includes measures for soils stabilization and erosion control when performing minor road or trail construction activities. With implementation of the Project Access Roads and Trails Management Plan, continued road and trail maintenance activities that would be implemented under the Proposed Action would have no effect on soil stability and the potential for erosion compared to effects under the No-Action Alternative.

7.6.3.3 Potential Soil Contamination from Implementation of Vegetation Management Activities

Under the Proposed Action, vegetation management, including the use of herbicides to control weeds and vegetation encroachment, would continue to be implemented at Project facilities. While SCE is not proposing to change vegetation management activities

under the Proposed Action, these activities have the potential to contaminate soils in treatment areas.

To minimize the potential for soil contamination because of herbicide application, SCE proposes implementing a Vegetation Management Plan (Appendix E.1). This plan includes continuation of SCE's current vegetation management practices related to herbicide use. Specifically, SCE must obtain written approval from the Forest Service for any planned uses of herbicides (i.e., Pesticide Use Proposal). Herbicide applications would be made consistent with the approved Pesticide Use Proposal and all associated best management practices. This includes a requirement for applications to be supervised by an individual with a Qualified Applicator License or Qualified Applicator Certificate, use of selective application techniques to avoid desirable vegetation, and work in appropriate weather conditions. With implementation of the Vegetation Management Plan, continued herbicide use that would be implemented under the Proposed Action would have no effect on soil contamination compared to effects under the No-Action Alternative.

7.6.4 Unavoidable Adverse Effects

There are no unavoidable adverse effects to geology and soils from continued operation and maintenance of the Project under the Proposed Action.

7.6.5 References

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TABLES

Table 7.6-1. Simplified Geologic Time Scale[1]

Eon	Era	Period	Years Before Present
Phanerozoic (542.0 mya to present)	Cenozoic (65.5 mya to present)	Quaternary	2.6 mya to present
		Holocene	11,700 yrs to present
		Pleistocene	2.588 mya to 11,700 yrs
		Tertiary	65.5 to 2.6 mya
	Mesozoic (251.0 to 65.5 mya)	Cretaceous	145.5 to 65.5 mya
		Jurassic	199.6 to 145.5 mya
		Triassic	251.0 to 199.6 mya
	Paleozoic (542.0 to 251.0 mya)	Permian	299.0 to 251.0 mya
		Carboniferous	359.2 to 299.0 mya
		Devonian	416.0 to 359.2 mya
		Silurian	443.7 to 416.0 mya
		Ordovician	488.3 to 443.7 mya
		Cambrian	542.0 to 488.3 mya
Precambrian			

Notes: [1] Adapted from Geologic Time Scale, University of California Museum of Paleontology (http://www.ucmp.berkeley.edu/help/timeform.php)

Key: mya = million years ago
yrs = years

Table 7.6-2. Description of Soils Within 0.5 Mile of the Project

Code (Corresponds to Map 7.6-5)	Association	Soil Description	Slope	Taxonomy	Parent Rock	Erosion K Factor1	Vegetation
139	Riverwash	–	–	–	–	–	–
201	Cieneba-Rock Outcrop Complex	very shallow and shallow, somewhat excessively drained soils that formed in material weathered from granitic rock	15 to 50	Loamy, mixed, superactive, nonacid, thermic, shallow Typic Xerorthents	granite and other rocks of similar texture and composition	0.24	chaparral and chemise with widely spread foothill pine or oak tree, small area of thin annual grasses and weeds
202	Cieneba-Rock Outcrop Complex	very shallow and shallow, somewhat excessively drained soils that formed in material weathered from granitic rock	50 to 75	Loamy, mixed, superactive, nonacid, thermic, shallow Typic Xerorthents	granite and other rocks of similar texture and composition	0.24	chaparral and chemise with widely spread foothill pine or oak tree, small area of thin annual grasses and weeds
212	Auberry-Cieneba-Rock Outcrop Complex	very shallow and shallow, somewhat excessively drained soils that formed in material weathered from granitic rock.	10 to 30	Loamy, mixed, superactive, nonacid, thermic, shallow Typic Xerorthents	granite and other rocks of similar texture and composition	0.28	chaparral and chemise with widely spread foothill pine or oak tree, small area of thin annual grasses and weeds
213	Auberry-Cieneba-Rock Outcrop Complex	very shallow and shallow, somewhat excessively drained soils that formed in material weathered from granitic rock.	30 to 50	Loamy, mixed, superactive, nonacid, thermic, shallow Typic Xerorthents	granite and other rocks of similar texture and composition	0.28	chaparral and chemise with widely spread foothill pine or oak tree, small area of thin annual grasses and weeds
267	Cieneba-Vista-Rock Outcrop Complex	very shallow and shallow, somewhat excessively drained soils that formed in material weathered from granitic rock	30 to 60	Loamy, mixed, superactive, nonacid, thermic, shallow Typic Xerorthents	granite and other rocks of similar texture and composition	0.17	chaparral and chemise with widely spread foothill pine or oak tree, small area of thin annual grasses and weeds
400	Rock Outcrop	–	–	–	–	–	–

Sources: California Soil Resource Lab 2025, Soil Survey Staff 2025a, Soil Survey Staff 2025b

Notes: [1] The K factor assesses the susceptibility of soil to sheet and rill erosion and is dependent upon the percentages of clay, silt, sand, and organic matter in the soil. In general, soils with low K factors are less susceptible to erosion and soils with high K factors are more susceptible to erosion.

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Table 7.6-3. Project Access Roads and Trails

Name[1]	Length (miles)
Project Access Roads	
Willow Spring Creek Road[2]	0.93
Powerline Road	0.09
Flume No. 1 Road	0.09
Dougherty Creek Road	0.11
Stark Creek Road	0.82
Forebay Operations Area Road	0.13
Lower Powerhouse Road	0.09
Upper Powerhouse Road	0.10
Total	***2.36***
Project Access Trails	
Democrat Gage Trail	0.30
Conduit No. 3 Trail	0.05
Cow Flat Creek Trail	0.14
Cow Flat Creek to Conduit No. 6 Trail[3]	0.61
Lucas Creek Trail	0.52
Dougherty Creek Trail	0.45
Stark Creek Trail	1.15
Forebay to Conduit No. 9 Trail	0.68
Overflow Spillway Trail	0.12
Forebay Operations Area to Aerial Tram Upper Landing Trail	0.51
Access Trail to Aerial Cable Upper Mount	0.04
Total	***4.57***

Notes: [1] The list of Project facilities included in the Pre-Application Document was updated/revised during development of the Application for New License based on study results and additional information becoming available. Table 7.6-3 includes the most current list of Project access roads and trails and their lengths.
[2] Willow Spring Creek Road is also referred to as Democrat Dam Road.
[3] The current Exhibit G maps on file with FERC indicate a trail extends from SR-178 up to Flume No. 3. However, during field reconnaissance staff confirmed this trail does not connect to SR-178. Instead, this trail runs along a portion of the Forest Service's Powerhouse Trail (from Cow Flat Creek to Conduit No. 6).

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Table 7.6-4. Overall Condition of Project Access Roads

Road Name	Overall Condition[1]
Willow Spring Creek Road	Fair
Powerline Road	Fair
Flume No. 1 Road	Fair
Dougherty Creek Road	Fair
Stark Creek Road	Fair
Forebay Operations Area Road	Fair
Lower Powerhouse Road	Fair
Upper Powerhouse Road	Good

Notes: [1] This column reflects the overall condition of each road; actual condition may vary for some segments of road. Refer to Appendix E.1, LAND 1 TM, Appendix C for the condition of each segment along Project access roads.

Table 7.6-5. Overall Condition of Project Access Trails

Trail Name	Overall Condition[1]
Democrat Gage Trail	Good
Conduit No. 3 Trail	Good
Cow Flat Creek Trail	Good
Cow Flat Creek to Conduit No. 6 Trail	Good
Lucas Creek Trail	Good
Dougherty Creek Trail	Good
Stark Creek Trail	Good
Forebay to Conduit No. 9 Trail	Fair
Overflow Spillway Trail	Poor
Forebay Operations Area to Aerial Tram Upper Landing Trail	Fair
Access Trail to Aerial Cable Upper Mount	Fair

Notes: [1] This column reflects the overall condition of each trail; actual condition may vary for some segments of trail. Refer to Appendix E.1, LAND 1 TM, Appendix C for the condition of each segment along Project access trails.

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Table 7.6-6. Project Access Road Drainage Features and Classification

Road Name	Data ID	Description	Drainage Classification		
			No Apparent Concern	Potential Concern	Concern Likely
Willow Spring Creek Road	DD-1	Culvert, 10 inches		✓	
	DD-2	Culvert, 24 inches	✓		
	DD-3	Culvert, 10 inches			✓
	DD-4	Culvert, 24 inches			✓
	DD-5	Slope drain		✓	
	DD-6	Culvert, 12 inches	✓		
	DD-7	Culvert, 12 inches		✓	
Flume No. 1 Road	FN-1	Slope drain		✓	
Stark Creek Road	SC-1	Culvert, 12-inch CMP			✓
	SC-2	Culvert, 12-inch CMP		✓	
	SC-3	Culvert, 12-inch CMP		✓	
	SC-4	Culvert, 12-inch CMP	✓		
	SC-5	Culvert, 12-inch CMP	✓		
	SC-6	Culvert, 12-inch CMP		✓	
	SC-7	Culvert, 12-inch CMP			✓
	SC-8	Culvert, 12-inch CMP		✓	
	SC-9	Low-water crossing			✓
	SC-10	Water bar/slope drain	✓		
	SC-11	Water bar/slope drain	✓		
	SC-12	Low-water crossing	✓		
	SC-13	Slope drain	✓		
	SC-14	Slope drain	✓		
	SC-15	Water bar	✓		
Forebay Operations Area Road	FO-1	Drain inlet	✓		
	FO-2	Drain inlet	✓		
	FO-3	Drain inlet	✓		
Lower Powerhouse Road	LP-1	Drain outlet		✓	
	LP-2	Drain outlet	✓		
	LP-3	Drain outlet	✓		

Road Name	Data ID	Description	Drainage Classification		
			No Apparent Concern	Potential Concern	Concern Likely
	LP-4	Drain outlet	✓		
Upper Powerhouse Road	UP-1	Drain inlet	✓		
	UP-2	Drain inlet		✓	
	UP-3	Drain inlet	✓		
	UP-4	Drain inlet	✓		
	UP-5	Drain inlet	✓		
	UP-6	Drain inlet	✓		
	UP-7	Drain inlet	✓		
	UP-8	Curb and gutter	✓		

Key: CMP = corrugated metal pipe

FIGURES

Figure 7.6-1. Example of Legacy Spoil Piles from Drilling the Project Conveyance Flowline.

MAPS

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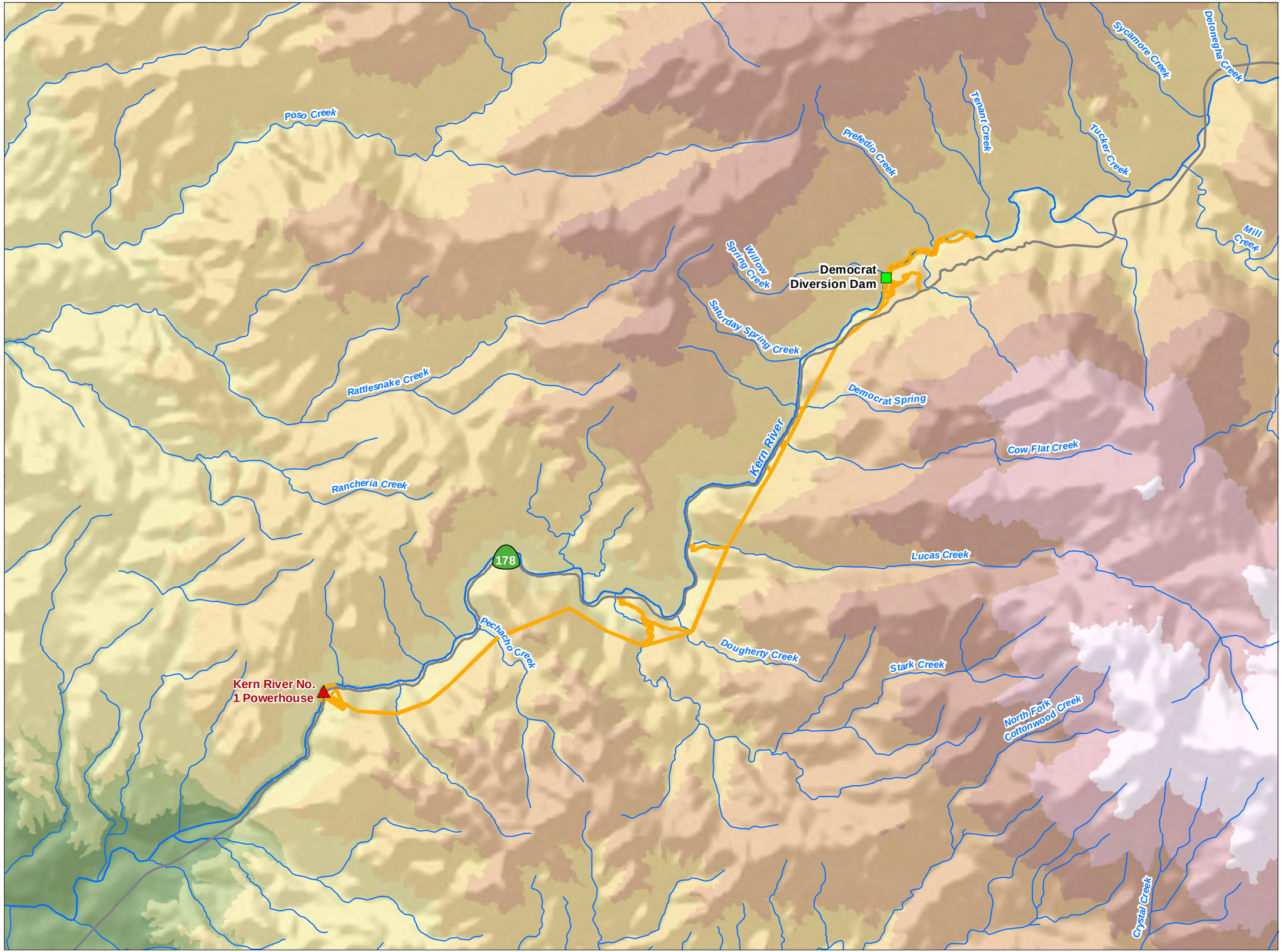

Facilities
- Dam
- Powerhouse
- FERC Boundary

Other Features
- Watercourse
- Highway

Elevations
- 100 - 800'
- 800' - 1000'
- 1000' - 2000'
- 2000' - 3000'
- 3000' - 4000'
- 4000' - 5000'
- 5000' - 6000'
- >6000'

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FERC Project No. 1930

Map 7.6-1

Topography in the Project Vicinity

0 0.5 1 Miles

Projection: UTM Zone 11
Datum: NAD 83

Date: 10/13/2025

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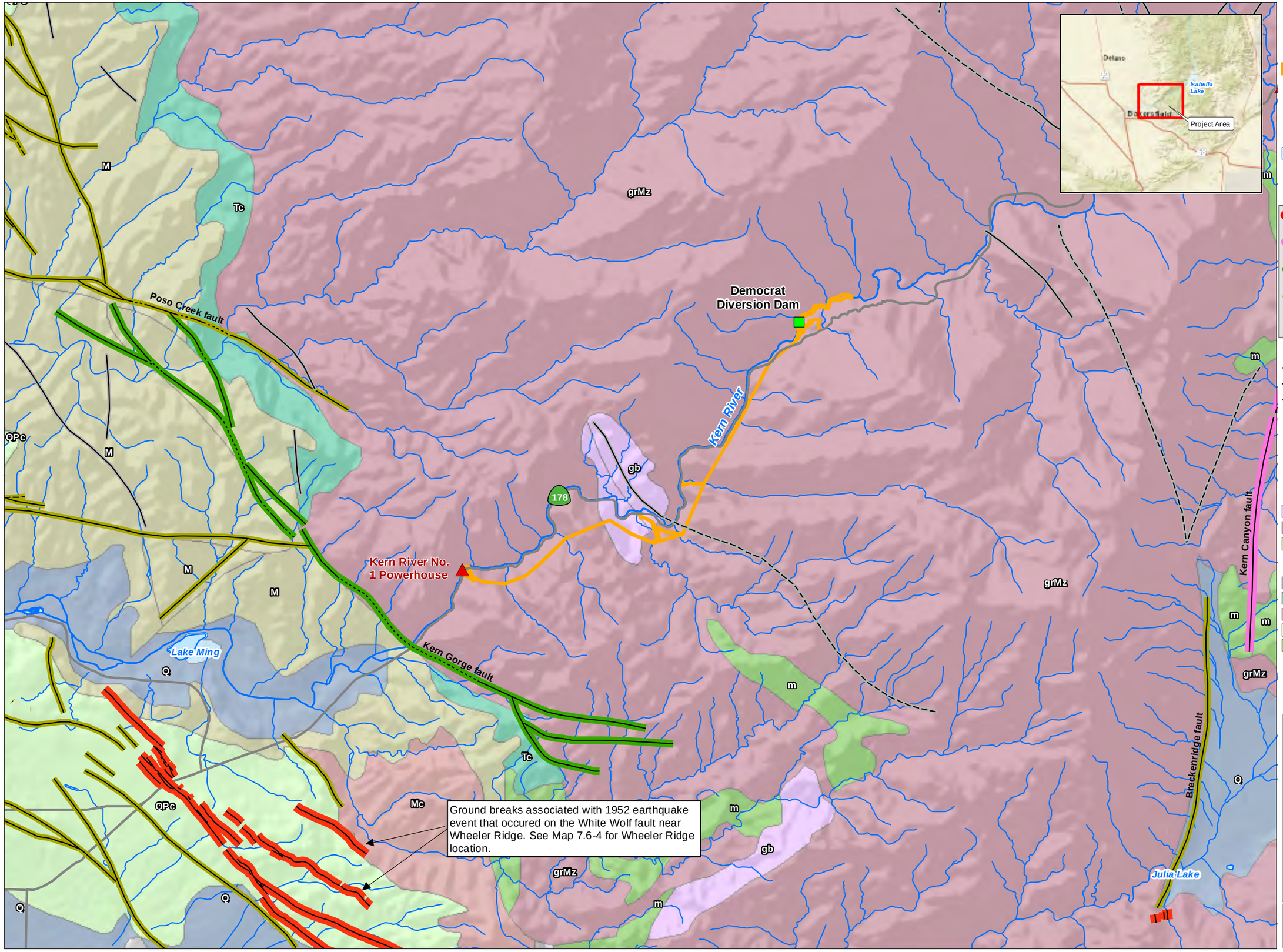

Facilities

- Dam
- Powerhouse
- FERC Boundary

Other Features

- Watercourse
- Highway
- Lake

Fault Zone Data*

Fault Age:

- Historic Displacement (last 200 years)
- Holocene Displacement (last 11,000 years)
- Late Quaternary Displacement (last 750,000 years)
- Undivided Quaternary Displacement (last 1.6 million years)
- Pre-Quaternary Period (more than two million years ago)

Fault Type

- Fault, Certain
- Fault, Approx. located
- Fault, Concealed

*SOURCES: -- USGS, Earthquake Hazards Program, 2018
https://earthquake.usgs.gov/hazards/qfaults
-- California Geological Survey, 2010
https://maps.conservation.ca.gov/cgs/

Geologic Rock Types**

Cenozoic - Precambrian

- gb gabbro
- grMz granodiorite
- M sandstone

Cenozoic

- Q alluvium
- Tc conglomerate
- Mc sandstone
- QPc sandstone
- m schist

**Source: Department of Conservation, California Geological Survey, 2010

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Map 7.6-2

Lithology in the Project Vicinity

0 1 2 Miles

Date: 10/13/2025

Projection: UTM Zone 11
Datum: NAD 83

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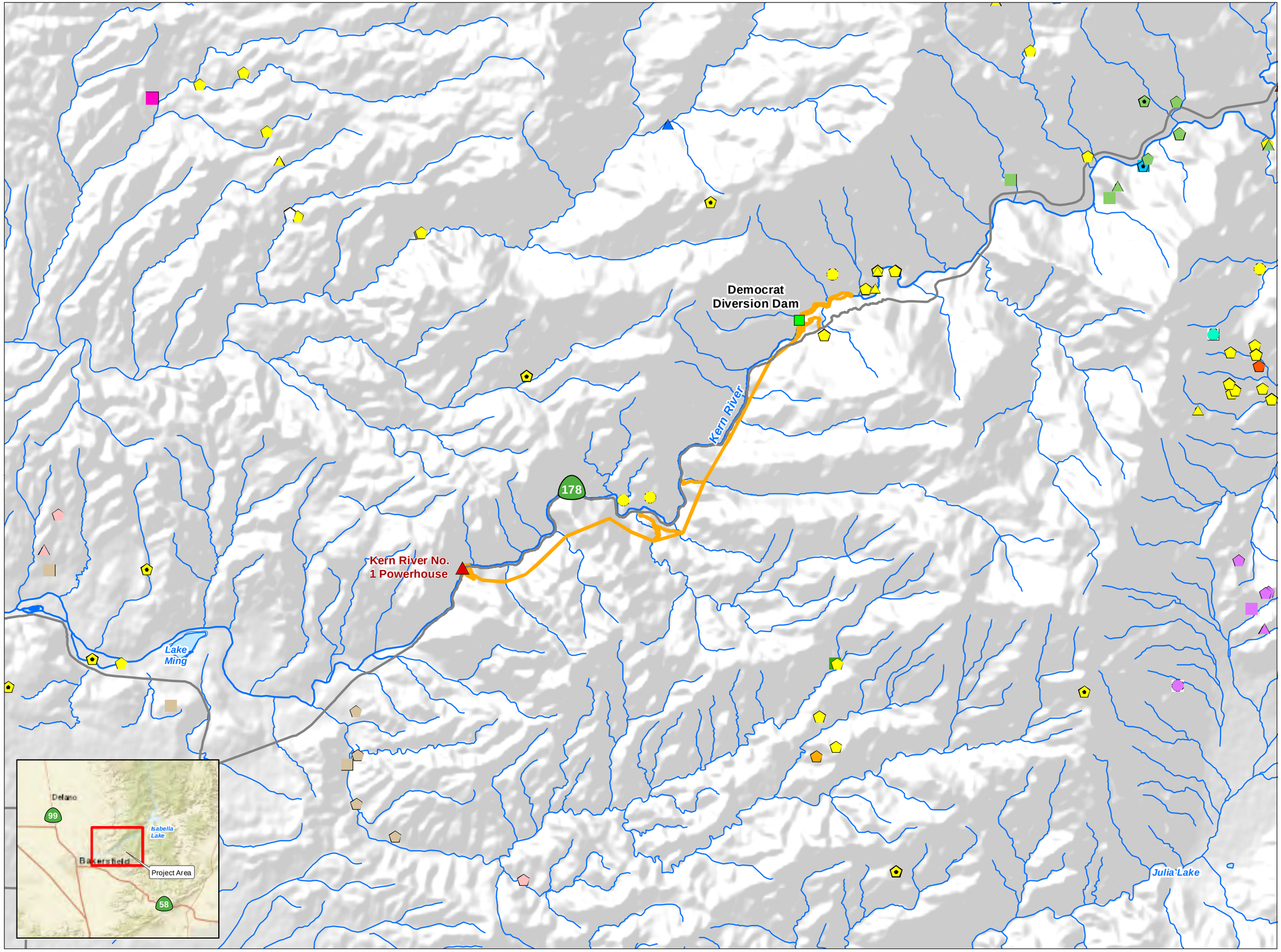

Facilities

- Dam
- Powerhouse
- FERC Boundary

Other Features

- Watercourse
- Highway
- Lake

Mining Data*

Material Mined

- Unknown
- Antimony
- Copper
- Gold, Arsenic
- Gold, Silver, Copper
- Gold, Silver
- Gold
- Gypsum-Anhydrite
- Iron
- Molybdenum
- Sand and Gravel, Construction
- Silica
- Tungsten
- Uranium

Mine Status

- Occurrence
- Prospect
- Past Producer
- Unknown
- Producer

*SOURCE: USGS Mineral Resources Data System, 2022

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Map 7.6-3

Historic and Current Mining Activity in the Project Vicinity

0 1 2 Miles

Date: 10/13/2025

Projection: UTM Zone 11
Datum: NAD 83

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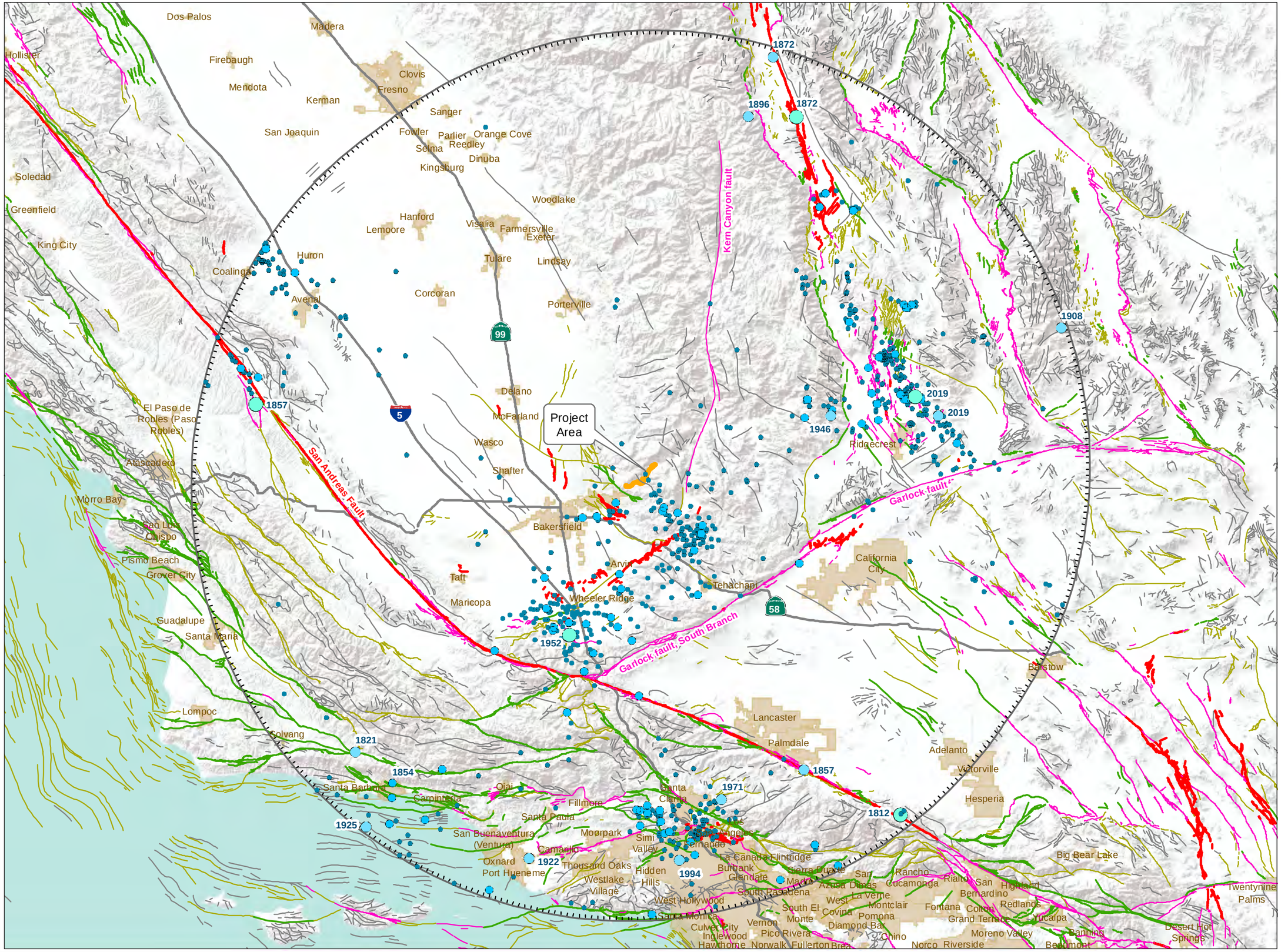

Facilities

FERC Boundary

Other Features

FERC Boundary 100 Mile Buffer

City Boundary

Ocean

Fault Zone Data*

Fault Age:

- Historic Displacement (last 200 years)
- Holocene Displacement (last 11,000 years)
- Late Quaternary Displacement (last 750,000 years)
- Undivided Quaternary Displacement (last 1.6 million years)
- Pre-Quaternary Period (more than two million years ago)

*SOURCES: -- USGS, Earthquake Hazards Program, 2018
https://earthquake.usgs.gov/hazards/qfaults
-- California Geological Survey, 2010
https://maps.conservation.ca.gov/cgs/

Seismicity Data 1800 - Present**

Magnitude:

- >7.0
- 6.0 -7.0
- 5.0 - 6.0
- 4.0 - 5.0

**SOURCE: -- USGS Earthquake Catalogue, Feb 2023
https://earthquake.usgs.gov/earthquakes/search/

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Map 7.6-4

Seismicity and Faults within a 100-mile Radius of the Project

0 12.5 25 Miles

Date: 10/13/2025

Projection: UTM Zone 11
Datum: NAD 83

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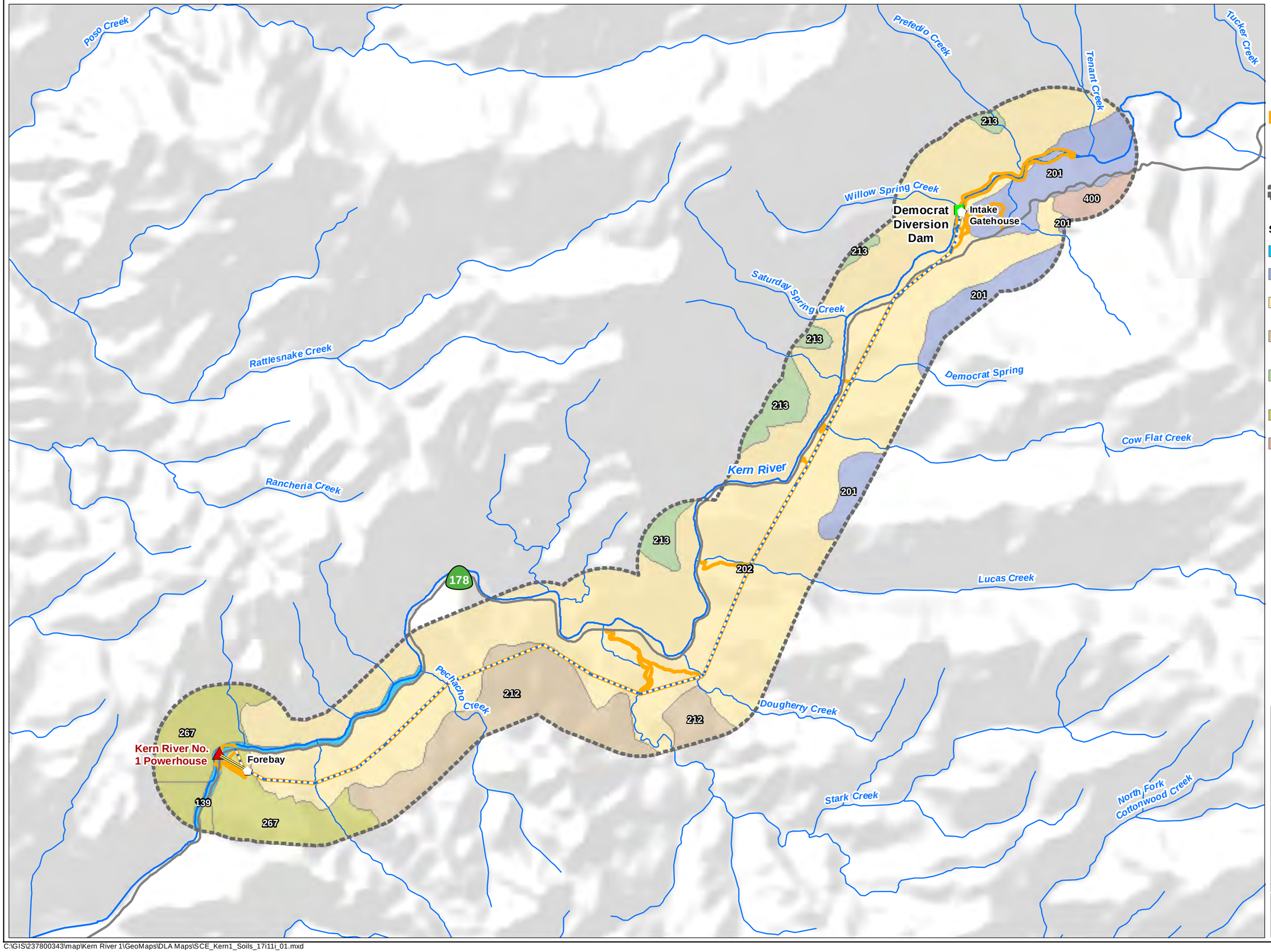


Facilities

- Dam
- Powerhouse
- Water Conveyence Feature
- Flowline
- Penstock
- FERC Boundary

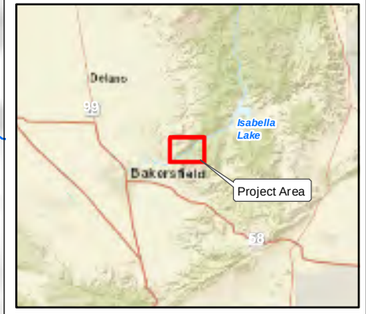
Other Features

- Watercourse
- Highway
- FERC Boundary 0.5 Mile Buffer

Soils Data*

- 139 & 139ne: Riverwash
- 201: Cieneba-Rock outcrop complex, 15 to 50
- 202: Cieneba-rock outcrop complex, 50 to 75 percent slopes
- 212: Auberry-Cieneba-rock outcrop complex, 10 to 30 percent slopes
- 213: Auberry-Cieneba-Rock outcrop complex, 30 to 50 percent slopes
- 267 & 267ne: Cieneba-Vista-Rock outcrop complex, 30 to 60 percent slopes
- 400:Rock outcrop

*DATA SOURCE: NRCS, Kern County, 2022



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Map 7.6-5

Soil Types within 0.5 Miles of the Project

0 0.25 0.5 Miles

Date: 10/13/2025

Projection: UTM Zone 11
Datum: NAD 83

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LIST OF ACRONYMS

AQ 1 TM	AQ 1 – Hydrology Technical Memorandum
BF	bankfull
CDFW	California Department of Fish and Wildlife
cfs	cubic feet per second
cm/sec	centimeters per second
CY	cubic yards

FERC	Federal Energy Regulatory Commission
Forest Service	United States Forest Service
ft^2	square feet
ft/sec	feet per second
LAND 1	LAND 1 – Road and Trail Condition Assessment Technical Memorandum
LAND 2	LAND 2 – Erosion and Sedimentation Technical Memorandum
LB	left bank
mm	millimeter
N/A	not applicable
PM&E	protection, mitigation, and enhancement
Project	Kern River No. 1 Hydroelectric Project
RB	right bank
RM	River Mile
SCE	Southern California Edison
SR-178	State Route 178
State Water Board	State Water Resources Control Board
USACE	United States Army Corps of Engineers

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7.7 GEOMORPHOLOGY

This section describes channel geomorphology, sediment supply, and sediment management in river reaches potentially affected by Southern California Edison's (SCE) Kern River No. 1 Hydroelectric Project (Project).

Section 7.7.1 describes the affected environment and resource conditions under current Project operation and maintenance (i.e., baseline condition). Section 7.7.2 identifies proposed environmental measures, management, and monitoring plans (collectively referred to as protection, mitigation, and enhancement [PM&E] measures) to be implemented under the Proposed Action (see Appendix E.1 for a full description of proposed PM&E measures). Section 7.7.3 includes an analysis of the potential environmental effects of the Proposed Action, including potential beneficial effects of proposed PM&E measures. Section 7.7.4 describes unavoidable adverse effects of the Proposed Action on geomorphology.

7.7.1 Affected Environment

7.7.1.1 Information Sources

This section was developed using existing, relevant, and reasonably available information in the following primary sources. Additional references are cited in the text, as appropriate.

- Federal Energy Regulatory Commission (FERC) Final Environmental Assessment for Hydropower License, Kern River No. 1 Hydroelectric Project (FERC 1998)
- SCE's Application for New License for the Kern River No. 1 Hydroelectric Project (SCE 1994)
- SCE's Sediment Monitoring Results and Sediment Management Plan (ENTRIX 1999)
- SCE's Pre-Application Document for the Kern River No. 1 Hydroelectric Project (SCE 2023)
- SCE Technical Memoranda developed for the relicensing that are provided in Appendix E.2, including:
  - AQ 1 – Hydrology Technical Memorandum (AQ 1 TM) (SCE 2025a)
  - LAND 1 – Road and Trail Condition Assessment Technical Memorandum (LAND 1 TM) (SCE 2025b)
  - LAND 2 – Erosion and Sedimentation Technical Memorandum (LAND 2 TM) (SCE 2025c)

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7.7.1.2 Regional Channel Reach Morphology

The longitudinal profile for the lower Kern River, from Lake Isabella to the mouth of the Kern Canyon, including the bypass reach (i.e., Democrat Dam to the Kern River No. 1 Powerhouse), is shown in Figure 7.7-1. The longitudinal profile is divided into seven river segments with relatively homogeneous gradients, starting at the mouth of Kern Canyon and ending below Lake Isabella, approximately 20 miles upstream of Democrat Dam (Figure 7.7-1, Table 7.7-1). The Kern River's slope increases downstream of Democrat Dam in the bypass reach. The largest tributaries in the vicinity of the Project are Lucas and Stark creeks, containing upstream drainages of approximately 35 to 45 square miles each. These drainages are dry or have minimal flow during the baseflow season but can provide flow and sediment to the Kern River during the wet season.

The steep and narrow bedrock-controlled canyon limits the valley's bottom width. The valley bottom width ranges from 100 to 500 feet and averages 220 feet between Democrat Dam and the mouth of Kern Canyon. The width of the active channel ranges between approximately 75 and 200 feet with an average width of 100 feet. The widest sections of the Kern River are found along significant bends in the channel. The Kern River bypass reach bed and bank substrate is primarily cobble, boulders, and bedrock.

Channel Morphology in the Bypass Reach

The approximately 10.5-mile-long bypass reach associated with the Project starts at Democrat Dam (River Mile [RM] 54.4) and ends at the Kern River No. 1 Powerhouse tailrace (RM 43.9) (Figure 7.7-1). The average channel slope from Democrat Dam to the confluence with Peachacho Creek is 1.5 percent (1.2 to 1.8 percent) and steepens to 3.5 percent in the reach from Peachacho Creek to the Kern River No. 1 Powerhouse. Gradients within the bypass reach range from 1.2 to 3.5 percent (Table 7.7-1; Figure 7.7-1).

The riverbed in the bypass reach is primarily comprised of bedrock and large boulders and cobbles, which make up 29 percent and 36 percent of the length of the bypass reach, respectively. Channel morphology is characterized by bedrock and boulder cascades and pool-riffle-bar sequences (Figure 7.7-2). Depositional features are present in lower gradient segments including transient sand bars that are deposited in eddies along the channel and are colonized by riparian vegetation.

The channel bed and banks within the bypass reach are generally stable laterally and vertically because of the high erosion resistance of the bedrock and prevalence of large boulders that are only mobilized during large and infrequent flood events (SCE 2023). Aerial imagery of the river planform at locations in the bypass reach during the term of the current license (1998 to present) shows:

- Minimal planform change.
- Minimal change to the location and extent of sediment bars (e.g., Figure 7.7-3 Photo A).

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- Minimal change to the location of morphological sequences (e.g., Figure 7.7-3, Photo B).

These locations are representative of the general bypass reach, with minimal change in planform, extent of sediment bars, and morphological sequences.

Limited large woody debris is found in the bypass reach or the river reach downstream of Lake Isabella. Lake Isabella captures large woody debris and there are limited woodland and forest communities along the river for large woody debris recruitment. There is also high transport capacity along the narrow Kern River canyon. At Democrat Dam, a boat or helicopter is used to lift the buoy line, as needed, to allow accumulated large woody debris to effectively be transported during high-flow events over the dam and downstream.

Upstream and Downstream of the Bypass Reach

Upstream of the bypass reach and diversion (Segment 7, upstream of Democrat Dam), the channel gradient is relatively flat at 0.5 percent. The Democrat Dam Impoundment extends approximately one mile upstream of Democrat Dam. At the upstream end of the impoundment, there is a large, stable island. There is no evidence of channel instability behind the dam.

The channel gradient from just downstream of the Kern River No. 1 Powerhouse to the mouth of Kern Canyon (Segment 1) is relatively steep at approximately 2.3 percent. Downstream of the mouth of Kern Canyon, the valley width increases (approximately 750 feet at its widest point compared to a 200 feet maximum active channel width within the bypass reach) and the channel morphology is characterized by braided channels or boulder and cobble fields that are adjacent to the main channel.

7.7.1.3 Sediment Supply and Transport

This section describes potential sediment contribution to the bypass reach from hillslope and streambank erosion, and the relative capacity of the reach to transport and store sediments.

The lower Kern River is characterized as a bedrock-controlled river with minimal horizontal or vertical channel adjustment and low fine-sediment loads (ENTRIX 1999). Across the seven river segments (Figure 7.7-1, Table 7.7-1), some areas are periodically supplied with sediment through mass wasting processes (e.g., debris flow sediment from floods and post-fire storm events) (SCE 2023). Sediment supplied from colluvial fan deposits from moderate to very steep slopes (e.g., headward erosion of small gullies) contains poorly sorted grain sizes from clay to cobbles.

Hillslope Erosion

Hillslope erosion is discussed in Section 7.6, *Geology and Soils*.

Streambank Erosion

The potential for bank erosion within the bypass reach is low due to the presence of bedrock and coarse boulder substrates that stabilize the streambed and banks. In addition, riparian vegetation generally acts to stabilize bars within the bypass reach, limiting streambank erosion.

Based on field observations from June 2024, there was very little active streambank erosion occurring with the only exceptions being two sites where active bank erosion was observed (Table 7.7-2, see Sites Bank Erosion RB_1 and Bank Erosion RB_2).

General Sediment Transport Regime

The Kern River's relatively steep river gradients in the vicinity of the Project result in high transport sediment capacity compared to lower gradient rivers. The actual transport of sediment is limited, however, due to availability of sediment supply. This is described as a supply-limited sediment regime in which the capacity to transport sand and gravel is greater than the amount of this size material supplied to the river. The bedrock, boulders, and large cobbles that armor the channel and that form much of the bed morphology are large enough to remain immobile except during large and infrequent floods. Consequently, fine to medium size sediment (primarily fine sands to gravel) that is supplied to the bypass reach from upstream is readily transported through the reach and only a small portion is deposited in areas with reduced shear stresses, such as along channel margins and in pools (ENTRIX 1999). Sediment trapped in and released from Democrat Dam is discussed below in Section 7.7.1.4, Sediment Management.

7.7.1.4 Sediment Management

Lake Isabella traps the sediment derived from the upper Kern River watershed transported by the North Fork and South Fork Kern River. Downstream of Lake Isabella, in the 20 miles between Lake Isabella and Democrat Dam, there are several small and/or ephemeral tributaries entering the Kern River. During intense winter storms and late summer and fall thunderstorm events these tributaries can introduce significant volumes of sediment to the Kern River and the Democrat Dam Impoundment.

Democrat Dam Operation

Democrat Dam is an overflow concrete gravity dam with a crest length of 204 feet and a height of 29 feet. The impoundment formed by the dam has a surface area of 27 acres. The dam includes a one-story control house, a grated intake structure, 329-foot-long drainage tunnel with a 72-inch electric motor operated sluice gate, and approximately 700 feet of concrete tunnel/flume leading to a sandbox at the head of the powerhouse flowline. Water is typically released to the Kern River either by (1) flow over the dam, (2) by a valve located along the southeast bank of the Kern River at the head of the flowline, at the sandbox, that releases minimum instream flows, and/or (3) flows from the Kern River No. 1 Powerhouse. Map 7.7-1a and b shows Democrat Dam and the facilities described above.

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The sandbox located at the head of the flowline, downstream of Democrat Dam, acts as a sediment trap, preventing the entry of damaging sediments into the flowline and the downstream hydroelectric plant. The sandbox has two slide-gate valves. Part of the diverted water flows to the Kern River No. 1 Powerhouse and a portion is released into the Kern River. One valve is left open year-round to provide minimum instream flow releases to the river (15 cubic feet per second [cfs] minimum from October 1 through May 31 and 50 cfs minimum from June 1 through September 30). Since continuous flow occurs, there is a continuous sediment release, and sediment does not accumulate in the sandbox. This is a pass through of naturally occurring sediment back into the Kern River.

Naturally occurring sediment can, however, accumulate behind Democrat Dam. Sediment behind the dam is managed by bypassing the sediment over the dam and/or through the low-level outlet (drain gate) located at the bottom of Democrat Dam. The drain gate measures 4-feet wide by 8-feet tall, and when completely open, can pass 800 cfs of water. The drain gate and the diversion can operate simultaneously. That is, if total river flow is 1,212 cfs, then SCE may divert 412 cfs to the Project powerhouse and 800 cfs may flow through the drain gate.

PERMITTING

In accordance with License Article 402, SCE conducted sediment monitoring to better understand sediment movement within the bypass reach and developed a Sediment Management Plan (ENTRIX 1999). In response to a sediment release event in 2000, SCE developed a revised sediment management plan (ENTRIX 2005). From approximately 2005 until recently, accumulated sediment was managed in accordance with SCE's Revised Sediment Management Plan (ENTRIX 2005) and resource agency permits (California Department of Fish and Wildlife [CDFW] Section 1600, State Water Resources Control Board [State Water Board] 401 Water Quality Certification, United States Army Corps of Engineers [USACE] 404 Permit). The permits expired in 2022 and 2023 and SCE is currently in the process of renewing the permits. In the interim, limited sediment management has occurred. Historical and interim management are described below:

HISTORICAL OPERATION

Historical operation (2005 to recently) for Democrat Dam included partial and full sediment bypass:

Partial Sediment Bypass

Two partial sediment bypass operations have been conducted historically during (1) precipitation event high flows and (2) normal high flows:

- Precipitation Event High Flows – During precipitation-driven high flows—winter storms or summer and fall thunderstorms—SCE temporarily ceases water diversion and fully opens the low-level outlet at Democrat Dam to allow naturally occurring turbid flows from upstream to pass over the dam and through the low-level outlet. During this operation, the sediment load is carried by the full river flow, mimicking the natural sediment transport regime of the river and protecting the turbine infrastructure from fine sediment abrasion. Once flood and naturally turbid

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flow conditions have improved and turbidity conditions subside, normal operations resume (low-level outlet is closed and diversion is opened). This procedure was formerly described as Peak Flow Sediment Bypass (ENTRIX 2005).

- Normal High Flows – Under normal high-flow conditions, when flows in the bypass exceed 600 cfs (July 1–March 14) or 1,200 cfs (March 15–June 30; smallmouth bass / hardhead minnow spawning period[1]), SCE partially or fully opens the low-level outlet to allow sediment around the low-level outlet and the diversion intake to pass downstream, as needed. Because the impoundment remains full, only sediment immediately around the low-level outlet intake and near the diversion intake is passed downstream. This procedure was formerly described as Operational Sluicing (ENTRIX 2005).

Full Sediment Bypass

- Full sediment bypass involves lowering the water level in Democrat Dam Impoundment and allowing all river flow to pass through the low-level outlet. Full sediment bypass successfully occurs when the lower drain gate is fully opened (releasing approximately 800 cfs) and inflow into Democrat Impoundment is ≤800 cfs. This allows the water level of the impoundment to be completely lowered and the full river flow (and any entrained sediment) to pass through the dam into the bypass reach. Water is not diverted to the powerhouse during full sediment bypass. This procedure was formerly referred to as Full Pond Drain (ENTRIX 2005).

- Full sediment bypass is anticipated to occur annually, when possible, to ensure that sediment does not accumulate behind the dam. However, full pond drains are not recommended during extended drought periods, when sediment transport in the lower Kern River is significantly reduced. Full sediment bypass can cause temporary sediment deposition in the river below the dam, however, because the overall sediment transport regime is supply limited, seasonal high flows will transport the sediment.

- Full sediment bypass is only implemented when anticipated flows, based on forecasted Lake Isabella water releases, are determined to be sufficient to transport the deposited sediment through the bypassed reach. SCE only implements full sediment bypass between November 15 and March 14 to (1) avoid impacts on hardhead minnow spawning and rearing (March 15–June 30), (2) avoid impacts on northwestern pond turtle juveniles and adults during the in-water rearing period (March 15–November 14), and (3) seasonally align releases to meet

[1] In 2005 the California Department of Fish and Wildlife (CDFW) species of management concern was the non-native game fish, smallmouth bass. CDFW has since shifted management focus to the hardhead minnow (*Mylopharodon concephalus*) a CDFW Species of Special Concern and Forest Service Sensitive species. The spawning period from March 15-June 30 remains unchanged.

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dissolved oxygen and temperature requirements in the Water Quality Control Plan for the Tulare Lake Basin.

INTERIM OPERATIONS

Sediment management activities currently are limited to Partial Sediment Bypass activities during either precipitation event or normal high flows (see above). When the agency permits (CDFW Section 1600, State Water Board 401, USACE 404) are renewed, it is anticipated that Full Sediment Bypass activities will resume.

Reporting of sediment operations listed above is provided in annual reports that SCE prepares for CDFW and the State Water Board. Since 2005, SCE has implemented Full Sediment Bypass on five occasions (March 2007, September–March 2009, February 2012, February–March 2013, January–February 2019). Partial Sediment Bypass has occurred on an as-needed basis since 2005.

The goal of sediment management at Democrat Dam is to emulate the natural sediment regime of the lower Kern River (to the extent possible) by allowing naturally occurring sediment to bypass the dam and continue downstream through the lower Kern River system without temporary storage behind Democrat Dam.

HISTORICAL BYPASS REACH MONITORING

In accordance with License Article 402, SCE conducted sediment monitoring to better understand sediment movement within the bypass reach and developed a Sediment Management Plan (ENTRIX 1999). Surveys were conducted in the late fall of 1995, 1996, and 1997, during or following periods of when SCE conducted sediment management activities. A summary of the sediment monitoring data, including pool substrate composition, pool channel change and sediment transport analysis within five studied pools downstream of Democrat Dam is shown in Tables 7.7-3 to 7.7-7. Pools that were sampled are shown on Map 7.7-2. Overall, the absolute and net changes in cross-sectional area for the years monitored indicated that the pool channels experienced either a balancing of deposition and aggradation, or moderate scour (ENTRIX 1999). The bed surface area of pools was dominated by 56 to 84 percent sand cover. Therefore, sediment management activities implemented at Democrat Dam did not cause significant deposition within the pools, indicating a supply-limited system. However, it should be noted that naturally occurring fine sediment was being trapped behind Democrat Dam during this period and likely influenced the fine sediment distribution in the bypass reach.

In September 2000, however, the impoundment was drained during dam inspection and maintenance activities and the accumulated sediment in the impoundment was scoured. Downstream flows were insufficient to carry the sediment load and the sediment deposited in a relatively short time over an approximately 3.1-mile reach of the river. At the time of the release, flows were sufficient to obscure the deposit, and the impacts were not clearly visible until approximately January 2001 (ENTRIX 2001). Once the magnitude of the deposit was apparent, consultation was initiated between SCE, the United States Forest Service (Forest Service), and California Department of Fish and Game (now referred to as CDFW). Subsequent consultation and cross-section monitoring showed

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that the sediment was eventually scoured by high flows in 2005–2006. The last published report on geomorphology monitoring in the bypass reach was in 2001 (ENTRIX 2001). Quantitative sediment monitoring, however, has been completed in several years since 2001, including 2002, 2003, 2004, and annually 2006 through 2021 but not formally published in a document. Results were typically provided at an annual Kern River stakeholder meeting. The monitoring locations are shown on Map 7.7-2.

The revised Sediment Management Plan (ENTRIX 2005) was developed to avoid a repeat of the 2000 sediment event, and to eliminate the episodic periods of sediment-starved and excess sediment conditions that preceded and followed the 2000 event. When sediment is precluded from the bypass reach there is potential for increased bank erosion, degradation of sandbars and beaches, and riparian recruitment. The plan included two additional management components: (1) a full pond drain on an annual basis (if criteria were met), to bypass sediment before it can significantly accumulate behind Democrat Dam; and (2) management of peak sediment inflows caused by winter storms or late summer and fall thunderstorm events (see Historical Operations above). The Revised Sediment Management Plan (ENTRIX 2005) was developed with data from previous studies and a six-year monitoring record of the bypass reach. The recommended schedule for implementation of the procedures was designed to prevent unnatural sediment conditions in the bypass reach and protect fish spawning and rearing habitat by mimicking the natural sediment transport regime.

The latest information on sediment management and monitoring was provided in a 2018 PowerPoint at the Annual Kern River Stakeholder Meeting (January 2018). Full pond drains occurred, March 2007 and October 2009, and monitoring in January 2012, showed deposits were scoured by high flows in 2011. Full pond drains occurred in February 2012 and February 2013 (5,000–15,000 cubic yards [CY] of sediment was released into the bypass reach). There was a subsequent five year drought, with little change in sediment conditions in the bypass reach (temporary sediment deposition was observed from Democrat Dam to lower Richbar) until 2017 wet water year conditions with peak flows over 4,000 cfs for 6 months (2 months over 5,000 cfs). January 2018 monitoring showed scoured conditions in the bypass reach. Figure 7.7-4 shows the hydrology, full pond drains, and monitoring through 2017. The last full pond drain was January–February 2018. The duration of the drain was about 19 days and the drain coincided with an powerhouse outage in order to drain the tunnel for repair of the intake gates (K.A. Colgate, Pers. Communication, September 2025). Other Partial Sediment Bypass activities (both precipitation event high flow and normal high flow bypass) have occurred from 2005 through the present when flow conditions are met.

Field Surveys of Erosion and Sedimentation

During field surveys conducted in June 2024, as part of the LAND 2 study, significant potential for erosion and/or sedimentation was observed at 19 sites in the vicinity of the Project. Potential for erosion and/or sedimentation at 17 of the sites was a result of natural processes and was not Project related. Table 7.7-2 has a description of the type of potential erosion or deposition, and whether the feature was naturally caused or Project

related. The locations of the sites are shown on LAND 2 TM, Map 5-1 and photographs of the sites are shown in LAND 2 TM, Appendix A (SCE 2025c).

The 17 non-project related sites showed signs of significant erosion and/or sedimentation in the form of sediment available for transport. These included sand and gravel deposits at State Route 178 (SR-178) culverts and/or in the stream channels and at confluences with the mainstem channel; signs of active bank erosion on the mainstem channel of the Kern River; and/or evidence of periodic landslide events (Table 7.7-2). Creeks that did not have safe access for visual observation or photographic documentation, were considered to be potentially significant sources of erosion and sedimentation similar to the observed creeks. At the time of field observation, there was no active erosion at any of the Project facilities. A review of historical aerial imagery indicated that potential erosion and sedimentation related to Project features was small scale and remained stable from 2002 to 2023 (availability of imagery). The only Project-related features that were identified as locations of potential erosion and sedimentation were the forebay overflow pipeline and the legacy spoil piles from excavating the water conveyance flowline:

- There was no visible erosion associated with the forebay overflow pipeline at the time of observation in the field. This was the site of the August 20, 2013, forebay spill caused by a storm-related debris flow and intrusion of sediment and debris into the flowline that plugged the forebay overflow pipe (refer to LAND 2 TM, Appendix A, Photos A-21 and A-22). The storm and resulting debris flow that caused this incident was a naturally occurring event which could not have been anticipated. Thus, no measures could have been taken to prevent the condition. SR-178 was closed by the California Highway Patrol the evening of August 19, 2013 because of multiple storm-related rockslides that blocked the road, which made the Project inaccessible. Following this event, SCE completed modifications to the flowline to prevent recurrence of a similar event. SCE made modifications at the vent opening at Adit 17/18 to redirect any upslope runoff or debris flows over the opening and prevent flow, mud or plant material from entering the flowline. At the forebay, modifications were completed to prevent future overtopping by removing the screen/rack at the intake to the overflow spill pipe thus preventing plugging and allowing any surge flow to enter the overflow pipe.

- The legacy spoils piles from construction at the flowline adits were visible in all historical aerial photographs and appear largely unchanged between 2002 and 2023. An aerial image of a few of the spoil piles is provided in LAND 2 TM, Figure 5-1 (SCE 2025c).

7.7.2 Proposed Environmental Measures

Under the Proposed Action, SCE proposes to implement PM&E measures associated with ongoing Project operation and maintenance activities. PM&E measures are designed to protect, maintain, or enhance environmental and cultural resources over the term of the new license. SCE proposes implementing the following PM&E measures related to geomorphology:

- Minimum Instream Flow Measure
- Stream Gaging Plan
- Sediment Management Plan
- Project Access Roads and Trails Management Plan
- Vegetation Management Plan

Appendix E.1 provides complete descriptions of measures SCE is proposing as part of the license application and to include in any new license issued for the Project.

7.7.3 Potential Project Effects

This section describes the potential effects to geomorphology (sediment supply, channel morphology, and sediment conditions) that could occur because of continued operation and maintenance activities to be implemented under the Proposed Action. Potential effects are determined by analyzing the changes in geomorphology that may result from activities implemented under the Proposed Action (Section 5.2) compared to the No-Action Alternative (existing condition) (Section 5.1). Final effects determinations consider PM&E measures to be included under the Proposed Action (refer to Appendix E.1).

Under the Proposed Action, SCE would continue to operate and maintain the Project as described in Section 5.1, *No-Action Alternative*, with minor adjustments to Project operation and maintenance activities in response to implementing proposed PM&E measures. No new or upgraded facilities, structural changes, or operational changes to the Project are proposed.

Consistent with FERC's Scoping Document 2 (FERC 2023), this section evaluates potential effects of continued Project operation and maintenance on the following:

- Potential effects on channel geomorphology (e.g., bank erosion) in the bypass reach associated with changes in Project operations, including:
    - Minimum instream flow releases
    - Large woody debris management
- Potential effects on channel geomorphology (e.g., sediment movement in shorelines/streambanks) in the bypass reach associated with sediment management of Democrat Dam Impoundment, including:
    - Flow and sediment releases from the Sandbox
    - Sediment Management at Democrat Dam

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A description of potential effects on flows in the bypass reach under the Proposed Action is presented in Section 7.2, *Water Use and Hydrology.* Potential effects related to erosion along the conveyance system, and as part of access road and trail maintenance are discussed in Section 7.6, *Geology and Soils*.

7.7.3.1 Potential effects on channel geomorphology in the bypass reach associated with changes in Project operations

Minimum Instream Flow Releases

As discussed in Section 7.7.1.2, *Regional Channel Reach Morphology*, the channel bed and banks within the bypass reach are generally stable because of the prevalence of bedrock and coarse boulder substrate along the bed and banks that limit lateral and vertical channel erosion. Under the Proposed Action, SCE would continue to implement the same minimum instream flows as under the current license (refer to the Minimum Instream Flow Measure in Appendix E.1). Based on the stability of the channel bed and banks and the fact that there are no changes proposed for minimum instream flows, there will be no effect on channel geomorphology in the bypass reach associated with the Proposed Action minimum instream flow releases compared to the No-Action Alternative.

Large Woody Debris Management

Under the No-Action Alternative, the buoy line upstream of Democrat Dam is used to prevent large woody debris from collecting in front of the intake grates. As needed, a boat or helicopter is used to lift the buoy line to allow accumulated large woody debris to effectively be transported during high-flow events over the dam and downstream. The same management of large woody debris will be implemented under the Proposed Action; therefore, the Proposed Action will have no effect on large woody debris transport into the bypass reach compared to the No-Action Alternative.

7.7.3.2 Potential effects on channel geomorphology associated with management of Democrat Dam Impoundment

Flow and sediment releases from the Sandbox

Sediment releases from the sandbox could affect geomorphology in the vicinity of the sandbox if large amounts of sediment were released into the river. Water diverted into the flowline system first enters the intake structure, then flows into a sandbox where sediment settles out of the water. The downstream end of the sandbox has two valves at the bottom on the river side. One of the valves is left open year-round to provide minimum instream flow releases to the river, which are currently 15 cfs from October 1 through May 31 and 50 cfs from June 1 through September 30. This provides continuous flushing of the sandbox. Under the Proposed Action, SCE is not proposing changes to this infrastructure or Project operations.

Since continuous flow occurs through the sandbox, there is continuous sediment flushing and sediment does not accumulate in the sandbox or in the river downstream. The Proposed Action would continue to pass inflowing, naturally occurring sediment back into

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the river. The continuous nature of the process has negligible effect on geomorphology in the bypass reach and would result in no change from the No-Action Alternative.

Sediment Management at Democrat Dam

PARTIAL SEDIMENT BYPASS

Partial sediment bypass at Democrat Dam includes both precipitation event and normal high flow bypasses. Releases of natural sediment from the impoundment could affect geomorphology in the bypass reach depending on the timing and magnitude of releases.

- Precipitation Event High Flows – During precipitation event high flows, including winter storms and summer and fall thunderstorms, SCE temporarily ceases diversion and allows sediment-laden flows entering Democrat Impoundment to pass over the dam and through the lower drain gate (see Section 7.7.1.4). The suspended sediment load is carried by the full river flow; thereby mimicking the natural sediment transport regime. Because this procedure is implemented during naturally turbid high-flow conditions and generally just bypasses incoming suspended sediment (although some local sediment deposits in the vicinity of the drain can be eroded), the Proposed Action does result in a nominal discharge of sediment, similar to natural background levels. The Proposed Action beneficially allows natural sediment to bypass Democrat Dam and mobilize naturally in the bypass reach and does not affect geomorphology in a negative way.

- Normal High Flows – When flow in the bypass reach is >600 cfs from July 1 to March 14, or >1,200 cfs from March 15 to June 30 (hardhead minnow spawning and rearing period), the drain gate is opened as needed, partially or fully, to allow sediment around the drain opening upstream of the dam and near the flowline intake screens to pass downstream. Only sediment in the direct vicinity of the drain gate is scoured, resulting in mobilization of a relatively minor amount of sediment (see Section 7.7.1.4).

  Sediment transport analysis by ENTRIX (1999) indicated flows above 600 cfs scour through the pools and maintain the morphology, however, they recommend that if releases occur during the period of smallmouth bass spawning or early fry rearing (March 15 and June 30), then a flowrate of 1,200 cfs would provide a biological safety factor. If normal high flow sediment bypass occurs under the specified parameters, the Proposed Action will have a negligible effect on the bypass reach geomorphology and will have no effect compared to the No-Action Alternative.

FULL SEDIMENT BYPASS

Full sediment bypass involves lowering the water surface elevation of Democrat Dam Impoundment by opening the drain gate when inflows are less than 800 cfs (capacity of the drain gate). Sediment is eroded from the impoundment banks as the water level in the impoundment recedes to the level of the dam drain outlet, and water velocity through the impoundment increases. SCE's USACE 404 permit (2012), authorized release of 20,000 CY of sediment annually and a maximum of 40,000 CY in the event that releases

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were delayed beyond one year. The full sediment bypass could impact geomorphology in the bypass reach (e.g., sediment deposition) depending on the amount of sediment released, the flows in the bypass reach, and the timing of the release.

The Proposed Action and the associated Sediment Management Plan (Appendix E.1) include full sediment bypass annually, when Kern River inflows make it possible, to ensure that sediment does not accumulate behind the dam to unmanageable levels. The Sediment Management Plan also includes sediment bypass planning and environmental monitoring. Full sediment bypass is not recommended during extended drought periods when sediment transport in the lower Kern River is significantly reduced as high flows are required to successfully transport the sediment released into the bypass reach. Because full sediment bypass can cause temporary sediment deposition in the river below the dam, full sediment bypass should only be implemented when anticipated flows, based on snowmelt inflow estimates and projected Lake Isabella water releases, are determined to be sufficient to transport the deposited sediment through the bypass reach. Also, based on previous consultation with CDFW, SCE should only implement full sediment bypass between November 15 and March 14, to avoid the spawning and rearing period for hardhead minnow, which extends from March 15 to June 30, and to avoid potential impacts to northwestern pond turtle juveniles and adults during the in-water rearing period March 15–November 14. In addition, this implementation time period seasonally aligns releases to meet dissolved oxygen and temperature requirements in the Water Quality Control Plan for the Tulare Lake Basin.

With implementation of the Sediment Management Plan, the Proposed Action will mimic natural sediment transport processes in the bypass reach to the extent possible, keep the Democrat Dam Impoundment free of sediment buildup in the impoundment and along the shorelines, keep the diversion operational, and have a negligible effect on geomorphology (sedimentation and erosion) in Democrat Dam Impoundment and the bypass reach.

7.7.4 Unavoidable Adverse Effects

There are no unavoidable adverse effects to channel geomorphology from continued operation and maintenance of the Project under the Proposed Action.

7.7.5 References

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____. 2025c. LAND 2 – Erosion and Sedimentation Technical Memorandum, Kern River No. 1 Hydroelectric Project, FERC Project No. 1930. December.

TABLES

Table 7.7-1. Kern River Segments

Location	Segment	River Mile			Channel Gradient (%)
		To	From	Total Segment Length	
Mouth of Kern Canyon to above Kern River No. 1 Powerhouse	1[1]	42.1	44.6	2.5	2.3
Above Kern River No. 1 Powerhouse to Peachacho Creek	2	44.6	45.9	1.3	3.5
Peachacho Creek to Live Oak	3	45.9	47	1.1	1.7
Live Oak to Lucas Creek	4	47	50.4	3.4	1.2
Lucas Creek to Saturday Spring Creek	5	50.4	52.9	2.5	1.8
Saturday Spring Creek to Democrat Dam	6	52.9	54.5	1.6	1.4
Democrat Dam to 10 miles upstream	7[2]	54.5	64.8	10.3	0.5

Notes: [1] Segment 1 starts at the Mouth of Kern Canyon and extends 1.8 miles to just upstream of Kern River No. 1 Powerhouse.
[2] Segment 7 starts just upstream of Democrat Dam and extends 10 miles upstream.

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Table 7.7-2. Locations of Potentially Significant Sources of Erosion and Sedimentation

Site	Photographs (LAND 2 Technical Memo, Appendix A)	Approximate Volume (CY)	Hydrology at the Time of the Survey	Project Related	Natural Causes	Description
Willow Spring Creek	N/A	N/A	N/A	No	Yes	Willow Spring Creek at Democrat Dam. Considered to be a potentially significant source of sediment during high flows based on observations of other named creeks in the canyon. Not accessible for visual observation or photos.
Unnamed Tributary	A-1 to A-2	N/A	Dry	No	Yes	Unnamed Tributary (Lower) that connects to the mainstem channel on LB below the Democrat Dam access road parking area. Sand and gravel deposits above and below culvert would likely be transported during high-flow conditions.
	A-3	4	Dry	No	Yes	Unnamed Tributary (Upper) at water crossing on Cow Flat Rd. Prism of sand and gravel deposited above road suggests significant potential for sediment transport during high-flow conditions.
Saturday Spring Creek	N/A	N/A	N/A	No	Yes	Saturday Spring Creek on RB of mainstem channel. Considered to be a potentially significant source of sediment during high flows based on observations of other named creeks in the canyon. Not accessible for visual observation or photos.

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Site	Photographs (LAND 2 Technical Memo, Appendix A)	Approximate Volume (CY)	Hydrology at the Time of the Survey	Project Related	Natural Causes	Description
Democrat Spring Creek	N/A	N/A	N/A	No	Yes	Democrat Spring Creek on LB of mainstem channel. Considered to be a potentially significant source of sediment during high flows based on observations of other named creeks in the canyon. Not accessible for visual observation or photos.
Cow Flat Creek	A-4	7	Dry	No	Yes	Upper Cow Flat Creek at water crossing on Cow Flat Rd. Prism of sand and gravel deposited above road suggests significant potential for sediment transport during high-flow conditions.
	A-5 to A-6	N/A	Dry	No	Yes	Cow Flat Creek at SR-178 culvert and confluence with mainstem channel. Prism of sand and gravel deposited below culvert adjacent to confluence suggests significant potential for sediment transport during high-flow conditions.
Lucas Creek	A-7 to A-8	N/A	Flowing	No	Yes	Upper Lucas Creek at water crossing on Cow Flat Rd. Abundant fine sediment that would likely be transported during high-flow conditions
	N/A	N/A	Flowing	No	Yes	Lucas Creek at SR-178 culvert and confluence with mainstem channel. Cobbles, sand, and gravel deposited below culvert adjacent to confluence suggests significant potential for sediment transport during high-flow conditions.

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Site	Photographs (LAND 2 Technical Memo, Appendix A)	Approximate Volume (CY)	Hydrology at the Time of the Survey	Project Related	Natural Causes	Description
Dougherty Creek	A-9	N/A	Flowing	No	Yes	Dougherty Creek at SR-178 culvert and confluence with mainstem channel. Steep drainage with rilling suggests significant potential for erosion and sediment transport during high-flow conditions. Boulders, cobbles, gravel, and sand deposited below culvert.
Bank Erosion_RB1	A-10 to A-11	N/A	N/A	No	Yes	Bank erosion at the confluence of an ephemeral drainage and the mainstem channel on RB. Steep cut bank composed of loose cobbles, gravel, and sand with rilling, slumping, and potential for significant erosion and sediment deposition.
Stark Creek	A-12	N/A	Dry	No	Yes	Upper Stark Creek at the end of the flowline access road. Scoured bedrock channel and matrix supported cobbles suggest potential for significant episodic erosion and sediment transport. Deposits of fine sand and gravel that would likely be transported during high-flow conditions.
	A-13	N/A	Dry	No	Yes	Stark Creek at SR-178. Boulder and cobble bed with some sand and gravel. Observations of the upper drainage and channel geometry suggest the potential for episodic debris flows and sediment transport that could impact travel on SR-178. Confluence with mainstem

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Site	Photographs (LAND 2 Technical Memo, Appendix A)	Approximate Volume (CY)	Hydrology at the Time of the Survey	Project Related	Natural Causes	Description
						channel not accessible for visual observation or photos.
Rilling/Landslide_RB1	A-14 to A-15	N/A	N/A	No	Yes	Landslide scar with rilling on RB across from Lower Richbar Day Use Area. Potential for episodic erosion and sediment delivery directly into mainstem channel.
Bank Erosion_RB2	A-16	N/A	N/A	No	Yes	Steep eroding cut bank on RB. Composed of boulders and cobbles supported by sand and gravel matrix.
Peachacho Creek	N/A	N/A	Dry	No	Yes	Peachacho Creek at SR-178. Steep, deeply incised drainage. Considered to be a potentially significant source of sediment during high flows based on observations of other named creeks in the canyon. Not accessible for visual observation or photos.
Landslide at KR1 Powerhouse	A-17 to A-19	N/A	N/A	No	Yes	Large landslide scar above the KR1 powerhouse on the RB.

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Site	Photographs (LAND 2 Technical Memo, Appendix A)	Approximate Volume (CY)	Hydrology at the Time of the Survey	Project Related	Natural Causes	Description
8/20/2013 Forebay Spill	A-20	N/A	N/A	Yes	No	Rock, mud, water, and plant material from a landslide entered the KR1 conduit approximately 1 mile upstream of the forebay. This material continued downstream in the tunnel creating a temporary surge in flows at the forebay, causing the pipe spillway to plug and forebay to spill. This resulted in severe erosion of the hillside below the forebay and along the pipe spillway.
8/20/2013 Forebay Erosion Deposit	A-21 to A-22	N/A	N/A	Yes	No	

Source: Appendix A of LAND 2 – Erosion and Sedimentation Technical Memorandum (SCE 2025c)
Key: CY = cubic yards
LB = Left Bank (when viewed in the downstream direction)
RB = Right Bank (when viewed in the downstream direction)
SR-178 = State Route 178
N/A = not applicable (not accessible for direct visual observation or photos, or the parameter is not applicable to the feature being described)

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Table 7.7-3. Summary of Estimated Substrate Composition for Pools in the Bypass Reach

Station Number/ Year	Substrate Composition (%)			
	Fines	Gravel	Cobble	Boulder/Bedrock
Pool No. 1				
1995	76.20	2.40	2.40	19.00
1996	75.50	11.10	6.70	6.70
1997	68.40	13.20	0.00	18.40
Pool No. 3				
1995	21.40	17.90	0.00	60.70
1996	36.40	3.00	6.10	54.50
1997	14.70	0.00	11.80	73.50
Pool No. 4				
1995	84.40	0.00	0.00	15.60
1996	81.80	0.00	3.00	15.20
1997	67.60	5.90	8.80	17.70
Pool No. 5*				
1996	56.10	0.00	0.00	43.90
1997	63.40	0.00	22.00	14.60
Pool No. 6*				
1996	43.90	0.00	0.00	56.10
1997	42.90	0.00	0.00	57.10

Source: SCE 1999
Notes: *Data was not reported from pool in 1995.
Station number 2 was not located in a pool habitat unit and sediment was not collected.

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Table 7.7-4. Summary of Median Grain Size for Pools in the Bypass Reach

Sample ID	Median Grain Size (mm)	
	1996	1997
Pool 1L	0.108	0.1
Pool 1M	1.218	1.05
Pool 1R	0.685	–
Pool 3L	0.138	–
Pool 3M	**	–
Pool 3R	0.25	0.4
Pool 4L	–	0.95
Pool 4M	1.501	0.87
Pool 4R	0.215	1.29
Pool 5L	0.904	–
Pool 5M	3.307	> 3.0
Pool 5R	1.348	0.13
Pool 6L	–	–
Pool 6M	1.099	> 3.0
Pool 6R	0.873	1.34

Source: SCE 1999
Notes: L, M, and R indicates where the sample was taken in the channel (left, middle or right).
Pool No. 2 does not exist. The naming convention of the pools skips Pool No. 2.
Key: mm = millimeter
– = sediment sample not collected.
** = sample collected is too granular and out of range for machine to calculate median grain size.

Table 7.7-5. Summary of Channel Form Indices in the Bypass Reach

Station Number	1995	1996	1997
Cross-Sectional Depth (mean in feet)			
Pool No. 1	8.23	8.4	8.53
Pool No. 3	8.72	8.64	9.04
Pool No. 4	11.11	10.75	11.08
Pool No. 5	–	8.47	9.02
Pool No. 6	–	10.73	10.81
Width: Depth Ratio			
Pool No. 1	22.61	22.14	22.8
Pool No. 3	9.98	10.07	9.63
Pool No. 4	10.74	11.10	10.77
Pool No. 5	–	11.44	10.75
Pool No. 6	–	11.66	11.57

Station Number	Absolute Percent Change in Area		Net Percent Change in Area	
	1995–1996	1996–1997	1995–1996	1996–1997
Percent Change in Cross-Sectional Area				
Pool No. 1	7.73	7.98	2.13	1.56
Pool No. 3	2.92	5.14	-0.92	4.62
Pool No. 4	4.48	4.36	-3.21	3.07
Pool No. 5	–	8.76	–	6.46
Pool No. 6	–	3.68	–	0.78

Source: SCE 1999
Notes: Pool No. 2 does not exist. The naming convention of the pools skips Pool No. 2.
Key: – = sediment sample not collected.

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Table 7.7-6. Calculated Maximum Grain-Size Transported (Shield's Criterion) in the Bypass Reach

Pool ID*	Slope	Area BF (ft^2)	Half-BF (ft^2)	Hydraulic Radius BF (feet)	Half-BF (feet)	Shear Velocity BF (cm/sec)	Half-BF (cm/sec)	Maximum Size - Onset Motion		Average Grain Size (D50) of Fines (mm)
								BF (mm)	Half-BF (mm)	
Pool No. 3 (1995)	0.0017	986	230	2	2.45	10.08	11.16	> 10	> 10	–
Pool No. 3 (1996)	0.000051	986	230	2	2.45	1.75	1.93	0.7	0.7	0.25
Pool No. 3 (1997)	0.000103	986	230	2	2.45	2.48	2.75	1.1	1.2	0.4
Pool No. 4 (1995)	0.0001	1160	395	4.85	2.46	3.81	2.71	2	1.2	–
Pool No. 4 (1996)	0.00005	1160	395	4.85	2.46	2.69	1.92	1.2	0.7	1.5
Pool No. 4 (1997)	0.0000	1160	395	4.85	2.46	–	–	–	–	1.29
Pool No. 5 (1996)	0.0003	877	385	5.48	2.85	7.01	5.06	7	3.5	3
Pool No. 5 (1997)	0.00001	877	385	5.48	2.85	1.28	0.92	0.3	0.2	3
Pool No. 6 (1996)	0.0002	1296	456	4.98	3.37	5.46	4.49	3.6	2.5	1
Pool No. 6 (1997)	0.0003	1296	456	4.98	3.37	6.68	5.5	6.8	3.6	3

Source: SCE 1999

Notes *Data was not collected for Pool No. 1.
Pool No. 2 does not exist. The naming convention of the pools skips Pool No. 2.

Key: cm/sec = centimeter per second
BF = bankfull
ft^2 = square feet
mm = millimeter
– = data not collected.

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Table 7.7-7. Calculated Sediment Transport Capacity During Monitored Conditions in the Bypass Reach

Pool ID	Avg. Depth (feet)	Width (feet)	Discharge (cfs)	Velocity (ft/sec)	Transport Capacity (tons/day)
Pool No. 3 (1995)	8.31	69.2	611	1.06	9.7
Pool No. 3 (1996)	8.39	45.3	20	0.05	–
Pool No. 3 (1997)	9.8	49.2	64	0.13	–
Pool No. 3 - BF	12	86	4000	4.05	200
Pool No. 4 (1995)	8.5	100.8	611	0.71	10
Pool No. 4 (1996)	7.3	88.8	20	0.03	–
Pool No. 4 (1997)	8.3	92.1	64	0.08	–
Pool No. 4 - BF	10	115	4000	3.45	150
Pool No. 5 (1996)	4.6	88.7	20	0.046	–
Pool No. 5 (1997)	5.4	89.9	64	0.13	–
Pool No. 5 - BF	9	99	4000	4.56	340
Pool No. 6 (1996)	6.5	72.5	20	0.04	–
Pool No. 6 (1997)	6.7	73.5	64	0.13	–
Pool No. 6 - BF	10.4	125	4000	3.08	110

Source: SCE 1999
Notes: *Data was not collected for Pool No. 1.
Pool No. 2 does not exist. The naming convention of the pools skips Pool No. 2.
Key: BF = bankfull
cfs = cubic feet per second
ft/sec = feet per second
– = data not collected.

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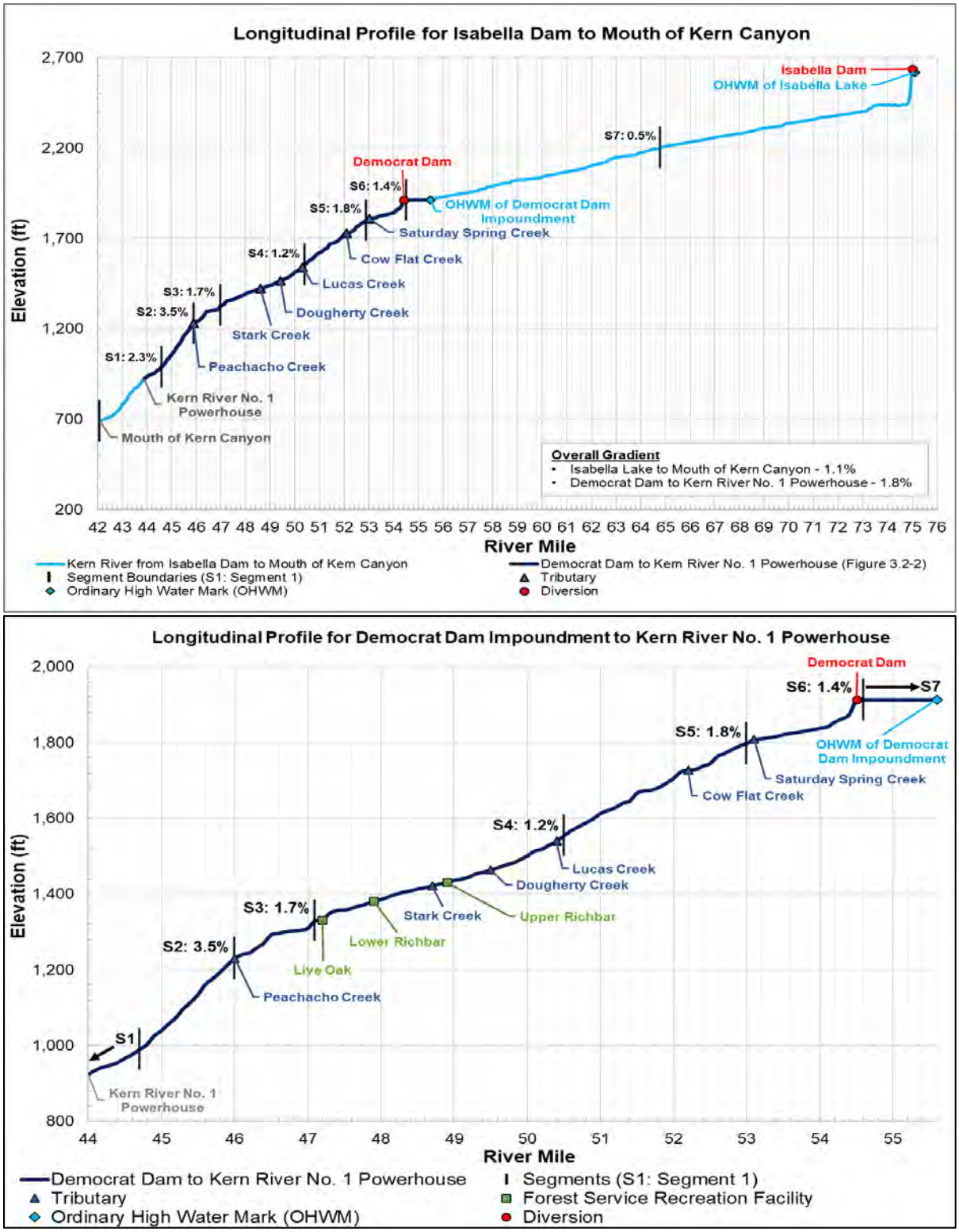
FIGURES



Source: Google 2013

Figure 7.7-1. Longitudinal Profile of the Lower Kern River from Isabella Dam to the Mouth of Kern Canyon (top) and Bypass Reach (bottom)

Figure 7.7-2. Representative Photographs of the A) Boulder Cascade (RM 45), B) Pool-Riffle Sequence (RM 47.5), C) Bar (RM 46.5), and D) Bedrock Channel (RM 53) Morphologies in the Bypass Reach

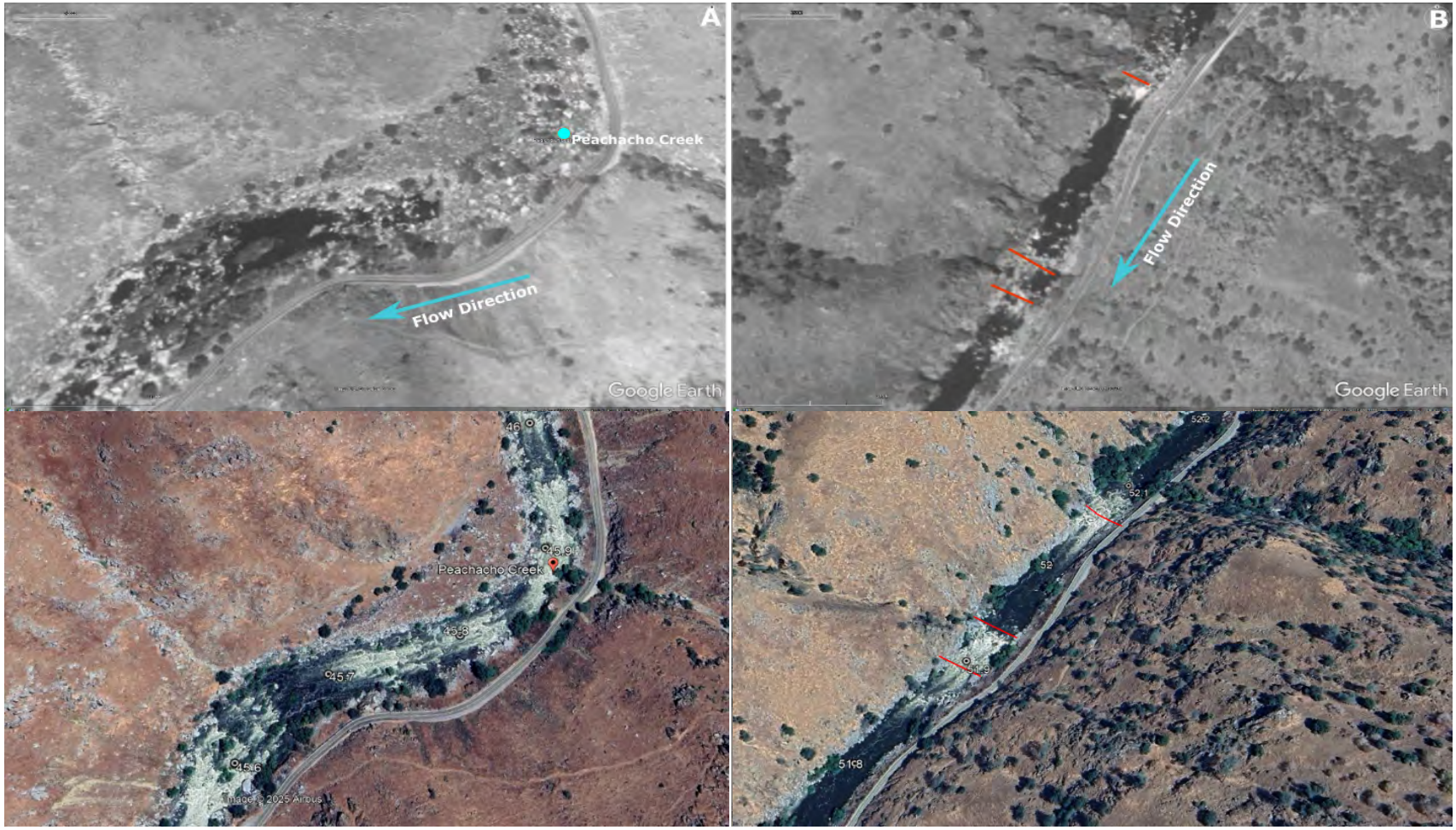


Figure 7.7-3. Representative Historical Aerial Imagery of Channel Reach Morphology in the Bypass Reach with Minimal Change Throughout the Previous License Term (1998 to 2013/2015). A) Bar morphology downstream of Peachacho Creek (RM 45.9) that shows minimal morphologic change from 2002 (top) to 2023 (bottom). B) Step-pool sequence located near RM 63 that has been maintained with minimal change from 2002 (top) to 2023 (bottom).

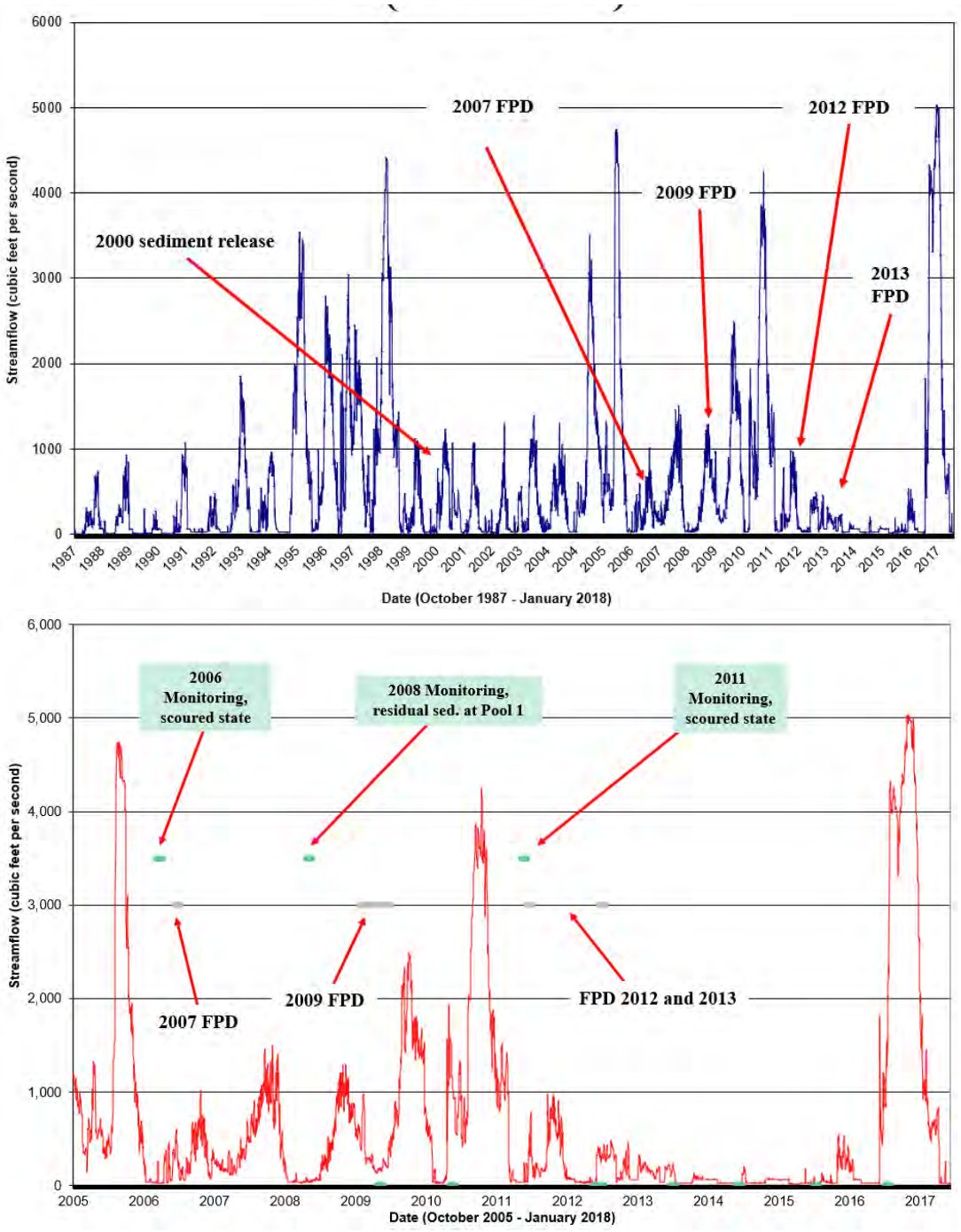


Figure 7.7-4. Kern River bypass reach hydrology 1988–2017 and full pond drain dates (FPD) (top) and Kern River bypass reach hydrology and monitoring dates (2005–2017) (bottom).

MAPS

Prefedio Creek

Democrat Dam Impoundment

Willow Spring Creek Road

Powerline Road

178

Kern River

a

b

Facilities

- Dam
- Water Conveyence Feature
- Tunnel
- Flume
- Conduit
- Sandbox
- Spillway
- Gage
- Ancillary Facility
- Ancillary Feature
- Powerline
- FERC Boundary

Transportation

- Project Road
- Other Road
- Project Trail

Other Features

- Watercourse

SOUTHERN CALIFORNIA EDISON
Energy for What's Ahead

Kern River No. 1 Hydroelectric Project
FERC Project No. 1930

Map 7.7-1a

Project Facilities near Democrat Dam and Impoundment

0 250 500
Feet

Projection: UTM Zone 11
Datum: NAD 83

Date: 10/22/2025

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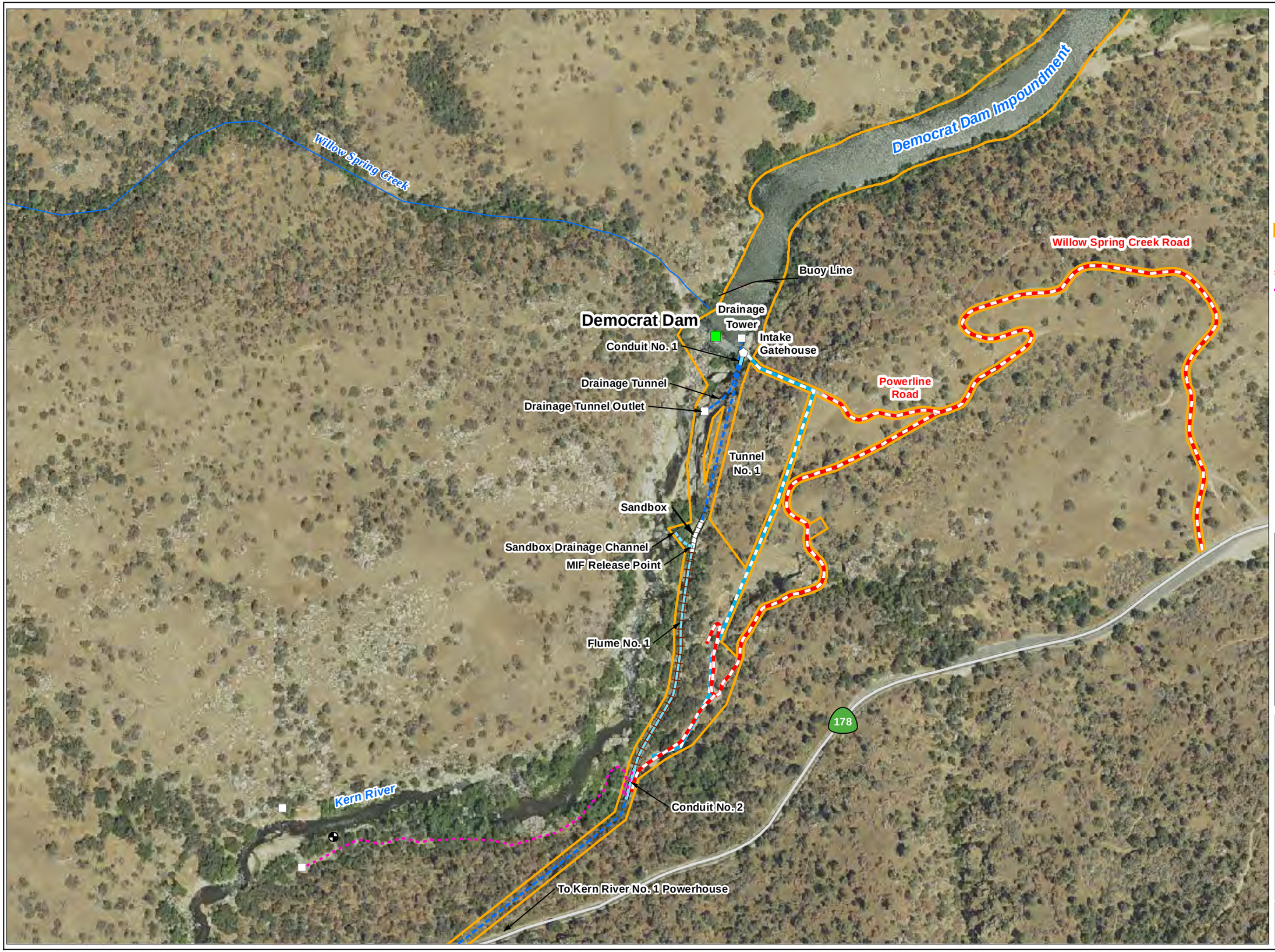


Facilities

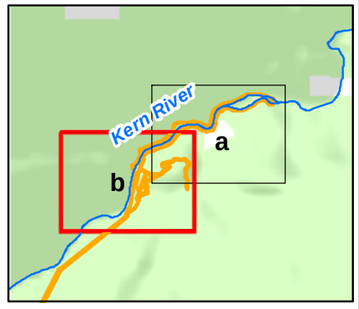
- Dam
- Water Conveyence Feature
- Tunnel
- Flume
- Conduit
- Sandbox
- Spillway
- Gage
- Ancillary Facility
- Ancillary Feature
- Powerline
- FERC Boundary

Transportation

- Project Road
- Other Road
- Project Trail

Other Features

- Watercourse



SOUTHERN CALIFORNIA EDISON
Energy for What's Ahead

Kern River No. 1 Hydroelectric Project
FERC Project No. 1930

Map 7.7-1b

Project Facilities near Democrat Dam and Impoundment

0 250 500
Feet

Projection: UTM Zone 11
Datum: NAD 83

Date: 10/22/2025

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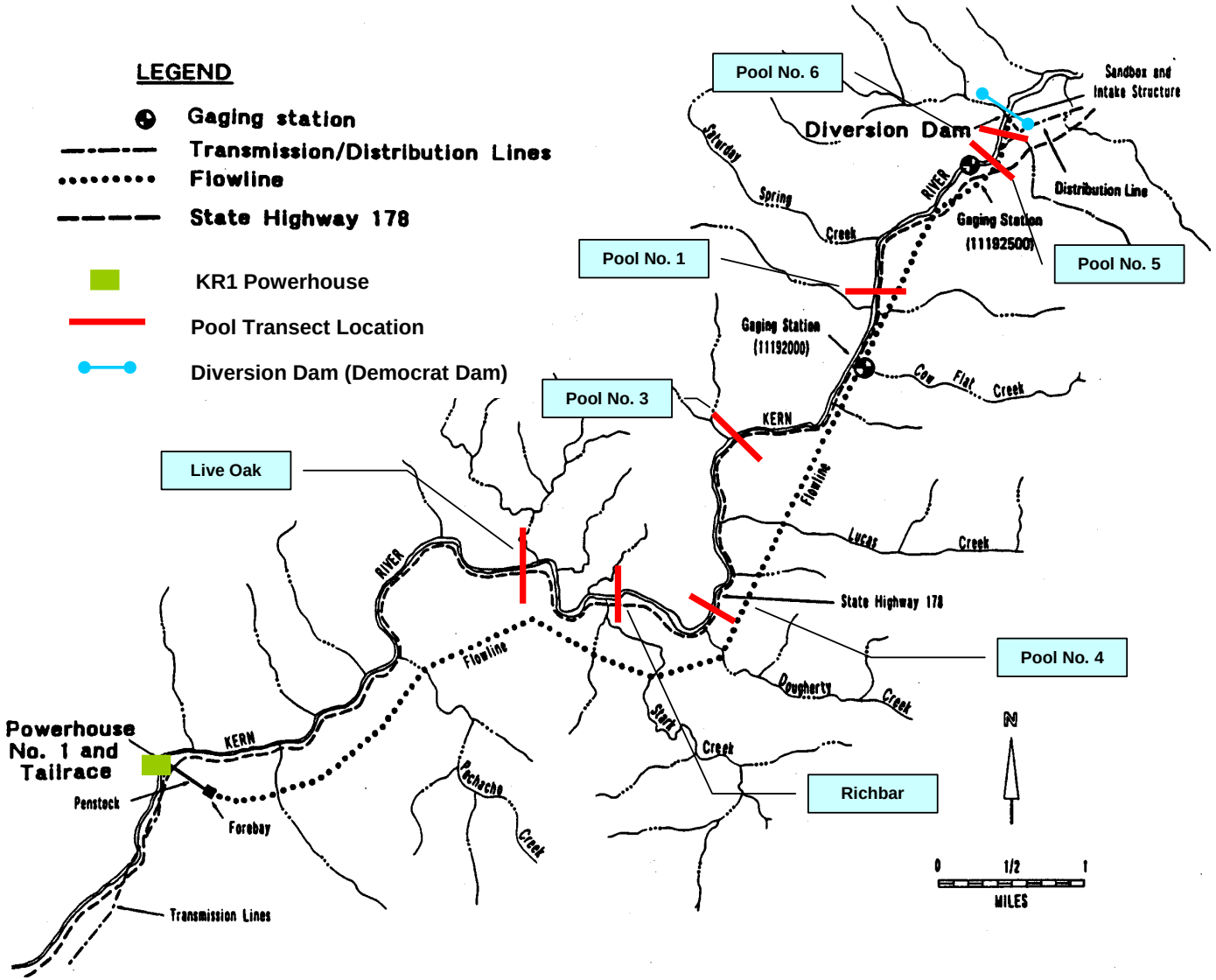

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LIST OF ACRONYMS

AQ 1 TM	AQ 1 – Hydrology Technical Memorandum
Cal-IPC	California Invasive Plant Inventory
CALVEG	Classification with LANDSAT of Visible Ecological Groupings
CDFW	California Department of Fish and Wildlife
cfs	cubic feet per second
cm	centimeter
CNPS	California Native Plant Society
ETP	Environmental Training Program
FERC	Federal Energy Regulatory Commission
Forest Service	United States Forest Service
GIS	Geographic Information System
LANDSAT	land satellite
MCV	Manual of California Vegetation
mm	millimeter
NNIP	non-native invasive plant
NRCS	Natural Resources Conservation Service

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NWI	National Wetlands Inventory
PM&E	protection, mitigation, and enhancement
Project	Kern River No. 1 Hydroelectric Project
SCE	Southern California Edison
SMP	Sediment Management Plan
SQF	Sequoia National Forest
TERR 1 TM	TERR 1 – Botanical Resources Technical Memorandum
TNC	The Nature Conservancy
USACE	United States Army Corps of Engineers
USDA	United States Department of Agriculture
USFWS	United States Fish and Wildlife Service
VMP	Vegetation Management Plan
WEAP	Worker Environmental Awareness Program

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7.8 WETLAND, RIPARIAN, AND LITTORAL HABITATS

This section describes riparian resources in the vicinity of Southern California Edison's (SCE) Kern River No. 1 Hydroelectric Project (Project). Riparian resources at Democrat Dam Impoundment, along the bypass reach, and near other Project facilities provide habitat for a variety of amphibians, wildlife, and avian species.

Riparian corridors provide valuable habitat for many species, including nesting birds, and provide value as cover near water sources and travel corridors for a multitude of wildlife species. Special-status plants and wildlife that may occur in or use riparian areas are discussed in Section 7.5, *Botanical and Wildlife Resources*. Amphibian and aquatic species that also use or are influenced by riparian and wetland habitats are described in Section 7.4, *Fish and Aquatic Resources*.

Hydrology and geomorphology information pertinent to the discussion of riparian resources are summarized in this section. Detailed information on hydrology and geomorphology is discussed in Sections 7.2, *Water Use and Hydrology* and 7.7, *Geomorphology*.

Section 7.8.1 describes the affected environment and resource conditions under current Project operation and maintenance (i.e., baseline condition). Section 7.8.2 identifies proposed environmental measures, management, and monitoring plans (collectively referred to as protection, mitigation, and enhancement measures [PM&E measures]) to be implemented under the Proposed Action (see Appendix E.1 for a full description of proposed PM&E measures). Section 7.8.3 includes an analysis of the potential environmental effects of the Proposed Action, including potential beneficial effects of proposed PM&E measures. Section 7.8.4 describes unavoidable adverse effects of the Proposed Action on riparian resources.

7.8.1 Affected Environment

A floodplain is a relatively flat lowland adjacent to a river, underlain by unconsolidated alluvial deposits, and subject to periodic inundation by the river. The littoral zone occurs in the near-shore areas of lakes and reservoirs where sunlight penetrates to the bottom of the waterbodies such that aquatic plants are able to grow.

Wetlands and riparian habitats may occur within the floodplain alongside a stream or within the littoral zone of a reservoir or lake. Hydrologic conditions (including water table elevations, the annual hydrograph, and overbanking flows/reservoir fluctuations) and soil types define the location of wetland and riparian habitats within the floodplains and littoral zones. Wetland and riparian habitats are defined as follows:

- Wetlands are areas that are inundated or saturated by surface or groundwater at a sufficient frequency and duration to support vegetation that is adapted to these hydrologic and saturated soil conditions.

- Riparian habitat is located in transitional areas between the aquatic and terrestrial landscapes regularly influenced by fresh water, and normally extend from the

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edges of waterbodies, including lakes and streams, to the edges of the upland community. The term 'riparian' or 'riparian zone', as referred to in this section, includes the stream bars and banks and the areas adjacent to the channel (floodplain) that are inundated or saturated by the historic dominant discharge every 1–3 years. The riparian plant community generally transitions into an upland community when the riparian community patterns are no longer controlled by the stream hydrologic conditions, including water table elevations, the annual hydrograph, and overbanking flows.

The study area in this section is defined to include the full extent of wetland and riparian habitats associated with the floodplains and littoral zones along the bypass reach of the Kern River and the Democrat Dam Impoundment. Also included are wetland and riparian habitats that are associated with the flumes, conduits, and adits located along the water conveyance system and which may be influenced by flume leakage as identified in Article 405 of the current Federal Energy Regulatory Commission (FERC) license order (FERC 1998).

7.8.1.1 Information Sources

This section was developed using existing, relevant, and reasonably available information. Existing information on floodplains, littoral zones, and associated wetland and riparian habitats include published reports associated with previous relicensing studies, geographic information system (GIS) data, aerial imagery, and management plans and policies that described desired conditions for riparian systems. Documents and studies that were reviewed in the development of this section include:

- Classification of Wetlands and Deepwater Habitats of the United States (Cowardin et al. 1979)
- Order Issuing New License for the Kern River No. 1 Hydroelectric Project No. 1930-014 (FERC 1998)
- Final Environmental Assessment for Kern River No. 1 Hydroelectric Project – FERC No. 1930-014, California (Environmental Assessment) (FERC and United States Department of Agriculture - Forest Service [Forest Service] 1998)
- Application for New License, Kern River No. 1 Hydroelectric Project – FERC Project No. 1930, Kern County, California (License Application) (SCE 1994)
- Google Earth © imagery
- The Forest Service Classification and Assessment with land satellite (LANDSAT) of Visible Ecological Groupings (CALVEG) data (Forest Service 2016)
- The United States Fish and Wildlife Service (USFWS) National Wetlands Inventory (NWI) (USFWS 2025)

- SCE Technical Memoranda developed for the relicensing that are provided in Appendix E.2, including:

  – AQ 1 – Hydrology Technical Memorandum (AQ 1 TM) (SCE 2025a)

  – TERR 1 – Botanical Resources Technical Memorandum (TERR 1 TM) (SCE 2025b)

7.8.1.2 Floodplains and Associated Wetland and Riparian Resources

Floodplains supporting riparian resources are found in three main locations in the study area: (1) along the bypass reach, (2) along the Democrat Dam Impoundment, and (3) along flumes, conduits, and adits associated with the water conveyance system. Riparian habitats in each of these locations are further described below.

Note that wetlands were not identified at any locations within the study area.

Bypass Reach

The bypass reach is defined as the stretch of the Kern River from Democrat Dam to the tailrace of the Kern River No. 1 Powerhouse. Like many western Sierran streams, establishment of riparian vegetation along the bypass reach is limited by the narrow-incised floodplain, steep canyon slopes, low rainfall, rapid runoff, high stream gradient, and large boulder and bedrock dominated substrates. Riparian vegetation is more extensive in some reach segments with more braided channels and slightly wider floodplains.

Two riparian vegetation alliances[1] were identified along the bypass reach during TERR 1 technical studies: *Platanus racemosa – Quercus agrifolia* Woodland Alliance (California sycamore – Pacific live oak riparian woodlands) (approximately 251 acres), and *Salix lucida* ssp. *lasiandra* Woodland Alliance (shining willow groves) (approximately 1.6 acres). These are the only riparian alliances found within the bypass reach area. Both *Platanus racemosa – Quercus agrifolia* Woodland Alliance (California sycamore – Pacific live oak riparian woodlands) (G3 S3) and *Salix lucida* ssp. *lasiandra* Woodland Alliance (shining willow groves) (G4 S3) are classified by the California Department of Fish and Wildlife (CDFW) as sensitive natural communities. Refer to Section 7.5, *Botanical and Wildlife Resources* for a further definition of sensitive natural communities.

In addition to general ground-truthing surveys, ten representative transects were established and sampled in September and October 2024 to characterize the existing riparian resources within the bypass reach and to determine the relationship of riparian vegetation to flow conditions. Transects were sampled using 5-meter by 5-meter sampling plots placed at each end of the transect (i.e., one on each bank, or more depending on the width of the riparian corridor) amounting to 22 total plots. Of the originally selected plots, only 18 were safely accessible at the time of the surveys. A description of the woody

[1] Riparian vegetation was classified using the Manual of California Vegetation (MCV) classification system (Sawyer et al. 2009).

riparian and herbaceous riparian resources observed during the transect surveys, as well as summary of the relationship of riparian resources to flow conditions, is provided below.

Refer to Table 7.8-1 for the acreage of each Manual of California Vegetation (MCV) riparian alliance within the bypass reach. Refer to Map 7.8-1 for the locations of MCV riparian alliances, transects, and sample plots in the bypass reach. Refer to Figure 7.8-1 for the transect locations along the elevation gradient within the bypass reach.

Woody Riparian Vegetation

A total of 11 shrub/tree species were observed in the bypass reach. California sycamore (*Platanus racemosa*) was the most common species, averaging 17.5 percent cover.[2] Red willow (*Salix laevigata*) provided the second most coverage at 14.3 percent. Mule-fat (*Baccharis salicifolia*) and narrowleaf willow (*Salix exigua*) have approximately equal percent coverage (11.6 and 10.7 percent respectively) and Goodding's willow (*Salix gooddingii*) had the least (5.2 percent). Other species observed but contributing less than three percent coverage included: common buttonbush (*Cephalanthus occidentalis*), Fremont cottonwood (*Populus fremontii*), interior live oak (*Quercus wislizeni*), American black nightshade (*Solanum americanum*), tree tobacco (*Nicotiana glauca*), and Pacific poison oak (*Toxicodendron diversilobum*).

Refer to Table 7.8-2 for a list of woody riparian species observed at each transect.

Herbaceous Vegetation

A total of 32 herbaceous species were observed in the bypass reach. Field surveys determined that swamp smartweed (*Persicaria hydropiperoides*) was the most prevalent herbaceous species (between 5 to 40 percent cover). Canadian horseweed (*Erigeron canadensis*) made up a large amount of coverage at one plot (60 percent), but had low coverage at all others. Only two species—Canadian horseweed and lakeshore sedge (*Carex lenticularis*)—accounted for greater than 40 percent coverage at any one plot.

Refer to Table 7.8-3 for a list of herbaceous riparian species observed at each transect.

Riparian Resources and Flow Relationships

The patterns of riparian vegetation establishment and distribution along a river are created by the interaction of physical processes (e.g., flows of varying magnitudes, timing of flows, flow recession rates, flow and depth to water table variability, and sediment deposition) and the different life history characteristics of the dominant species. The woody riparian species present along the bypass reach have many life history adaptations that promote their success under dynamic and episodic, yet seasonally predictable, hydrologic conditions.

[2] Average percent cover is defined as the total cover of graminoids, herbs, shrubs, and trees averaged across all sampling plots and transects.

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High magnitude, infrequent flow events (scouring flows) affect the channel by scouring banks and the channel bed, and are important for maintaining channel complexity. These events create areas for new colonization by riparian species and maintain the compositional and structural diversity of the riparian community. The scouring flows are also important for limiting encroachment of riparian vegetation into the channel by scouring vegetation along the channel margins, which reduce the potential for berm development and channel narrowing. Riparian species can also readily reproduce vegetatively from downed or abraded limbs, trunks, and root sprouts or from twig or root pieces deposited during a high flow event. This resiliency enables these species to rapidly re-establish following scouring flood events.

The magnitude, timing, and recession rates of spring flows (recruitment flows) are important determinants for successful regeneration and establishment of riparian species. For successful recruitment to occur, flows that coincide with the release of seeds with suitable recession rates are necessary to provide sufficient moisture to the seedlings and sprouts. This hydrology may occur in the same year as the scouring flow or may occur several years later (Mahoney and Rood 1998; Dixon 2003; Karrenberg et al. 2002; Merritt et al. 2009; Stella et al. 2013). The dominant species in the bypass reaches, California sycamore and willows, release seeds in the early spring, timed with the natural snowmelt hydrograph at this elevation. These seeds are only viable for a short period of time (weeks), requiring suitable moisture and soil conditions to be present at the time of seed release. For seedlings to survive, flow recession rates mut be slow and groundwater must be available through the dry summer. Recession rates from the spring flows cannot exceed the root growth rates of the seedlings.

Results from studies in the literature indicate that seedlings typically survive flow recession rates that range from 0.4 to 1.6 inches per day. Seedlings can survive flow recession rates of up to 3.9 inches per day, depending on various factors such as species, substrate characteristics, and other sources of water (e.g., seeps, hillslope runoff, precipitation) (Braatne et al. 1996; Shafroth et al. 2017). Seedlings that establish too close to the channel where late summer and fall water is available are more susceptible to scouring and uprooting by subsequent high winter or spring flows. As a result, riparian vegetation often establishes in elevation zones where water is available during the drier months, but not too close to the base flow (summer and fall) channel where it is susceptible to damage by higher flows.

A summary of the life history strategies of the dominant woody riparian species (California sycamore, willows, and mule-fat) present along the bypass reaches is provided in Table 7.8-4. The timing of seed dispersal of these common species is summarized in Table 7.8-5.

The hydrology associated with riparian vegetation (frequency of high recruitment flows and recession rates) and the position of vegetation along the channel (frequency, duration, width, and depth of inundation) were evaluated as part of the TERR 1 TM (SCE 2025b). Riparian trees and shrubs of various ages (young, medium-aged, and mature) were present along the bypass reach, indicating that existing flows promote successful establishment and survival. Recruitment flows were evaluated at a 2-year recurrence

interval with and without Project hydrology. The magnitude and frequency of flows that promote riparian recruitment were similar under existing Project and without-Project hydrology. During February to April (months of seed setting for the dominant species), sufficient recruitment flows were provided under Project hydrology (average of 5 to 10 days). Recession rates of spring/early summer flows during the spring seed release and seed setting were evaluated and are within the range identified in the literature for seedling survival success (less than 1.6 inches per day). Seedlings and young woody riparian individuals were observed along the bypass reach, indicating that recruitment is occurring under the existing flow regime.

7.8.1.3 Democrat Dam Impoundment

The Democrat Dam Impoundment is approximately 1.1 miles long and is more riverine than lacustrine. The floodplain is wider than sections of the Kern River immediately above and below the impoundment. The Democrat Dam Impoundment contains an island that is extensively bordered by riparian vegetation, and thin bands of riparian vegetation are also present along the banks.

Ground-truthing surveys conducted along the Democrat Dam Impoundment determined that five MCV riparian alliances are present, including 8.5 acres of *Baccharis salicifolia* Shrubland Alliance (mule-fat thickets); 4.0 acres of *Salix lasiolepis* Shrubland Alliance (arroyo willow thickets); 3.5 acres of *Salix lucida* ssp. *lasiandra* Woodland Alliance (shining willow groves). 2.2 acres of *Salix exigua* Shrubland Alliance (sandbar willow thickets); and 1.5 acres of *Platanus racemosa* – *Quercus agrifolia* Woodland Alliance (California sycamore – Pacific live oak riparian woodlands). As stated previously, *Platanus racemosa* – *Quercus agrifolia* Woodland Alliance (California sycamore – Pacific live oak riparian woodlands) (G3 S3) and *Salix lucida* ssp. *lasiandra* Woodland Alliance (shining willow groves) (G4 S3) are classified by CDFW as sensitive natural communities.

Refer to Map 7.8-2a for the location of these riparian alliances within the impoundment.

7.8.1.4 Project Flumes, Conduits, and Adits

The Project contains 19 tunnels with six open flumes, nine conduits, and nine adits. Generally, flumes, conduits, and adits are located in areas where the tunnels intersect with drainages to the Kern River. Riparian and wetland vegetation in these drainages are tightly associated with the stream channels within a narrow floodplain. Ground-truthing surveys conducted under the TERR 1 TM (SCE 2025b) indicate that there are four open flumes, two conduits, and one adit that support the following riparian alliances: *Platanus racemosa* – *Quercus agrifolia* Woodland Alliance, *Baccharis salicifolia* Shrubland Alliance, and *Salix lucida* ssp. *lasiandra* Woodland Alliance. The location of riparian habitat in relation to Project flumes, conduits, and adits is provided below.

***Platanus racemosa* – *Quercus agrifolia* Woodland Alliance**

This alliance, which is considered a sensitive natural community by CDFW, totals approximately 25 acres along Project flumes and conduits. There are four Project facilities that are associated with this habitat: Flume No. 2 Cow Flat Creek, Flume No. 4 Lucas Creek, Flume No. 5 Dougherty Creek, and Conduit No. 7. Refer to Maps 7.8-2a through

7.8-2g for the location of this riparian habitat in relation to the flumes and conduit. Refer to Table 7.8-1 for the total acreage of the riparian alliances associated with each of these facilities.

***Baccharis salicifolia* Shrubland Alliance**

This alliance totals approximately 4.9 acres along Project flumes and conduits. There are two Project facilities that are associated with this habitat: Flume No. 6 Stark Creek and Conduit No. 8. Refer to Maps 7.8-2a through 7.8-2g for the location of this riparian habitat in relation to the flume and conduit. Refer to Table 7.8.1 for the total acreage of the riparian alliances associated with each of these facilities.

***Salix lucida* ssp. *lasiandra* Woodland Alliance**

This alliance, which is considered a sensitive natural community by CDFW, totals approximately 5.8 acres along Project adits. There is only one Project facility that is associated with this habitat, Adit 12 & 13. Refer to Maps 7.8-2a through 7.8-2g for the location of this riparian habitat in relation to the adit. Refer to Table 7.8.1 for the total acreage of the riparian alliance associated with this facility.

7.8.1.5 Littoral Zones and Associated Wetlands and Riparian Resources

Based on a review of aerial imagery and the description of vegetation communities provided in the License Application (SCE 1994) and the Environmental Assessment (FERC and Forest Service 1998), there are no littoral zones in the vicinity of the Project. Field surveys conducted under the TERR 1 TM (SCE 2025b) confirmed that the narrow, incised channel of the Kern River causes fast flows on a relatively steep gradient that prevents the development of a littoral zone. The Democrat Dam Impoundment is best characterized as riverine habitat rather than lacustrine.

7.8.1.6 Plant and Wildlife Species that Use Riparian and Wetland Habitats

Riparian and wetland habitats in the vicinity of the Project provide habitat for a variety of plants, amphibians, wildlife, and avian species (refer to Section 7.5, *Botanical and Wildlife Resources*). Riparian corridors provide valuable habitat for many species, including riparian nesting birds, and provide value as cover near water sources and travel corridors for a multitude of wildlife species. Refer to Table 7.8-6 for a list of special-status plants, non-native invasive plants (NNIPs), and special-status wildlife species that are known to occur or may potentially utilize riparian habitats. Plants and wildlife that have the potential to occur in the vicinity of the Project and the habitats in which they occur are described further in Section 7.5, *Botanical and Wildlife Resources*. Fish and other aquatic species that also use or are influenced by riparian habitats are described in Section 7.4, *Fish and Aquatic Resources*.

7.8.2 Proposed Environmental Measures

Under the Proposed Action, SCE proposes to implement PM&E measures associated with ongoing Project operation and maintenance activities. PM&E measures are designed to protect, maintain, or enhance environmental and cultural resources over the term of

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the new license. SCE proposes implementing the following PM&E measures related to riparian resources:

- Sediment Management Plan
- Vegetation Management Plan

Appendix E.1 provides complete descriptions of measures SCE is proposing as part of the license application and to include in any new license issued for the Project.

7.8.3 Potential Project Effects

This section describes the potential effects to wetland, riparian, and littoral habitats that could occur because of continued operation and maintenance activities to be implemented under the Proposed Action. Potential effects are determined by analyzing the changes in wetland, riparian, and littoral habitats that may result from activities implemented under the Proposed Action (Section 5.2) compared to the No-Action Alternative (existing condition) (Section 5.1). Final effects determinations consider PM&E measures to be included under the Proposed Action (refer to Appendix E.1).

Under the Proposed Action, SCE would continue to operate and maintain the Project as described in Section 5.1, *No-Action Alternative*, with minor adjustments to Project operation and maintenance activities in response to implementing proposed PM&E measures. No new or upgraded facilities, structural changes, or operational changes to the Project are proposed.

Consistent with FERC's Scoping Document 2 (FERC 2023), this section evaluates potential effects of continued Project operation and maintenance on the following:

- Timing and magnitude of flows resulting from continued operation of the Project, on riparian habitat along the Kern River, including the bypass reach.
- Project maintenance activities on riparian habitat.

Potential effects of the Proposed Action on flows in the bypass reach are discussed in Section 7.2, *Water Use and Hydrology*. Potential effects on channel morphology and sediment processes are discussed in Section 7.7, *Geomorphology*. Potential effects on aquatic species are discussed in Section 7.4, *Fish and Aquatic Resources*. Potential effects on special-status plants, mosses, and riparian-dependent wildlife species that have the potential to occur in riparian and wetland habitats are identified in Section 7.5, *Botanical and Wildlife Resources*.

A description of the potential effects to riparian resources from implementation of the Proposed Action, considering new environmental measures; management and monitoring plans; and programs is provided below.

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7.8.3.1 Project Operations

Under the Proposed Action, SCE would continue to operate the Project in run-of-river mode generally consistent with water management practices described in Section 5.1.4, *Project Operations*, and Section 5.1.5, *Project Maintenance*. The are no proposed changes to minimum instream flows. Minimum instream flows of 50 cubic feet per second (cfs) would be released between June 1 and September 30 and 15 cfs would be released between October 1 and May 31, or inflow, if upstream releases from Lake Isabella are lower than the seasonal flow requirement. Hydrology in the bypass reach would continue to be mainly dependent on flow release regimes from the upstream Lake Isabella.

Under the Proposed Action, the timing and amount of flows would be identical to the No-Action Alternative. As discussed in Section 7.8.1.2, TERR 1 studies on the relationship between riparian habitat and flows indicate that the existing flow regime promotes successful establishment and survival of riparian vegetation. Flows are sufficient in February through April to allow seed setting for the dominant species; sufficient recruitment flows were provided under Project hydrology (average of 5 to 10 days); and recession rates of spring/early summer flows during the spring seed release and seed setting are within the range identified in the literature for seedling survival success. Seedlings and young woody riparian individuals were observed along the bypass reach, indicating that recruitment is occurring under the existing flow regime.

Therefore, there would be no effect on riparian resources (including sensitive natural communities) from implementation of the Proposed Action. Operations would continue to maintain riparian habitat consistent with the existing conditions in the bypass reach.

7.8.3.2 Project Maintenance

Under the Proposed Action, SCE would continue to maintain Project facilities as described under the No-Action Alternative (Section 5.1). Ongoing maintenance activities that could potentially affect the extent or condition of riparian habitat include sediment management and vegetation management (including vegetation removal associated with road and trail maintenance). Activities that could result in the introduction or spread of NNIPs (e.g., road and trail use or ground-disturbing activities) could also impact riparian habitat. The potential effect of each of these activities is described below.

As stated in Section 7.8.1, no wetlands were identified in the study area. Therefore, the Proposed Action will not affect wetland habitat.

Sediment Management

Under existing conditions, SCE conducts routine sediment management activities at the Democrat Dam Impoundment. Historical operation (2005 to recently) for Democrat Dam included partial and full sediment bypass (refer to Section 5.1.5.4 and 7.7.1.4 for more details). Sediment management activities result in the passing of sediment trapped behind the Democrat Dam into the bypass reach of the Kern River.

From approximately 2005 until recently, accumulated sediment was managed in accordance with SCE's Revised Sediment Management Plan (SMP) and resource

agency permits (CDFW Section 1600, State Water Resources Control Board [State Water Board] 401 Water Quality Certification, United States Army Corps of Engineers [USACE] 404 Permit). The permits expired in 2022 and 2023 and SCE is currently in the process of renewing the permits. In the interim, limited sediment management has occurred.

Partial sediment bypass operations mimic natural flow and sediment transport dynamics that would have a beneficial effect on riparian vegetation in the bypass reach. As described above, riparian vegetation in the bypass reach is dominated by *Platanus racemosa – Quercus agrifolia* Woodland Alliance (California sycamore – Pacific live oak riparian woodlands) and *Salix lucida* ssp. *lasiandra* Woodland Alliance (shining willow groves), which have a state rank of S3 and are therefore considered sensitive natural communities. Healthy riparian ecosystems depend on a supply of sediment from scouring flows and fresh sediment deposits to allow the recruitment of new riparian vegetation and to increase the diversity of the age-class structure in riparian systems (Kondolf et al. 1996). In sediment starved systems (such as streams below large reservoirs), flow releases tend to (1) erode the bed and bank of the stream, thereby removing the surface area where riparian vegetation can establish, and (2) drop the alluvial water table, resulting in moisture stress on remaining riparian vegetation (Williams and Wolman 1984). As discussed previously, continued sediment management activities would benefit riparian habitats within the bypass reach by providing a sediment supply that provides colonization substrates and enhances the diversity of floodplain geomorphology. SCE has been releasing beneficial sediment through partial sediment bypass under existing conditions.

Full sediment bypass involves lowering the water level in Democrat Dam Impoundment and allowing the river and sediment to pass through the low-level outlet. During this operation, the low-level outlet is opened, and water is not diverted to the powerhouse. These activities are restricted to between November 15 and March 14 to avoid impacts on aquatic fish and reptile species. If sediment has built up behind the impoundment to unmanageable levels and high flows are not available to flush sediment, then release of the sediment may cause turbidity and deposition immediately downstream of the dam. This sediment deposition could result in short-term burial or disturbance to riparian vegetation until the next high flow cycle. However, these short-term effects would be considered negligible, and delivery of a sediment supply would have beneficial effects on riparian in the bypass reach, as described above.

Lowering the water surface elevation of the Democrat Dam Impoundment may also affect riparian vegetation growing along the shoreline by lowering the water table and removing the water supply. However, given the timing of full sediment bypass, these activities would take place at the driest time of year, outside the early spring/summer germination and establishment season, and the riparian species in the Kern Canyon are adapted to dynamic fluctuations in flow conditions that they would experience under natural hydrological conditions. Full sediment bypass usually occurs over a period less than three weeks, and then the impoundment would be allowed to fill again. Therefore, any effects to riparian vegetation from lowering the water surface elevation of the Democrat Dam Impoundment would be considered negligible.

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Under the Proposed Action, SCE will implement a SMP which includes the same operations as under the No-Action Alternative (partial and full sediment bypass) and includes sediment bypass planning and environmental monitoring. The SMP sets operating limitations for sediment management activities which is protective of riparian and other resources in Democrat Dam Impoundment and the bypass reach. With implementation of the SMP, the Proposed Action will continue to mimic natural sediment transport processes in the bypass reach to the extent possible and benefit riparian vegetation (including sensitive natural communities) in the bypass reach.

Vegetation Management

Two riparian habitats, both of which are considered sensitive natural communities by CDFW, are present around Project facilities and may be affected by continued vegetation management over the term of the new license.

- *Platanus racemosa – Quercus agrifolia* Woodland Alliance (California sycamore – Pacific live oak riparian woodlands) (G3 S3) is mapped in the vicinity of Flume No. 1 and the Democrat Gage Trail in the Democrat Dam vicinity, Flume No. 2 and the Cow Flat Creek Trail, Lucas Creek Trail and Flume No. 4, the Dougherty Creek Trail near Flume No. 5, and near the Kern River No. 1 Powerhouse facility by the Kern River No. 1 Switchyard and Lower Powerhouse Road.

- *Salix lucida* ssp. *lasiandra* Woodland Alliance (shining willow groves) (G4 S3) is found in the vicinity of Stark Creek Trail, near Adit 12 & 13.

Refer to Map 7.8-2a to Map 7.8-2g for the location of riparian habitat in relation to Project facilities.

In general, vegetation management will have minimal effects to riparian vegetation in the study area. Vegetation management activities include vegetation removal by hand and herbicide use, and are limited to defined areas around the dam, exposed water conveyance system features, the forebay perimeter fence, the powerhouse, the switchyard, communications and power lines, and access roads and trails (refer to Section 5.1.5.5 for specific buffers). Hazard tree removal is also conducted on an as-needed basis to ensure safe operation of the Project. The purpose of vegetation management is to minimize vegetation growth around developed facilities to ensure visibility and safety; facilitate efficient operation of the Project and minimize fire risk. Therefore, these areas support minimal vegetation under existing conditions. Natural areas outside of the vegetation management or other work area buffers would not be affected by the Proposed Action.

To further minimize potential effects to riparian vegetation, SCE would implement the Vegetation Management Plan (VMP) (Appendix E.2), which includes the following:

- Environmental screening process – Planned routine operation and maintenance activities are screened annually to determine whether avoidance and protection measures are necessary to minimize potential effects to sensitive botanical resources. Typical avoidance and protection measures are reviewed during the

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Annual FERC Environmental Training Program (ETP). Measures associated with planned operation and maintenance activities may include, but are not limited to:

– Limiting vegetation management activities to defined work areas, and avoiding work within sensitive habitats (e.g., riparian habitats), to the degree possible.

– Avoidance buffers or seasonal restrictions for special-status plants: avoiding vegetation removal within known populations or conducting operation and maintenance activities outside of the emergence period (post-senescence or pre-emergence) to avoid disturbance to reproductive life cycle and seed dispersal.

– Topsoil salvage and replacement to preserve existing native seedbank when new ground disturbance is needed for operation and maintenance.

– Implementation of herbicide applications consistent with a Forest Service approved Pesticide Use Proposal and all associated best management practices.

Other measures may also be developed, as needed, based on the specific activity or resource, or in consultation with resource agencies.

New or non-routine maintenance or construction activities that are not included in the Proposed Action may be subject to separate, additional environmental review, as well as agency approvals, permits, or other authorizations, to be determined on a case-by-case basis.

- Environmental training – SCE staff or contractors operating in the Project area are required to take an Annual FERC ETP that provides a review of sensitive species that may occur in the vicinity of planned routine operation and maintenance, as well as associated measures to minimize or avoid environmental effects. Additional training may be required prior to new or non-routine maintenance or construction activities, typically through a project-specific Worker Environmental Awareness Program (WEAP).

Considering that vegetation management is limited to defined areas around Project facilities and would have minimal effect on surrounding habitats, and with implementation of the VMP, effects to riparian vegetation alliances, including CDFW sensitive natural habitats, would be negligible.

Non-Native Invasive Plants

The invasion of NNIPs can degrade habitat for riparian vegetation communities by reducing species overall species diversity and reducing the abundance of native seedlings (Alvarez and Cushman 2002, Cushman and Gaffney 2010). Riparian vegetation communities (including sensitive natural communities) could therefore be affected by the inadvertent spread of NNIPs through Project-related activities including,

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but not limited to, ongoing use of Project roads and trails, road and trail maintenance, and vegetation management.

To minimize the potential for the introduction or spread of NNIPs, SCE would implement the VMP, which includes prevention strategies for NNIPs, including equipment and vehicle cleaning, use of weed-free straw, and use of native species for revegetation as part of erosion control or in large ground disturbance or cleared areas. In addition, prescriptions and implementation schedules for treatment of new and established NNIP infestations will be developed in consultation with the Sequoia National Forest (SQF) over the term of the license.

With implementation of the VMP, potential effects to riparian vegetation from NNIPs would be considered negligible.

7.8.4 Unavoidable Adverse Effects

There are no unavoidable adverse effects to wetland, riparian, and or littoral habitats from continued operation and maintenance of the Project under the Proposed Action.

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TABLES

Table 7.8-1. Manual of California Vegetation Riparian Alliances within the Study Area

Project Location or Facility	Acreage of Each MCV Riparian Alliance					
	Baccharis salicifolia Shrubland Alliance (mule-fat thickets)	**Platanus racemosa – Quercus agrifolia Woodland Alliance (California sycamore – Pacific live oak riparian woodlands)**	**Salix exigua Shrubland (sandbar willow thickets)**	**Salix lasiolepis Shrubland Alliance (arroyo willow thickets)**	**Salix lucida ssp. lasiandra Woodland Alliance (shining willow groves)**	**Total Acres Per Facility**
Democrat Impoundment	8.46	1.50	2.23	4.02	3.45	**19.66**
Bypass Reach	–	250.99	–	–	1.56	**252.55**
Flume No. 2 Cow Flat Creek	–	7.58	–	–	–	**7.58**
Flume No. 4 Lucas Creek	–	11.64	–	–	–	**11.64**
Flume No. 5 Dougherty Creek / Conduit No. 7[1]	–	5.73	–	–	–	**5.73**
Flume No. 6 Stark Creek / Conduit No. 8[1]	4.86	–	–	–	–	**4.86**
Adit 12 and 13	–	–	–	–	5.77	**5.77**
Total	**13.32**	**277.44**	**2.23**	**4.02**	**10.78**	**307.79**

Notes: [1]The Project facilities on these rows are within close proximity and thus fall into the same observed riparian alliance habitat. As such, the acreage of the habitat intersecting with these facilities is only counted once.
Key: MCV = Manual of California Vegetation

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Table 7.8-2. Dominant Woody Riparian Tree and Shrub Species Observed at Riparian Transects

Species		NWI Indicator Status[1]	Riparian Transect (X = plant present at transect)									
Scientific Name	**Common Name**		**KT1**	**KT2**	**KT3**	**KT4**	**KT5**	**KT6**	**KT7**	**KT8**	**KT9**	**KT10**
Baccharis salicifolia	Mule-fat	FACW	X	X		X		X	X			
Cephalanthus occidentalis	Common buttonbush	OBL	X	X	X	X	X	X		X		
Nicotiana glauca	Tree tobacco	FAC				X						
Platanus racemosa	California sycamore	FACW	X		X		X	X	X		X	X
Populus fremontii	Fremont cottonwood	FAC						X				
Quercus wislizeni	Interior live oak	NA				X		X				X
Salix exigua	Narrowleaf willow	FACW		X	X							
Salix gooddingii	Goodding's willow	FACW		X								
Salix laevigata	Red willow	FACW					X			X		X
Solanum americanum	American black nightshade	FAC		X						X		
Toxicodendron diversilobum	Pacific poison oak	NI								X		
Total Number of Species			**3**	**5**	**3**	**4**	**3**	**5**	**2**	**4**	**1**	**3**

Notes: [1] National Wetlands Inventory (NWI) Wetland Indicator Status as per the National Wetland Plant List (USACE 2022)
Key: FAC = Equally likely to occur in wetlands and nonwetlands
FACU = Usually occur in non-wetlands but occasionally found in wetlands
FACW = Usually occur in wetlands but occasionally found in non-wetlands
NI = Not included on the National Wetland Plant List
OBL = Obligate wetland species only found in wetlands
UPL = Upland species not likely to occur in wetlands

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Table 7.8-3. Riparian/Wetland Herbaceous and Graminoid Plants Observed at Riparian Transects

Species		NWI Indicator Status1	Riparian Transect (X = plant present at transect)									
Scientific Name	Common Name		KT1	KT2	KT3	KT4	KT5	KT6	KT7	KT8	KT9	KT10
Artemisia douglasiana	Douglas' sagewort	FAC						X	X	X		
Avena barbata	Slender oat	NI					X					
Bromus diandrus	Ripgut brome	NI					X					X
Carex lenticularis	Lakeshore sedge	OBL					X	X		X		
Cynodon dactylon	Bermudagrass	FACU			X						X	
Cyperus eragrostis	Tall flatsedge	FACW					X					X
Datura wrightii	Sacred thorn-apple	NI		X		X		X			X	
Epilobium canum	Hummingbird trumpet	NI					X					X
Epilobium ciliatum	Fringed willowherb	FACW								X		
Erigeron canadensis	Canadian horseweed	NI		X	X		X	X	X		X	X
Euthamia occidentalis	Western goldentop	OBL		X						X		
Gnaphalium palustre	Western marsh cudweed	FACW			X	X						
Helenium puberulum DC.	Rosilla	FACW						X				
Juncus spp.	Unknown juncus	NA	X									
Juncus balticus	Mountain rush	FACW					X					
Juncus mexicanus	Mexican rush	FACW			X							
Medicago lupulina	Black medick	FAC	X		X			X			X	
Melilotus albus	sweetclover	NI										X

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Species		NWI Indicator Status1	Riparian Transect (X = plant present at transect)									
Scientific Name	**Common Name**		**KT1**	**KT2**	**KT3**	**KT4**	**KT5**	**KT6**	**KT7**	**KT8**	**KT9**	**KT10**
Onopordum acanthium	Scotch cottonthistle	NI						X				
Persicaria hydropiperoides	Swamp smartweed	NI	X	X	X		X	X		X	X	X
Phacelia egena	Kaweah River phacelia	NI									X	X
Polypogon maritimus	Mediterranean rabbitsfoot grass	OBL					X	X			X	X
Pseudognaphalium luteoalbum	Jersey cudweed	NI						X			X	X
Rumex crispus	Curly dock	FACW						X				
Setaria parviflora	Marsh bristlegrass	FAC		X	X		X		X		X	X
Setaria viridis	Green bristlegrass	NI									X	
Solidago californica	California goldenrod	NI		X								
Urtica dioica	Stinging nettle	FACU				X	X			X		
Verbascum thapsus	Common mullein, Woolly mullein	NI		X				X	X			X
Xanthium strumarium	Rough cocklebur	FAC					X			X		
Unknown plant	Unknown plant[2]	NA				X						
Poaceae	Unknown grass	NA							X		X	X
Total Number of Species			**3**	**7**	**7**	**4**	**12**	**12**	**5**	**7**	**11**	**12**

Notes: [1] National Wetlands Inventory (NWI) Wetland Indicator Status as per the National Wetland Plant List (USACE 2022)
[2] Plant lacked sufficient features to allow for identification.

Key: FAC = Equally likely to occur in wetlands and nonwetlands.
FACU = Usually occur in non-wetlands but occasionally found in wetlands
FACW = Usually occur in wetlands but occasionally found in non-wetlands.
NI = Not included on the National Wetland Plant List.
OBL = Obligate wetland species only found in wetlands.
UPL = Upland species not likely to occur in wetlands.

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Table 7.8-4. Life History Strategies of Dominant Woody Riparian Species Found in the Study Area

Attribute		Woody Species						
		Red willow (Salix laevigata)	**Narrowleaf willow (Salix exigua)**	**Goodding's willow (*Salix gooddingii*)**	**Mule-fat (Baccharis salicifolia)**	**Common buttonbush (Cephalanthus occidentalis)**	**California sycamore (*Platanus racemosa*)**	**Fremont cottonwood (*Populus fremontii*)**
Seed Initiation[1]								
Reproduction	**Flowering Timing**	December to June (Argus 2012a)	March to June (Argus 2012b)	March to April (Argus 2012c)	May to July (Karrfalt and Olson 2004)	June to September (Preston and Dempster 2012)	February to April (Baldwin et al. 2012)	March to June (Stella et al. 2006)
	Seed Dispersal Timing	Spring (CNPS 2024)	May to early June (Young and Clements 2003)	June to July (Young and Clements 2003)	May to July (Karrfalt and Olson 2004)	Fall (USDA-NRCS 2024)	February to March (Baldwin et al. 2012)	March to July depends on location (Baldwin et al. 2012, Stella et al. 2006)
	Seed Dispersal Agent[2]	Anemochoric and hydrochoric	Anemochoric and hydrochoric	Anemochoric and hydrochoric	Anemochoric and hydrochoric	Anemochoric and hydrochoric	Primarily anemochoric, also hydrochoric and zoochoric	Hydrochoric and anemochoric
	Asexual Traits	Sprouts from shoot buds on lateral roots (Kindschy 1985)	Sprouts from underground shoot buds on lateral roots (CNPS 2024)	Buds on large branches and trunks, and underground structures (CNPS 2024)	Buds on small branches (CNPS 2024)	Buds on small branches (CNPS 2024)	Can reproduce from root crown.	Crown breakage and flood-related disturbance (e.g., tree fall) (Braatne et al. 1996)
Germination and Establishment[3]	**Seed Viability (in natural conditions)**	Remain viable for around 30 days (McBride and Strahan 1984)	Seeds remain viable for an average of 44 days (Stella et al. 2006)	Seeds remain viable for an average of 31 days (Stella et al. 2006)	1 to 2 weeks (McBride and Strahan 1984)	Unknown (Conner 2004)	Not a limiting factor	1 to 3 weeks (as cited in Braatne et al. 1996)
	Germination	Within 24 hours (Karrenberg et al. 2002)	12 to 24 hours under proper conditions (Nellessen 2004)	Within 24 hours (Karrenberg et al. 2002)	7 to 15 days (Karrfalt and Olson 2004)	24 hours (Bonner 1974)	Germinates quickly in moist conditions.	24 hours in moist, bare soil (Braatne et al. 1996)
	Seedling Root Growth Rate (and Recession Rate Associated with Establishment)	Recession rate of 1 to 2.5 centimeters (cm) per day (Amlin and Rood 2002)	Recession rate of 1 to 2.5 cm per day (Amlin and Rood 2002)	Recession rate of 1 to 2.5 cm per day (Amlin and Rood 2002)	Growth rate of 2.17 cm per day (Glenn et al. 1998)	Moderate (USDA-NRCS 2024)	Similar to cottonwoods	Seedling root growth rate: 4 to 12 mm/day (as cited in Braatne et al. 1996); can reach 40 cm length in 30 days (Braatne et al. 1996) Recession rate: 2.5 to 4 cm/day (up to 10 cm/day) (Mahoney and Rood 1998; Amlin and Rood 2002; Roberts et al. 2002; Stella et al. 2006)
Dormant Season	**Rooting Depth of Sapling, first growing season**	40 to 60 cm (Karrenberg et al. 2002)	40 to 60 cm (Karrenberg et al. 2002)	40 to 60 cm (Karrenberg et al. 2002)	60 cm (Braudrick and Orr 2021)	35 cm (Tentative, found two plant store websites that said that, not primary sources)	Similar to cottonwoods	75 to 150 cm (Braatne et al. 1996)

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Attribute	Woody Species						
	Red willow (Salix laevigata)	**Narrowleaf willow (Salix exigua)**	**Goodding's willow (*Salix gooddingii*)**	**Mule-fat (Baccharis salicifolia)**	**Common buttonbush (Cephalanthus occidentalis)**	**California sycamore (*Platanus racemosa*)**	**Fremont cottonwood (*Populus fremontii*)**
Maturation[4]							
Age at Reproductive Maturity	2 years (CNPS 2024)	2 years (CNPS 2024)	2 years (CNPS 2024)	2 years (CNPS 2024)	2 years (CNPS 2024)	6 to 7 years	5 to 10 years (as cited in Braatne et al. 1996)
Rooting Depth of Mature Stands/Depth to Groundwater	Minimum 28 inches (USDA-NRCS 2024)	Minimum 20 inches (USDA-NRCS 2024)	Minimum 28 inches (USDA-NRCS 2024)	Minimum of 12 inches (USDA-NRCS 2024)	Minimum of 14 inches (USDA-NRCS 2024)	Less than 1 meter (USDA-NRCS 2024)	3 to 5+ meters (as cited in Braatne et al. 1996)
Lifespan	Stems survive 10 to 20 years (USDA-NRCS 2024)	Stems survive 10 to 20 years (USDA-NRCS 2024)	Stems survive 10 to 20 years (USDA-NRCS 2024)	Stems survive 10 to 20 years (USDA-NRCS 2024)	Stems survive 10 to 20 years (USDA-NRCS 2024)	200+ years	130+ years (as cited in Braatne et al. 1996)
Tree Height (mature tree)	Up to 4 meters (CNPS 2024)	2 to 4 meters (CNPS 2024)	Up to 30 meters (CNPS 2024)	Up to 3 meters (USDA-NRCS 2024)	Up to 6 meters (USDA-NRCS 2024)	20 to 35 meters (CNPS 2024)	12 to 35 meters (USDA-NRCS 2024)
Diameter at Breast Height (mature tree)	10 to 15 cm (Hartwell et al. 2010)	Up to 13 cm (Nellessen 2004)	10 to 15 cm (Hartwell et al. 2010)	NA	NA	up to 1 meters (CNPS 2024)	30 to 150 cm (USDA-NRCS 2024)
Germination/Recruitment Microsite Characteristics							
Depth to Water Table or Elevation above Baseflow	Elevation above baseflow 0.6 to 3 meters (Mahoney and Rood 1998)	Elevation above baseflow 0.6 to 3 meters (Mahoney and Rood 1998)	Elevation above baseflow 0.6 to 3 meters (Mahoney and Rood 1998)	Elevation above baseflow 0.3 to 1.2 meters (River Partners 2008)	Elevation above baseflow 0.3 to 1.2 meters (River Partners 2008)	Maximum depth to water table, 1.5 to 4.5 meters (TNC 1998)	Elevation above baseflow: 1 to 3 meters (Mahoney and Rood 1998; Roberts et al. 2002)
Substrate	Fine textured moist bare soil (CNPS 2024)	Fresh alluvium deposits with silt, sand, or gravelly soils (CNPS 2024)	Fine textured alluvium over subsurface of soils from silt to silty clay loam soil (USDA-NRCS 2024)	Adapted to course, medium, and fine soils (USDA-NRCS 2024)	Sandy, loamy sandy, or alluvial soil with a sandy or silty surface (USDA-NRCS 2024)	Sunny, coarse, medium textured substrate near water (USDA-NRCS 2024)	Bare, moist sandy, humous, or gravelly soils - with silts and clays.
Location on Floodplain	Lowland alluvial floodplains, shores, and bars (McBride and Strahan 1984)	Lowland alluvial floodplains, shores, and bars (Stella et al. 2006)	Lowland alluvial floodplains, shores, and bars (Stella et al. 2006)	Sand and gravel bars, alluvial surfaces near rivers and streams (McBride and Strahan 1984)	Lowland alluvial floodplains (USDA-NRCS 2024)	Sand and gravel bars, alluvial surfaces near rivers and streams (USDA-NRCS 2024)	Point bars, cut off channels, lower terraces

Notes: [1] Initiation refers to seed dispersal, germination, and initial seedling growth.
[2] Hydrochoric: water-dispersed; Anemochoric: wind-dispersed; Zoochoric: animal-dispersed.
[3] Establishment refers to the continued survival and growth of seedlings and saplings over several years until the tree or shrub reaches maturity.
[4] Maturity (sexual) occurs once a tree begins to flower and produce seed.

Key: cm = centimeter
CNPS = California Native Plant Society
mm = millimeter
TNC = The Nature Conservancy
USDA-NRCS = U.S. Department of Agriculture–Natural Resources Conservation Service

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Table 7.8-5. Timing of Flowering and Seed Dispersal for Common Woody Riparian Species in the Study Area

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
WILLOWS												
Goodding's Willow												
Flowering (Argus 2012c)												
Seed Dispersal (Young and Clements 2003)												
Red Willow												
Flowering (Argus 2012a)												
Seed Dispersal (USDA-NRCS 2024)												
Narrowleaf Willow												
Flowering (Argus 2012b)												
Seed Dispersal (Young and Clements 2003)												
BACCHARIS												
Mule-fat												
Flowering (Karrfalt and Olson 2004)												
Seed Dispersal (Karrfalt and Olson 2004)												
CEPHALANTHUS												
Common Buttonbush												
Flowering (Preston and Dempster 2012)												
Seed Dispersal (USDA-NRCS 2024)												
SYCAMORE												
California Sycamore												
Flowering (Baldwin et al. 2012)												
Seed Dispersal (Baldwin et al. 2012)												
COTTONWOODS												
Fremont Cottonwood												
Flowering (Stella et al. 2006)												
Seed Dispersal (Stella et al. 2006)												

Key: USDA-NRCS = U.S. Department of Agriculture–Natural Resources Conservation Service

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Table 7.8-6. Special Status Plants, Non-Native Invasive Plants, and Special-Status Wildlife Associated with Riparian Habitats

Scientific name Common name	Status	Potential to occur		Riparian and Wetland Habitat types Potentially Utilized by Riparian and Wetland Species		
				MCV Riparian habitats		
		Known to Occur	May Potentially Occur	Platanus racemosa – Quercus agrifolia Woodland Alliance	Baccharis salicifolia Shrubland Alliance	Salix lucida ssp. lasiandra Woodland Alliance
Special-Status Plants						
Calochortus striatus alkali mariposa lily	FSCC, 1B.2		X	X	X	X
Non-Native Invasive Plants						
Bromus rubens (*Bromus madritensis* ssp. *rubens*) Red brome	Cal-IPC Rating: High	X		X	X	X
Cirsium vulgare Bull thistle	Cal-IPC Rating: Moderate	X		X	X	X
Polypogon monspeliensis Rabbitsfoot grass	Cal-IPC Rating: Limited	X		X	X	X
Verbascum thapsus Wooly mullein	Cal-IPC Rating: Limited	X		X	X	X
Aegilops triuncialis Barb goatgrass	Cal-IPC Rating: High		X	X	X	X
Arundo donax Giant reed	Cal-IPC Rating: High		X	X	X	X
Carduus pycnocephalus Italian thistle	Cal-IPC Rating: Moderate		X	X	X	X
Centaurea solstitialis Yellow starthistle	Cal-IPC Rating: High		X	X	X	X
Centaurea stoebe ssp. *micranthos* Spotted knapweed	Cal-IPC Rating: High		X	X		X
Cortaderia jubata Jubatagrass	Cal-IPC Rating: High		X	X	X	X
Cortaderia selloana Pampasgrass	Cal-IPC Rating: High		X	X	X	X
Cytisus scoparius Scotch broom	Cal-IPC Rating: High		X	X	X	X
Delairea odorata Cape-ivy	Cal-IPC Rating: High		X	X	X	X
Digitalis purpurea Foxglove	Cal-IPC Rating: Limited		X	X	X	X
Elymus caput-medusae Medusahead	Cal-IPC Rating: High		X		X	
Genista monspessulana French broom	Cal-IPC Rating: High		X	X	X	X

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Scientific name Common name	Status	Potential to occur		Riparian and Wetland Habitat types Potentially Utilized by Riparian and Wetland Species		
				MCV Riparian habitats		
		Known to Occur	May Potentially Occur	Platanus racemosa – Quercus agrifolia Woodland Alliance	Baccharis salicifolia Shrubland Alliance	Salix lucida ssp. lasiandra Woodland Alliance
Hedera helix English ivy	Cal-IPC Rating: High		X	X	X	X
Lepidium latifolium Perennial pepperweed	Cal-IPC Rating: High		X	X	X	X
Lythrum salicaria Purple loosestrife	Cal-IPC Rating: High		X	X	X	X
Olea europaea Olive	Cal-IPC Rating: Limited		X	X		X
Oncosiphon pilulifer Stinknet	Cal-IPC Rating: High		X	X	X	X
Poa pratensis Kentucky bluegrass	Cal-IPC Rating: Limited		X	X	X	X
Rubus armeniacus Himalayan blackberry	Cal-IPC Rating: High		X	X	X	X
Sesbania punicea Rattlebox	Cal-IPC Rating: High		X	X	X	X
Silybum marianum Milk thistle	Cal-IPC Rating: Limited		X	X	X	X
Spartium junceum Spanish broom	Cal-IPC Rating: High		X	X	X	X
Tamarix chinensis Chinese tamarisk	Cal-IPC Rating: High		X	X	X	X
Tamarix gallica French tamarisk	Cal-IPC Rating: High		X	X	X	X
Tamarix parviflora Smallflower tamarisk	Cal-IPC Rating: High		X	X	X	X
Tamarix ramosissima Saltcedar	Cal-IPC Rating: High		X	X	X	X
Ulex europaeus Gorse	Cal-IPC Rating: High		X	X	X	X
Special-Status Wildlife						
Danaus plexippus Monarch butterfly	FPT	X		X	X	X
Batrachoseps simatus Kern Canyon slender salamander	FPT, FSCC, CT	X		X	X	X
Batrachoseps relictus Relictual slender salamander	FPE, FSCC, CSC		X	X	X	X

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Scientific name Common name	Status	Potential to occur		Riparian and Wetland Habitat types Potentially Utilized by Riparian and Wetland Species		
				MCV Riparian habitats		
		Known to Occur	May Potentially Occur	Platanus racemosa – Quercus agrifolia Woodland Alliance	Baccharis salicifolia Shrubland Alliance	Salix lucida ssp. lasiandra Woodland Alliance
Ensatina eschoscholtzii croceator Yellow-blotched ensatina	FSCC, WL	X		X	X	X
Aniella spp. California legless lizard	CSC	X		X	X	X
Actinemys marmorata Northwestern pond turtle	FPT, CSC	X		X	X	X
Haliaeetus leucocephalus Bald eagle	Eagle Act, FSCC, CE, CFP	X		X	X	X
Buteo swainsoni Swainson's hawk	CT	X		X	X	X
Falco peregrinum anatum American peregrine falcon	FD, WL	X		X	X	X
Baeolophus inornatus Oak titmouse	BCC	X		X	X	X
Icterus bullockii Bullock's oriole	BCC	X		X	X	X
Lasiurus frantzii Western red bat	CSC	X		X	X	X
Spea hammondii Western spadefoot	FPT, CSC		X	X	X	X
Agelaius tricolor Tricolored blackbird	BCC, FSCC, CT		X	X	X	X
Empidonax trailli extimus Southwestern willow flycatcher	FE, CE		X	X	X	X
Icteria virens Yellow-breasted chat	CSC		X	X	X	X

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Scientific name Common name	Status	Potential to occur		Riparian and Wetland Habitat types Potentially Utilized by Riparian and Wetland Species		
				MCV Riparian habitats		
		Known to Occur	May Potentially Occur	Platanus racemosa – Quercus agrifolia Woodland Alliance	Baccharis salicifolia Shrubland Alliance	Salix lucida ssp. lasiandra Woodland Alliance
Setophaga petechia Yellow warbler	CSC		X	X	X	X
Bassariscus astuts Ringtail	CFP		X	X	X	X

Federal Status
BCC = Birds of Conservation Concern
Eagle Act = Bald and Golden Eagle Protection Act
FC = Candidate Species
FE = Federal Endangered
FSCC = Inyo National Forest Service Species of Conservation Concern
FT = Federal Threatened
FPT = Federal Proposed Threatened
FD = Federal Delisted

State Status
CFP = California Fully Protected
CSC = California Species of Special Concern
CR = California Rare
CT = California Threatened
CE = California Endangered

CRPR = California Native Plant Society Rare Plant Rank
1B = rare, threatened or endangered in California and elsewhere
2B = rare in California but more common elsewhere
3 = need more information
4 = plants of limited distribution, a watch list
_.1 = Seriously threatened in California (over 80% of occurrences threatened/high degree and immediacy of threat)
_.2 = Moderately threatened in California (20 – 80% of occurrences threatened)
_.3 = Not very threatened in California (less than 20% of occurrences threatened or no current threats known)

The California Invasive Plant Inventory (Cal-IPC) categorizes plants as High, Moderate, or Limited, according to the degree of ecological impact in California (Cal-IPC 2025).

- **High.** Severe ecological impacts on physical processes, plant and animal communities, and vegetation structure. Their reproductive biology and other attributes are conducive to moderate to high rates of dispersal and establishment. Most are widely distributed ecologically.
- **Moderate.** Substantial and apparent—but generally not severe—ecological impacts on physical processes, plant and animal communities, and vegetation structure. Their reproductive biology and other attributes are conducive to moderate to high rates of dispersal, though establishment is generally dependent upon ecological disturbance. Ecological amplitude and distribution may range from limited to widespread.
- **Limited.** Invasive but their ecological impacts are minor on a statewide level or there was not enough information to justify a higher score. Their reproductive biology and other attributes result in low to moderate rates of invasiveness. Ecological amplitude and distribution are generally limited, but these species may be locally persistent and problematic.

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FIGURES

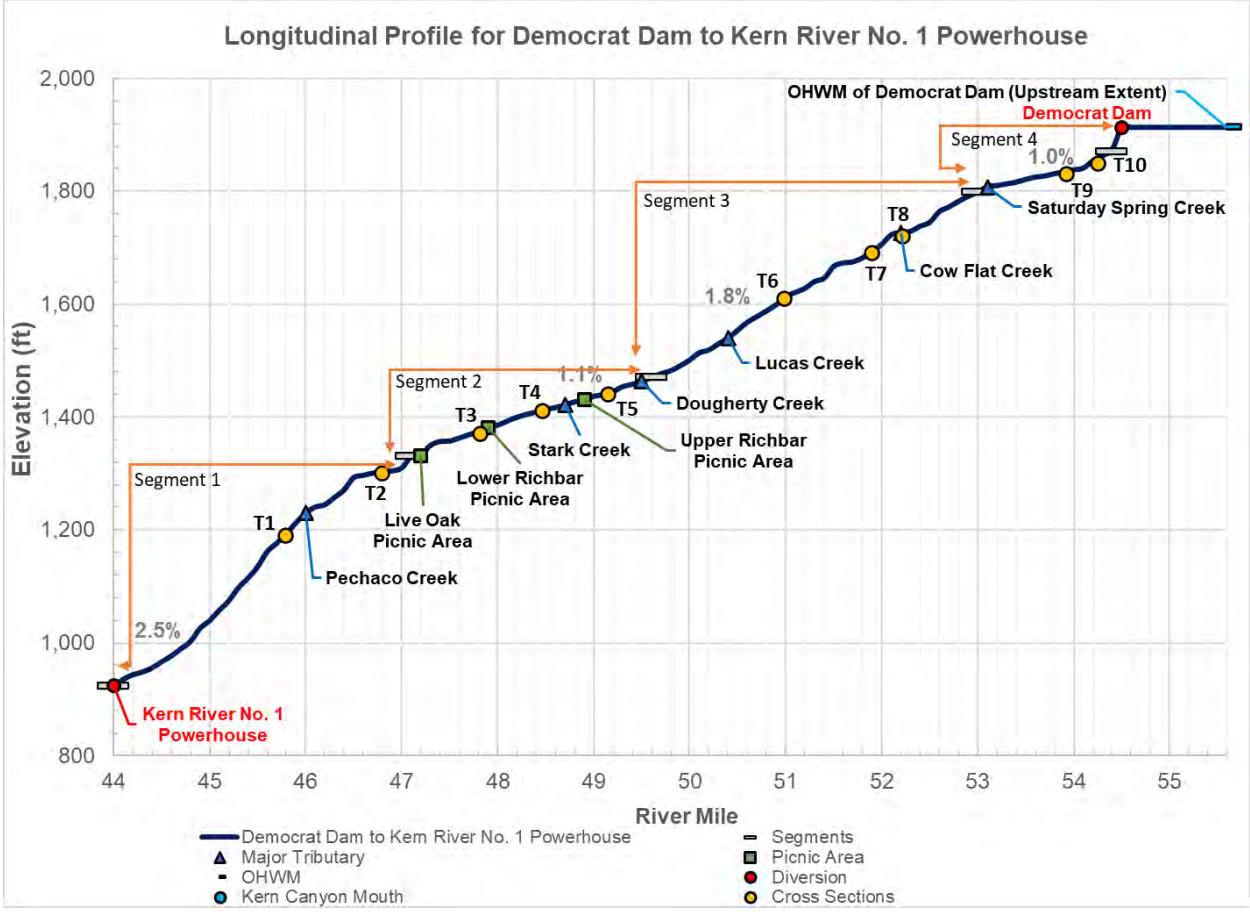
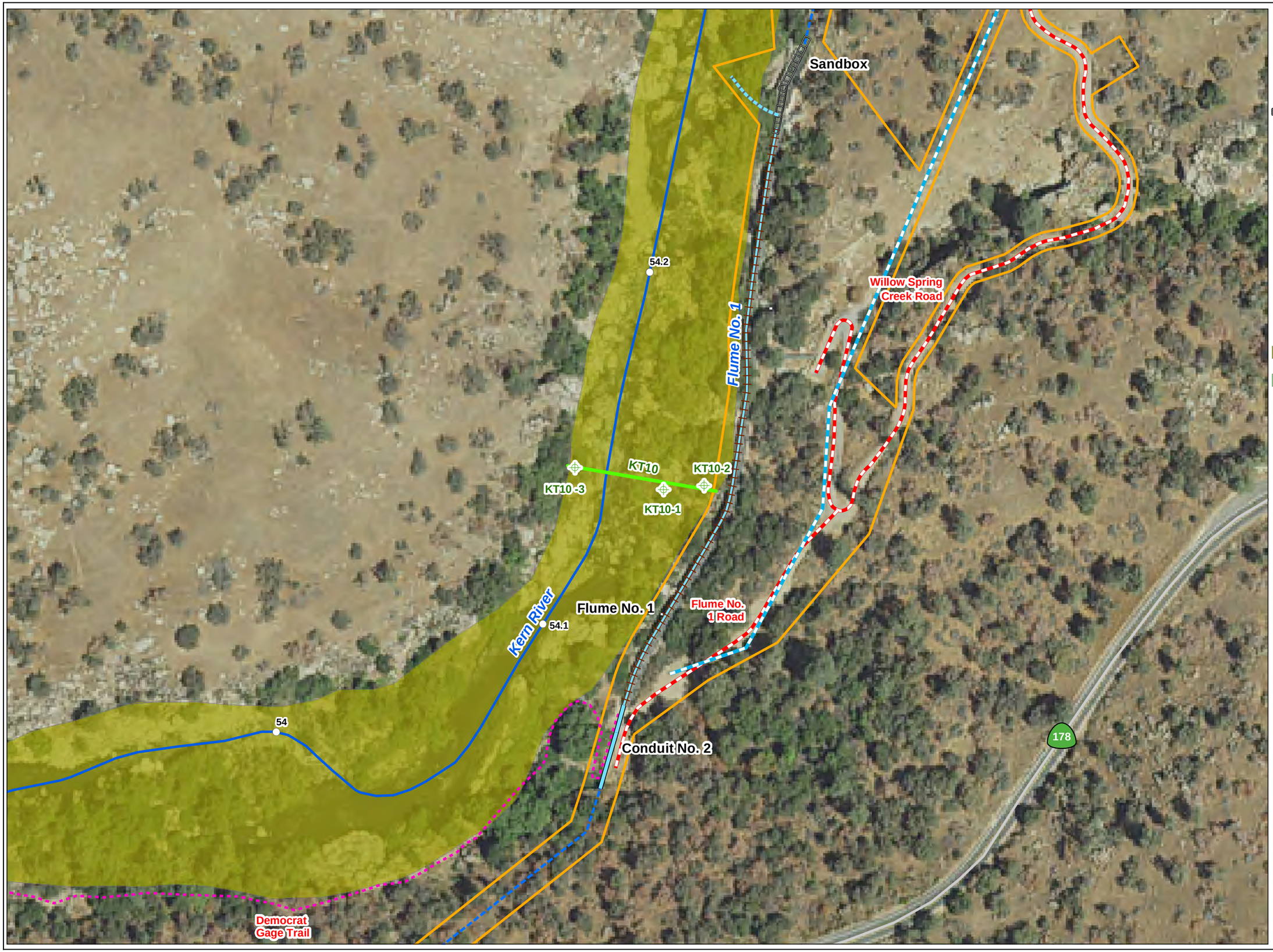


Figure 7.8-1. Transect Locations (i.e., Cross Sections) at Representative Elevations along the Kern River Bypass Reach

MAPS



Facilities

- Gage
- Conduit
- Flume
- Powerline
- Sandbox
- Ancillary Facility
- Spillway
- Tailrace
- Tunnel
- FERC Boundary

Transportation

- Project Road
- Project Trail
- Other Road

Other Features

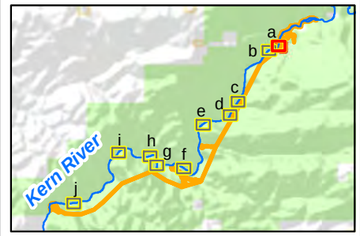
- River Mile (1/10th Mile)
- Watercourse

Transects/Sampling Plots

- Plots
- Transect

Riparian Alliances

- Platanus racemosa - Quercus agrifolia Woodland Alliance
- Salix lucida ssp. lasiandra Woodland Alliance



SOUTHERN CALIFORNIA EDISON
Energy for What's Ahead™

Kern River No. 1 Hydroelectric Project
FERC Project No. 1930

Map 7.8-1a

Riparian Alliances and Riparian Transects Along the Kern River No. 1 Project Bypass Reach

0 75 150
Feet

Projection: UTM Zone 11
Datum: NAD 83

Date: 10/30/2025

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Facilities

- Gage
- Ancillary Facility
- Conduit
- Spillway
- Flume
- Tailrace
- Powerline
- Tunnel
- Sandbox
- FERC Boundary

Transportation

- Project Road
- Other Road
- Project Trail

Other Features

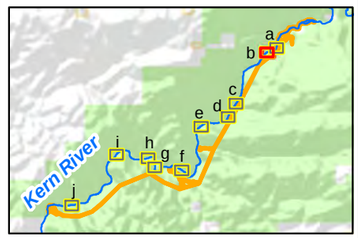
- River Mile (1/10th Mile)
- Watercourse

Transects/Sampling Plots

- Plots
- Transect

Riparian Alliances

- Platanus racemosa - Quercus agrifolia Woodland Alliance
- Salix lucida ssp. lasiandra Woodland Alliance



SOUTHERN CALIFORNIA EDISON
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Kern River No. 1 Hydroelectric Project
FERC Project No. 1930

Map 7.8-1b

Riparian Alliances and Riparian Transects Along the Kern River No. 1 Project Bypass Reach

0 75 150
Feet

Projection: UTM Zone 11
Datum: NAD 83

Date: 10/30/2025

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Facilities

- Gage
- Conduit
- Flume
- Powerline
- Sandbox
- Ancillary Facility
- Spillway
- Tailrace
- Tunnel
- FERC Boundary

Transportation

- Project Road
- Project Trail
- Other Road

Other Features

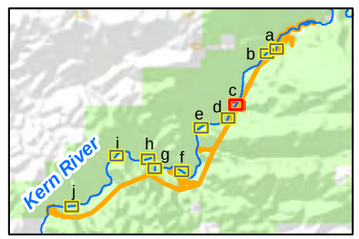
- River Mile (1/10th Mile)
- Watercourse

Transects/Sampling Plots

- Plots
- Transect

Riparian Alliances

- Platanus racemosa - Quercus agrifolia Woodland Alliance
- Salix lucida ssp. lasiandra Woodland Alliance



SOUTHERN CALIFORNIA EDISON
Energy for What's Ahead

Kern River No. 1 Hydroelectric Project
FERC Project No. 1930

Map 7.8-1c

Riparian Alliances and Riparian Transects Along the Kern River No. 1 Project Bypass Reach

N S E W

0 75 150
Feet

Projection: UTM Zone 11
Datum: NAD 83

Date: 10/30/2025

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Facilities

- Gage
- Conduit
- Flume
- Powerline
- Sandbox
- Ancillary Facility
- Spillway
- Tailrace
- Tunnel
- FERC Boundary

Transportation

- Project Road
- Project Trail
- Other Road

Other Features

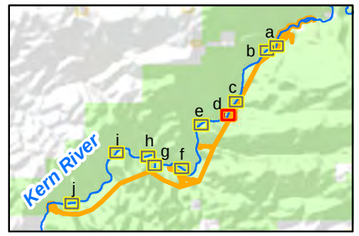
- River Mile (1/10th Mile)
- Watercourse

Transects/Sampling Plots

- Plots
- Transect

Riparian Alliances

- Platanus racemosa - Quercus agrifolia Woodland Alliance
- Salix lucida ssp. lasiandra Woodland Alliance



SOUTHERN CALIFORNIA EDISON
Energy for What's Ahead™

Kern River No. 1 Hydroelectric Project
FERC Project No. 1930

Map 7.8-1d

Riparian Alliances and Riparian Transects Along the Kern River No. 1 Project Bypass Reach

0 75 150
Feet

Projection: UTM Zone 11
Datum: NAD 83

Date: 10/30/2025

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The Kern River flows during the time of the survey made crossing too dangerous; therefore, a plot was only taken on one side of the river.

51

Kern River

50.9

KT6

KT6-1

178

50.8

Facilities

- Gage
- Conduit
- Flume
- Powerline
- Sandbox
- Ancillary Facility
- Spillway
- Tailrace
- Tunnel
- FERC Boundary

Transportation

- Project Road
- Project Trail
- Other Road

Other Features

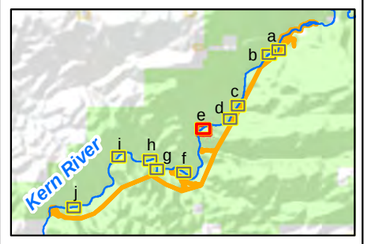
- River Mile (1/10th Mile)
- Watercourse

Transects/Sampling Plots

- Plots
- Transect

Riparian Alliances

- Platanus racemosa - Quercus agrifolia Woodland Alliance
- Salix lucida ssp. lasiandra Woodland Alliance



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Kern River No. 1 Hydroelectric Project
FERC Project No. 1930

Map 7.8-1e

Riparian Alliances and Riparian Transects Along the Kern River No. 1 Project Bypass Reach

0 75 150
Feet

Date: 10/30/2025

Projection: UTM Zone 11
Datum: NAD 83

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48.9
49
49.1
49.2
Kern River
KT5
KT5-1
KT5-2
178
Stark
Creek Road

Facilities

- Gage
- Conduit
- Flume
- Powerline
- Sandbox
- Ancillary Facility
- Spillway
- Tailrace
- Tunnel
- FERC Boundary

Transportation

- Project Road
- Project Trail
- Other Road

Other Features

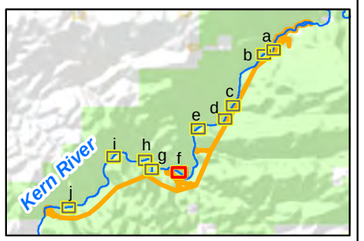
- River Mile (1/10th Mile)
- Watercourse

Transects/Sampling Plots

- Plots
- Transect

Riparian Alliances

- Platanus racemosa - Quercus agrifolia Woodland Alliance
- Salix lucida ssp. lasiandra Woodland Alliance



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Kern River No. 1 Hydroelectric Project
FERC Project No. 1930

Map 7.8-1f

Riparian Alliances and Riparian Transects Along the Kern River No. 1 Project Bypass Reach

0 75 150
Feet

Projection: UTM Zone 11
Datum: NAD 83

Date: 10/30/2025

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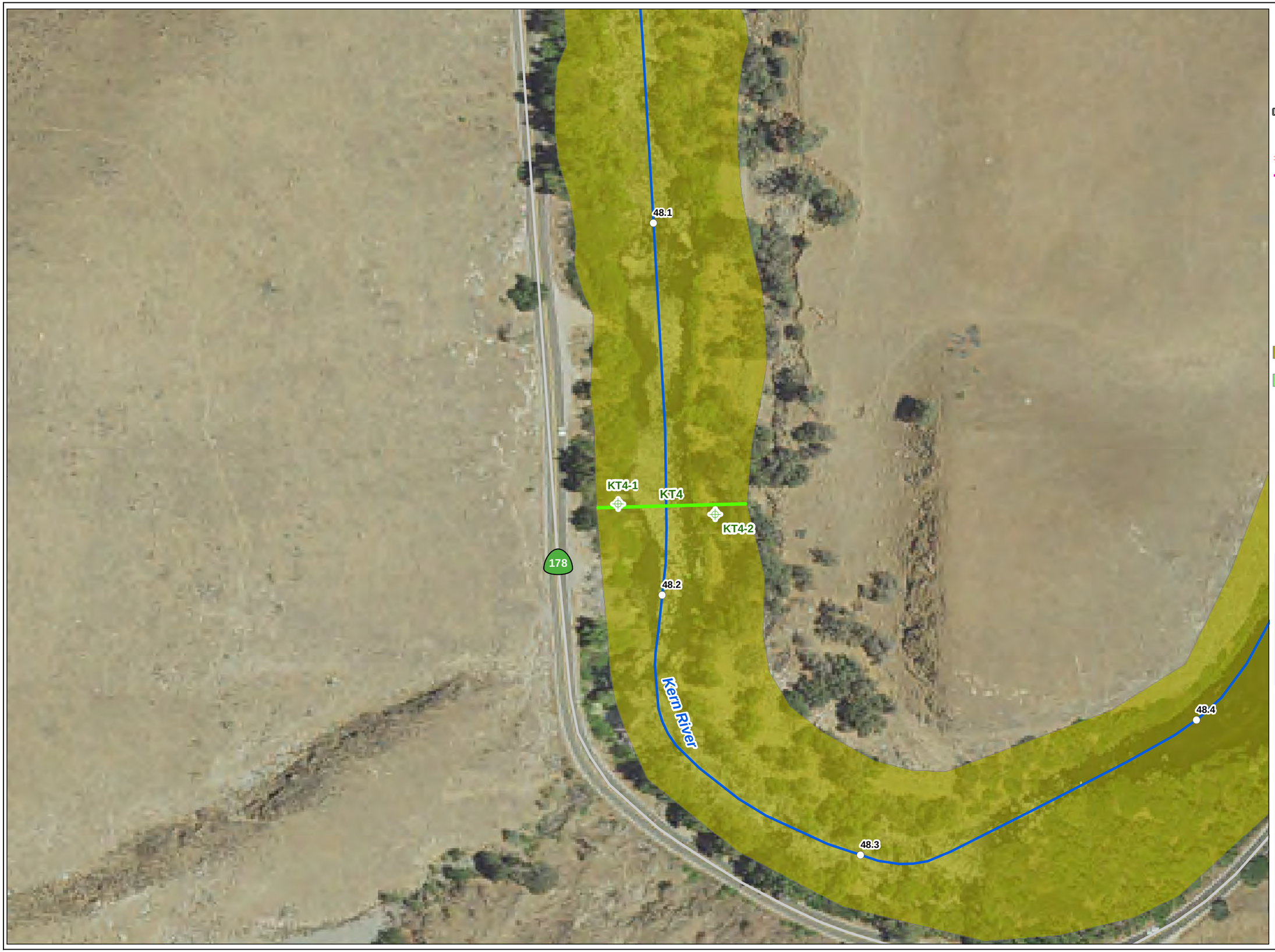


Facilities

- Gage
- Conduit
- Flume
- Powerline
- Sandbox
- Ancillary Facility
- Spillway
- Tailrace
- Tunnel
- FERC Boundary

Transportation

- Project Road
- Project Trail
- Other Road

Other Features

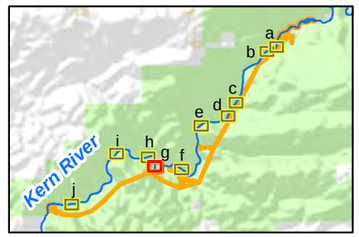
- River Mile (1/10th Mile)
- Watercourse

Transects/Sampling Plots

- Plots
- Transect

Riparian Alliances

- Platanus racemosa - Quercus agrifolia Woodland Alliance
- Salix lucida ssp. lasiandra Woodland Alliance



SOUTHERN CALIFORNIA EDISON
Energy for What's Ahead

Kern River No. 1 Hydroelectric Project
FERC Project No. 1930

Map 7.8-1g

Riparian Alliances and Riparian Transects Along the Kern River No. 1 Project Bypass Reach

0 75 150
Feet

Projection: UTM Zone 11
Datum: NAD 83

Date: 10/30/2025

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The Kern River flows during the time of the survey made crossing too dangerous; therefore, a plot was only taken on one side of the river.

Kern River

47.6

47.7

47.8

47.9

48

KT3

KT3-1

178

Facilities

- Gage
- Conduit
- Flume
- Powerline
- Sandbox
- Ancillary Facility
- Spillway
- Tailrace
- Tunnel
- FERC Boundary

Transportation

- Project Road
- Project Trail
- Other Road

Other Features

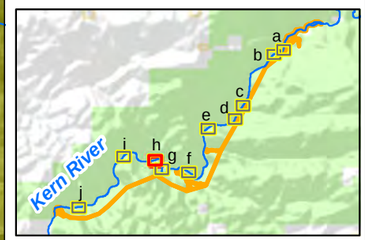
- River Mile (1/10th Mile)
- Watercourse

Transects/Sampling Plots

- Plots
- Transect

Riparian Alliances

- Platanus racemosa - Quercus agrifolia Woodland Alliance
- Salix lucida ssp. lasiandra Woodland Alliance



SOUTHERN CALIFORNIA EDISON
Energy for What's Ahead

Kern River No. 1 Hydroelectric Project
FERC Project No. 1930

Map 7.8-1h

Riparian Alliances and Riparian Transects Along the Kern River No. 1 Project Bypass Reach

0 75 150
Feet

Projection: UTM Zone 11
Datum: NAD 83

Date: 10/30/2025

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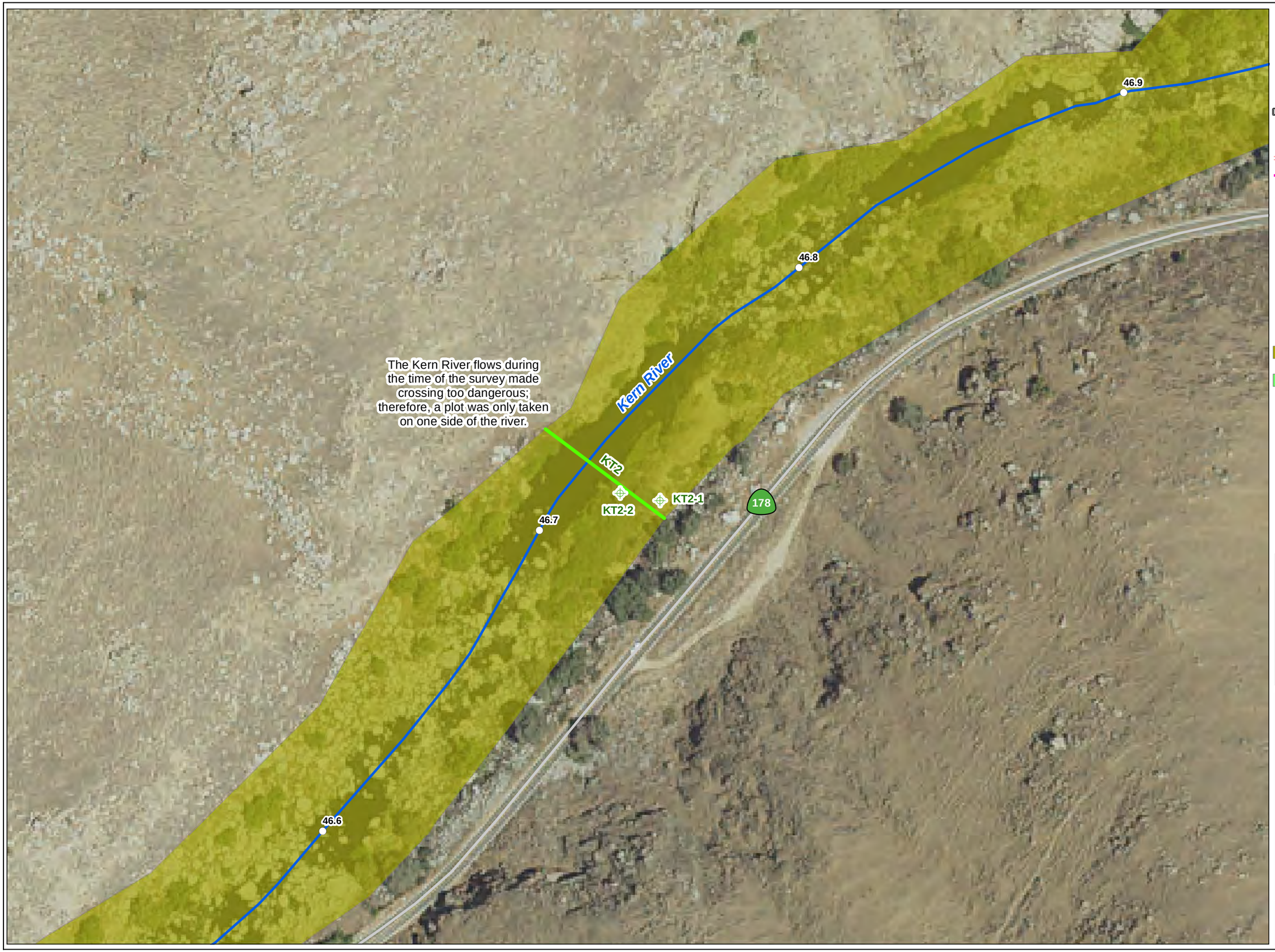


Facilities

- Gage
- Conduit
- Flume
- Powerline
- Sandbox
- Ancillary Facility
- Spillway
- Tailrace
- Tunnel
- FERC Boundary

Transportation

- Project Road
- Project Trail
- Other Road

Other Features

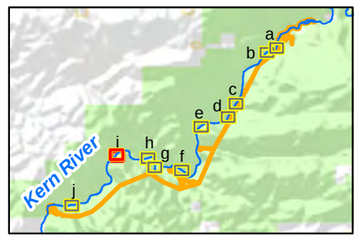
- River Mile (1/10th Mile)
- Watercourse

Transects/Sampling Plots

- Plots
- Transect

Riparian Alliances

- Platanus racemosa - Quercus agrifolia Woodland Alliance
- Salix lucida ssp. lasiandra Woodland Alliance



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Energy for What's Ahead™

Kern River No. 1 Hydroelectric Project
FERC Project No. 1930

Map 7.8-1i

Riparian Alliances and Riparian Transects Along the Kern River No. 1 Project Bypass Reach

0 75 150
Feet

Date: 10/30/2025

Projection: UTM Zone 11
Datum: NAD 83

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The Kern River flows during the time of the survey made crossing too dangerous; therefore, a plot was only taken on one side of the river.

Kern River

KT1

KT1-1

44.4

44.5

44.6

44.7

178

Facilities

- Gage
- Ancillary Facility
- Conduit
- Spillway
- Flume
- Tailrace
- Powerline
- Tunnel
- Sandbox
- FERC Boundary

Transportation

- Project Road
- Other Road
- Project Trail

Other Features

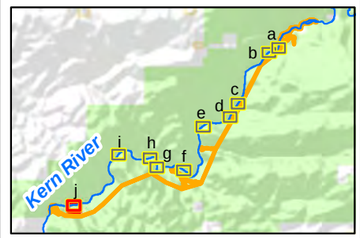
- River Mile (1/10th Mile)
- Watercourse

Transects/Sampling Plots

- Plots
- Transect

Riparian Alliances

- Platanus racemosa - Quercus agrifolia Woodland Alliance
- Salix lucida ssp. lasiandra Woodland Alliance



SOUTHERN CALIFORNIA EDISON
Energy for What's Ahead

Kern River No. 1 Hydroelectric Project
FERC Project No. 1930

Map 7.8-1j

Riparian Alliances and Riparian Transects Along the Kern River No. 1 Project Bypass Reach

0 75 150
Feet

Projection: UTM Zone 11
Datum: NAD 83

Date: 10/30/2025

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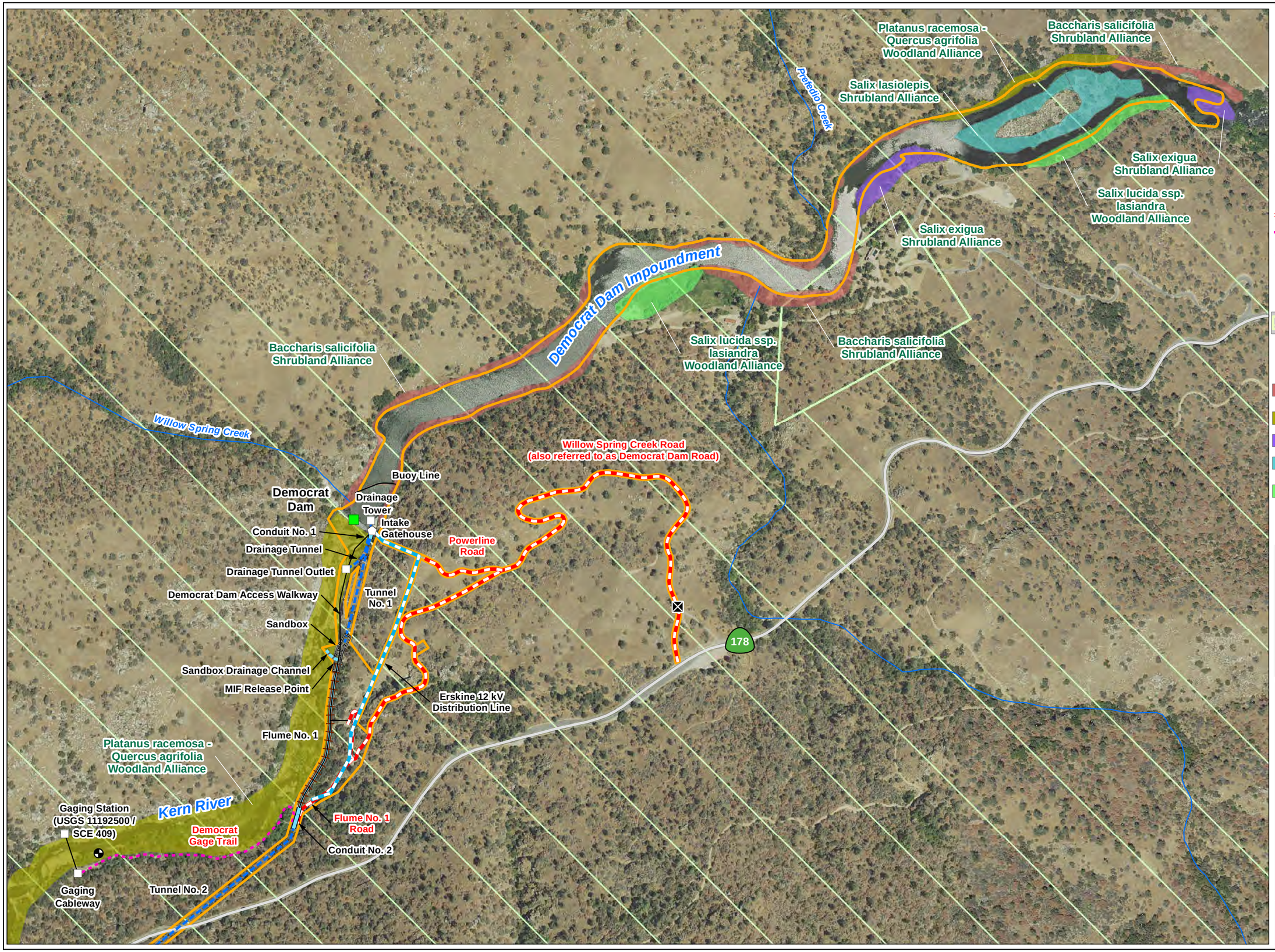


Facilities

- Dam
- Powerhouse
- Water Conveyence Feature
- Tunnel
- Flume
- Conduit
- Sandbox
- Penstock
- Spillway
- Tailrace
- Gage
- Ancillary Facility
- Ancillary Feature
- Powerline
- Communication/ Powerline
- FERC Boundary

Transportation

- Project Road
- Project Trail
- Other Road
- Gate

Other Features

- Watercourse

Land Jurisdiction*

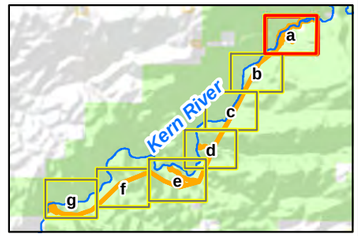
- U.S. Forest Service

*SOURCE: BLM 2021

Riparian Alliances

- Baccharis salicifolia Shrubland Alliance
- Platanus racemosa - Quercus agrifolia Woodland Alliance
- Salix exigua Shrubland Alliance
- Salix lasiolepis Shrubland Alliance
- Salix lucida ssp. lasiandra Woodland Alliance

Note: Other than Democrat Dam Impoundment and the Kern River, there were no Special Aquatic Features in the Study Area



SOUTHERN CALIFORNIA EDISON
Energy for What's Ahead

Kern River No. 1 Hydroelectric Project
FERC Project No. 1930

Map 7.8-2a

Riparian Alliances and Special Aquatic Features Within the FERC Project Boundary, Along Project Access Trails, and Along the Kern No. 1 Project Bypass Reach

0 250 500
Feet
Projection: UTM Zone 11
Datum: NAD 83

Date: 10/30/2025

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Facilities

- Dam
- Powerhouse
- Water Conveyence Feature
- Tunnel
- Flume
- Conduit
- Sandbox
- Penstock
- Spillway
- Tailrace
- Gage
- Ancillary Facility
- Ancillary Feature
- Powerline
- Communication/ Powerline
- FERC Boundary

Transportation

- Project Road
- Project Trail
- Other Road
- Gate

Other Features

- Watercourse

Land Jurisdiction*

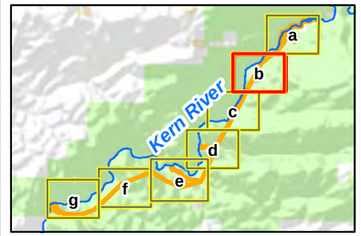
- U.S. Forest Service

*SOURCE: BLM 2021

Riparian Alliances

- Baccharis salicifolia Shrubland Alliance
- Platanus racemosa - Quercus agrifolia Woodland Alliance
- Salix exigua Shrubland Alliance
- Salix lasiolepis Shrubland Alliance
- Salix lucida ssp. lasiandra Woodland Alliance

Note: Other than Democrat Dam Impoundment and the Kern River, there were no Special Aquatic Features in the Study Area



SOUTHERN CALIFORNIA EDISON
Energy for What's Ahead™

Kern River No. 1 Hydroelectric Project
FERC Project No. 1930

Map 7.8-2b

Riparian Alliances and Special Aquatic Features Within the FERC Project Boundary, Along Project Access Trails, and Along the Kern No. 1 Project Bypass Reach

0 250 500
Feet
Projection: UTM Zone 11
Datum: NAD 83

Date: 10/30/2025

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Facilities

- Dam
- Powerhouse
- Water Conveyence Feature
- Tunnel
- Flume
- Conduit
- Sandbox
- Penstock
- Spillway
- Tailrace
- Gage
- Ancillary Facility
- Ancillary Feature
- Powerline
- Communication/ Powerline
- FERC Boundary

Transportation

- Project Road
- Project Trail
- Other Road
- Gate

Other Features

- Watercourse

Land Jurisdiction*

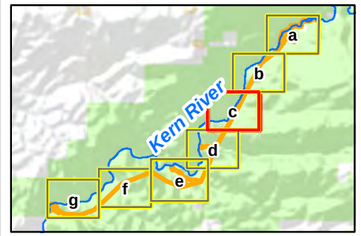
- U.S. Forest Service

*SOURCE: BLM 2021

Riparian Alliances

- Baccharis salicifolia Shrubland Alliance
- Platanus racemosa - Quercus agrifolia Woodland Alliance
- Salix exigua Shrubland Alliance
- Salix lasiolepis Shrubland Alliance
- Salix lucida ssp. lasiandra Woodland Alliance

Note: Other than Democrat Dam Impoundment and the Kern River, there were no Special Aquatic Features in the Study Area



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Energy for What's Ahead™

Kern River No. 1 Hydroelectric Project
FERC Project No. 1930

Map 7.8-2c

Riparian Alliances and Special Aquatic Features Within the FERC Project Boundary, Along Project Access Trails, and Along the Kern No. 1 Project Bypass Reach

0 250 500
Feet
Projection: UTM Zone 11
Datum: NAD 83

Date: 10/30/2025

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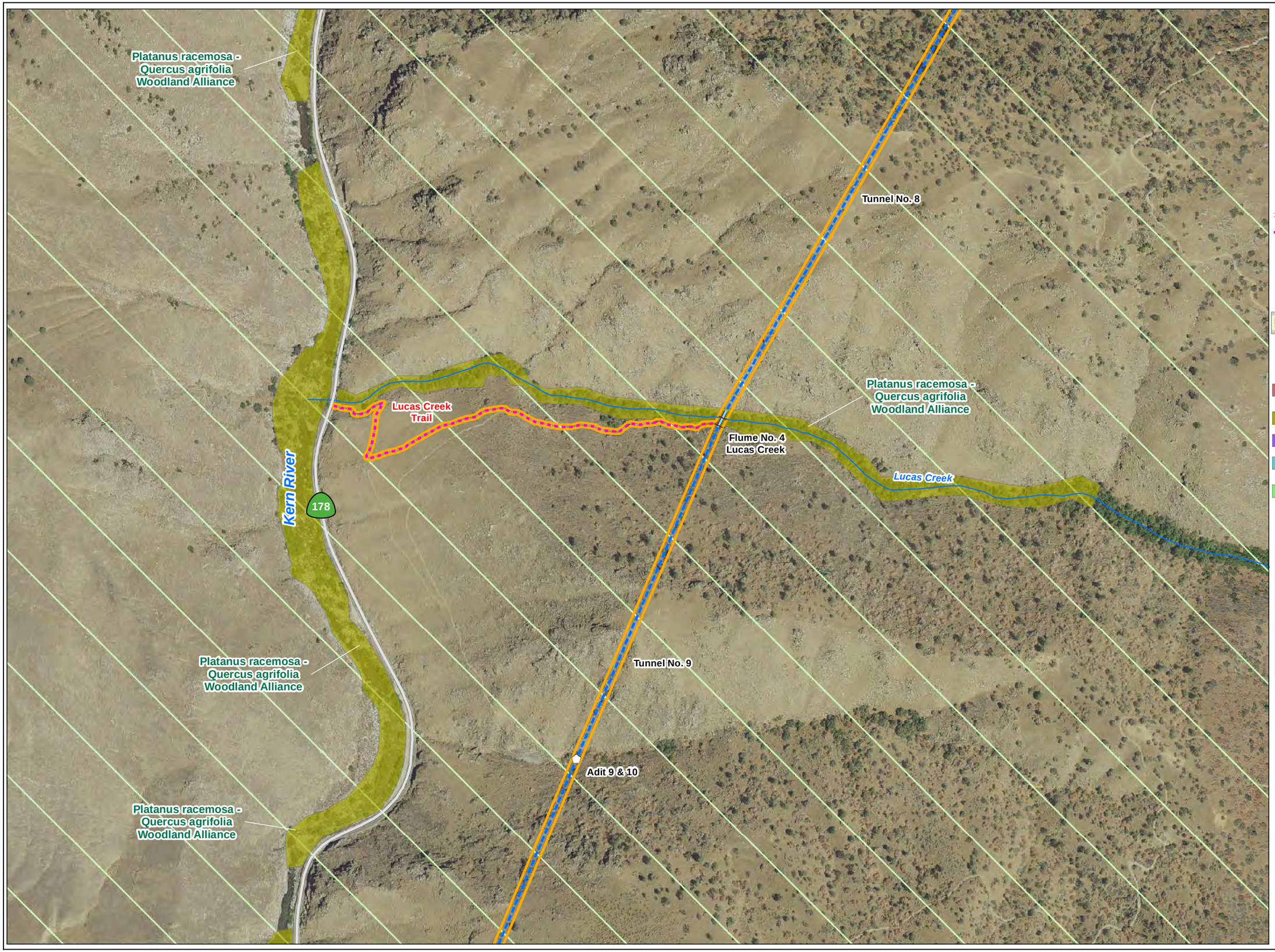


Facilities

- Dam
- Powerhouse
- Water Conveyence Feature
- Tunnel
- Flume
- Conduit
- Sandbox
- Penstock
- Spillway
- Tailrace
- Gage
- Ancillary Facility
- Ancillary Feature
- Powerline
- Communication/ Powerline
- FERC Boundary

Transportation

- Project Road
- Project Trail
- Other Road
- Gate

Other Features

- Watercourse

Land Jurisdiction*

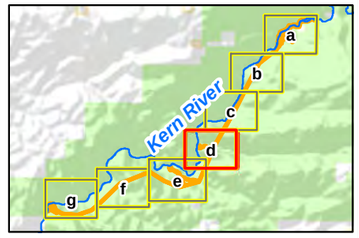
- U.S. Forest Service

*SOURCE: BLM 2021

Riparian Alliances

- Baccharis salicifolia Shrubland Alliance
- Platanus racemosa - Quercus agrifolia Woodland Alliance
- Salix exigua Shrubland Alliance
- Salix lasiolepis Shrubland Alliance
- Salix lucida ssp. lasiandra Woodland Alliance

Note: Other than Democrat Dam Impoundment and the Kern River, there were no Special Aquatic Features in the Study Area



SOUTHERN CALIFORNIA EDISON
Energy for What's Ahead™

Kern River No. 1 Hydroelectric Project
FERC Project No. 1930

Map 7.8-2d

Riparian Alliances and Special Aquatic Features Within the FERC Project Boundary, Along Project Access Trails, and Along the Kern No. 1 Project Bypass Reach

0 250 500
Feet
Projection: UTM Zone 11
Datum: NAD 83

Date: 10/30/2025

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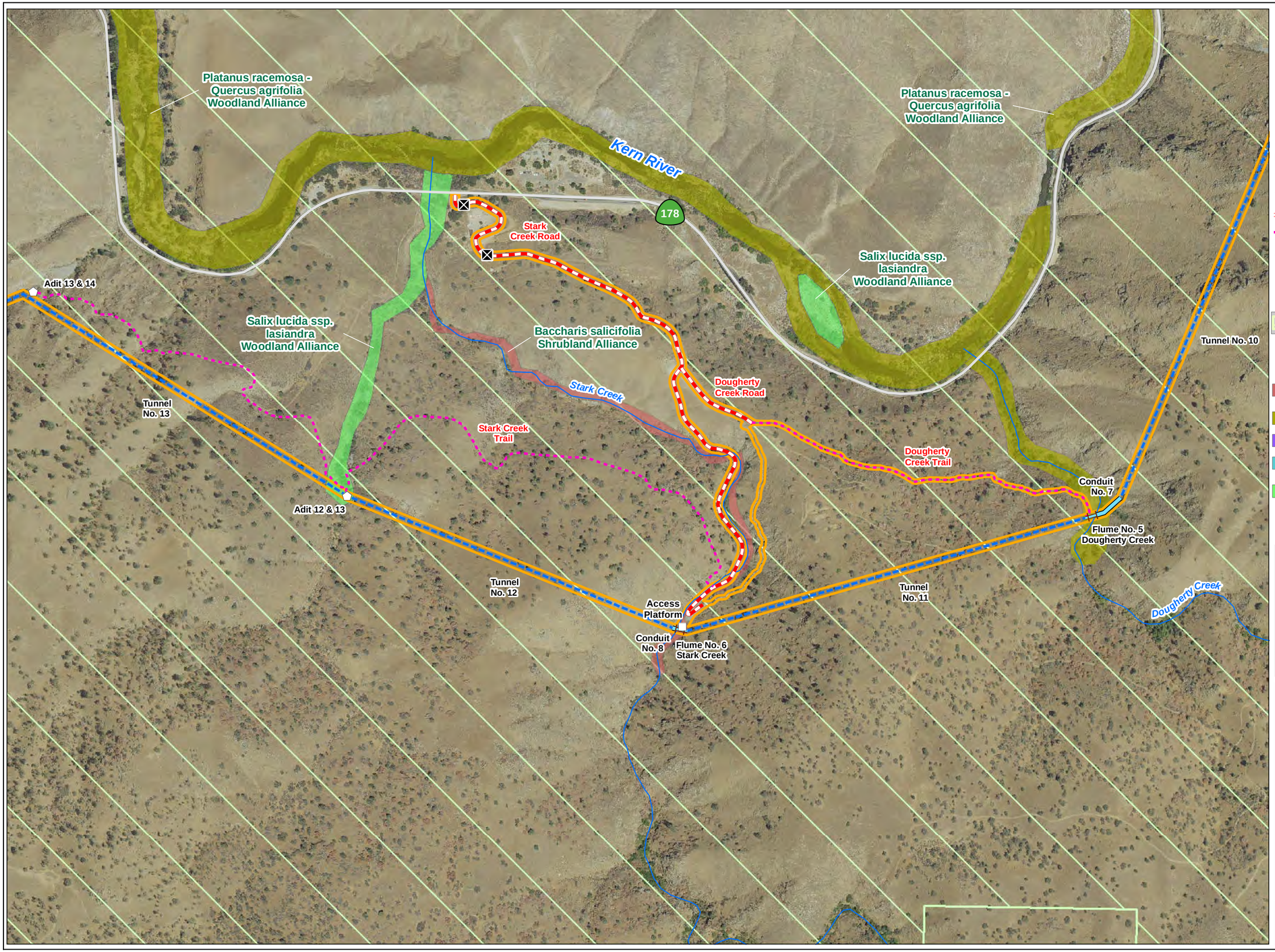

Facilities

- Dam
- Powerhouse
- Water Conveyence Feature
- Tunnel
- Flume
- Conduit
- Sandbox
- Penstock
- Spillway
- Tailrace
- Gage
- Ancillary Facility
- Ancillary Feature
- Powerline
- Communication/ Powerline
- FERC Boundary

Transportation

- Project Road
- Project Trail
- Other Road
- Gate

Other Features

- Watercourse

Land Jurisdiction*

- U.S. Forest Service

*SOURCE: BLM 2021

Riparian Alliances

- Baccharis salicifolia Shrubland Alliance
- Platanus racemosa - Quercus agrifolia Woodland Alliance
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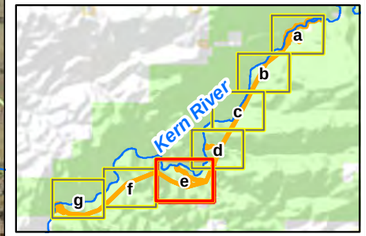

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Kern River No. 1 Hydroelectric Project
FERC Project No. 1930

Map 7.8-2e

Riparian Alliances and Special Aquatic Features Within the FERC Project Boundary, Along Project Access Trails, and Along the Kern No. 1 Project Bypass Reach

0 250 500
Feet
Projection: UTM Zone 11
Datum: NAD 83

Date: 10/30/2025

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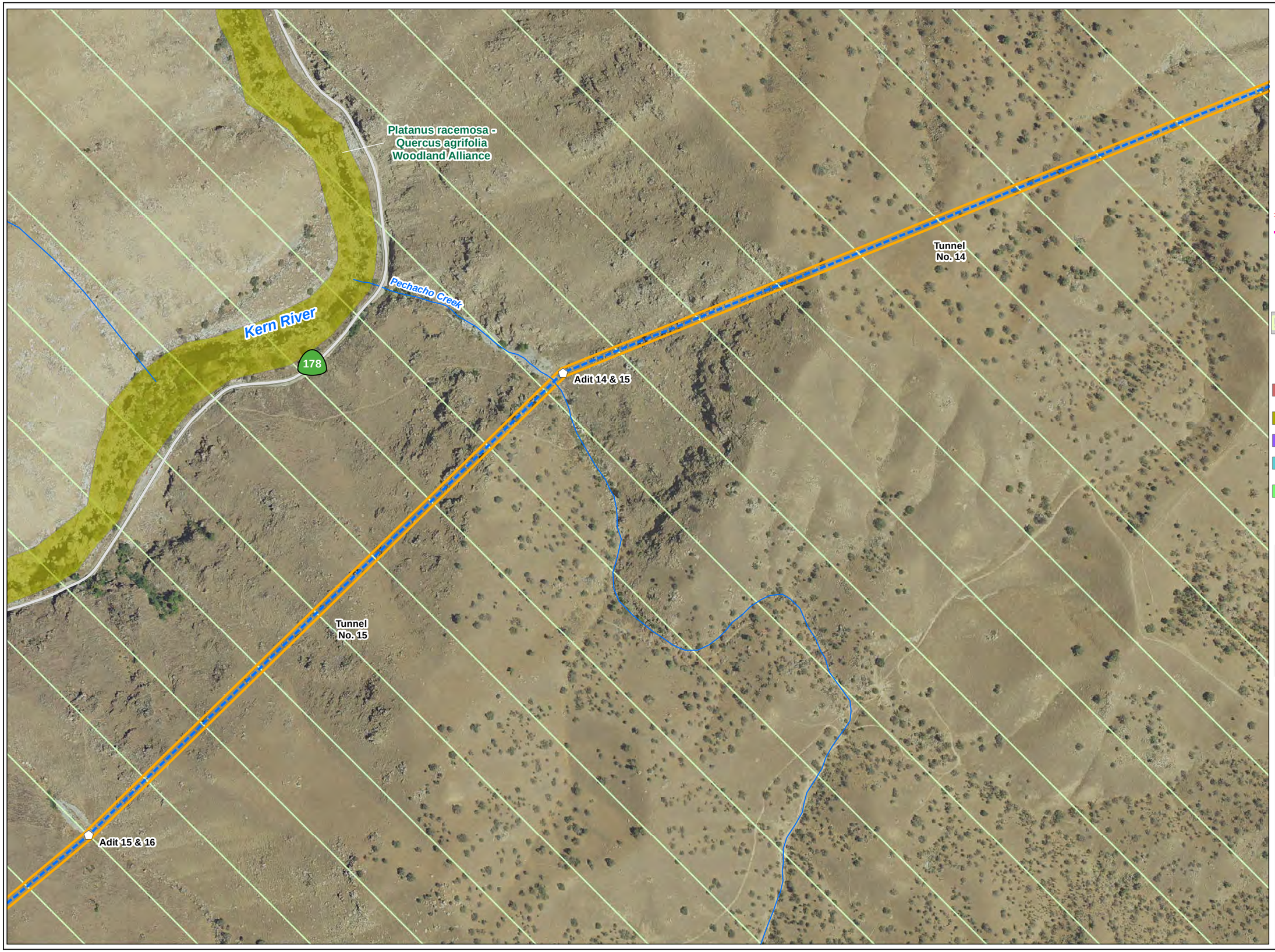

Facilities

- Dam
- Powerhouse
- Water Conveyence Feature
- Tunnel
- Flume
- Conduit
- Sandbox
- Penstock
- Spillway
- Tailrace
- Gage
- Ancillary Facility
- Ancillary Feature
- Powerline
- Communication/ Powerline
- FERC Boundary

Transportation

- Project Road
- Project Trail
- Other Road
- Gate

Other Features

- Watercourse

Land Jurisdiction*

- U.S. Forest Service

*SOURCE: BLM 2021

Riparian Alliances

- Baccharis salicifolia Shrubland Alliance
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- Salix exigua Shrubland Alliance
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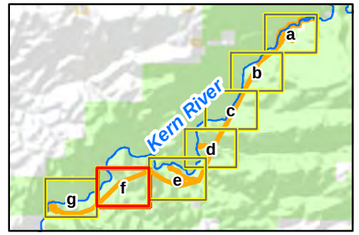

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Kern River No. 1 Hydroelectric Project
FERC Project No. 1930

Map 7.8-2f

Riparian Alliances and Special Aquatic Features Within the FERC Project Boundary, Along Project Access Trails, and Along the Kern No. 1 Project Bypass Reach

0 250 500
Feet
Projection: UTM Zone 11
Datum: NAD 83

Date: 10/30/2025

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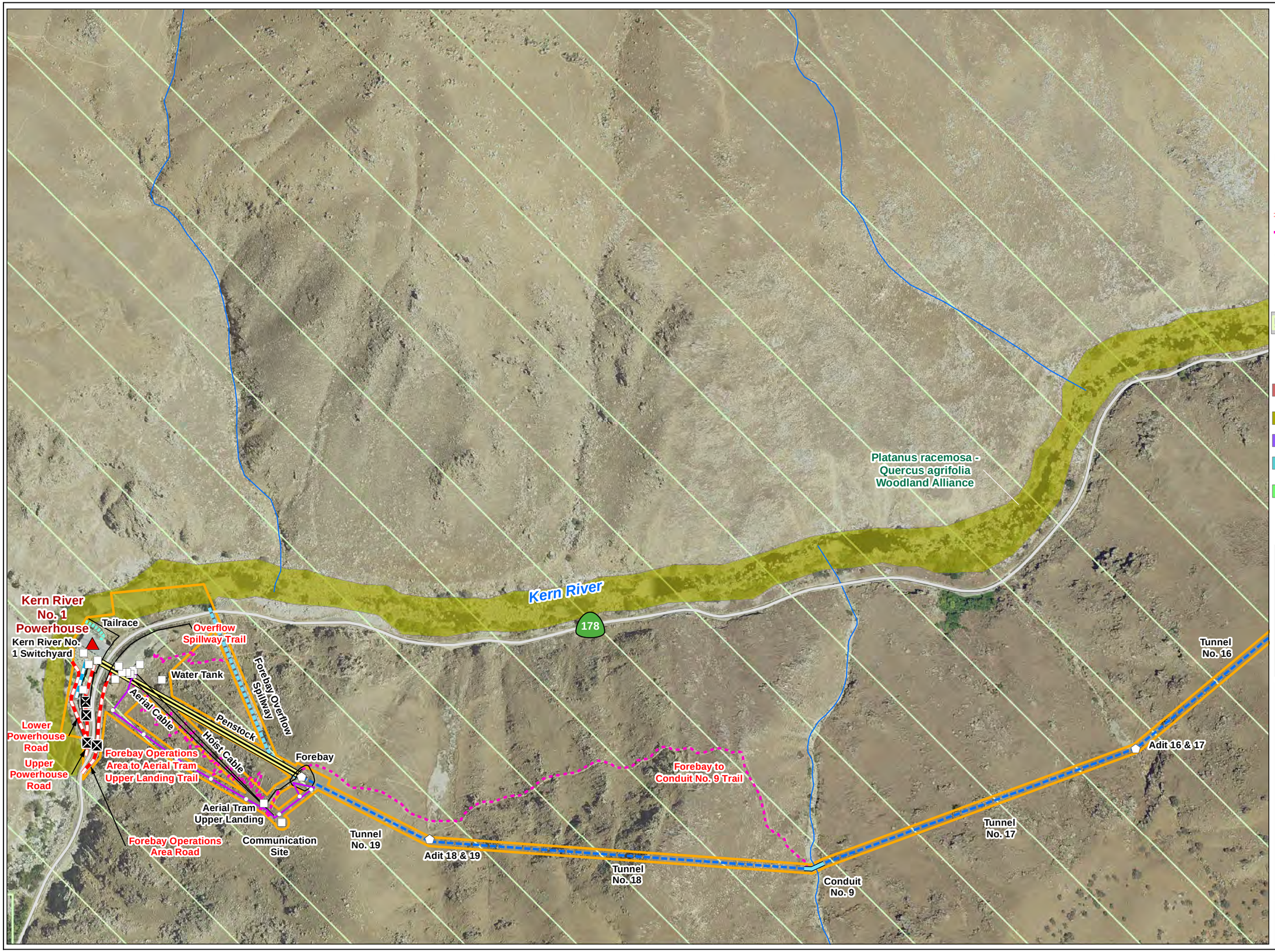

Facilities

- Dam
- Powerhouse
- Water Conveyence Feature
- Tunnel
- Flume
- Conduit
- Sandbox
- Penstock
- Spillway
- Tailrace
- Gage
- Ancillary Facility
- Ancillary Feature
- Powerline
- Communication/ Powerline
- FERC Boundary

Transportation

- Project Road
- Project Trail
- Other Road
- Gate

Other Features

- Watercourse

Land Jurisdiction*

- U.S. Forest Service

*SOURCE: BLM 2021

Riparian Alliances

- Baccharis salicifolia Shrubland Alliance
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- Salix exigua Shrubland Alliance
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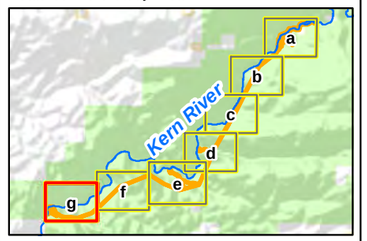

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Kern River No. 1 Hydroelectric Project
FERC Project No. 1930

Map 7.8-2g

Riparian Alliances and Special Aquatic Features Within the FERC Project Boundary, Along Project Access Trails, and Along the Kern No. 1 Project Bypass Reach

0 250 500
Feet
Projection: UTM Zone 11
Datum: NAD 83

Date: 10/30/2025

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LIST OF ACRONYMS

BLM	United States Bureau of Land Management
CAL FIRE	California Department of Forestry and Fire Protection
FERC	Federal Energy Regulatory Commission
Forest Plan	Sequoia National Forest Land Management Plan
Forest Service	United States Forest Service
PM&E	protection, mitigation, and enhancement
Project	Kern River No. 1 Hydroelectric Project
RMA	Recreation Management Area
SCE	Southern California Edison
SQF	Sequoia National Forest

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7.9 LAND USE

This section describes land use in the vicinity of Southern California Edison's (SCE) Kern River No. 1 Hydroelectric Project (Project). Federal Energy Regulatory Commission (FERC) regulations require the applicant to provide information regarding land use and recreation. This section describes land uses and pertinent land management plans and policies that govern land uses within and adjacent to the FERC Project boundary. A description of recreation resources is provided in Section 7.10, *Recreation Resources*. A description of scenic resources is described in Section 7.11, *Aesthetic Resources*.

Section 7.9.1 describes the affected environment and resource conditions under current Project operation and maintenance (i.e., baseline condition). Section 7.9.2 identifies proposed environmental measures, management, and monitoring plans (collectively referred to as protection, mitigation, and enhancement [PM&E] measures) to be implemented under the Proposed Action (see Appendix E.1 for a full description of proposed PM&E measures). Section 7.9.3 includes an analysis of the potential environmental effects of the Proposed Action, including potential beneficial effects of proposed PM&E measures. Section 7.9.4 describes unavoidable adverse effects of the Proposed Action on land use.

7.9.1 Affected Environment

7.9.1.1 Information Sources

This section was developed using existing, relevant, and reasonably available information in the following primary sources. Additional references are cited in the text, as appropriate.

- Forest Service Final Environmental Impact Statement for Revision of the Sequoia and Sierra National Forests Land Management Plans (Forest Service 2022)
- Forest Service Land Management Plan for the Sequoia National Forest. Fresno, Kern, and Tulare Counties, California (Forest Service 2023)
- Kern County General Plan (Kern County 1982, 2009)

7.9.1.2 Land Use and Management Within the FERC Project Boundary

The Project is located along a section of the lower Kern River on the western slope of the Sierra Nevada, approximately 15 miles east of the City of Bakersfield in Kern County, California. The current FERC Project boundary is narrowly defined by the features of the Project encompassing a total of approximately 121.27 acres of land, of which 116.79 acres are on federal land within the Kern River Ranger District of the Sequoia National Forest (SQF) and the remaining 4.48 acres are SCE owned. The SQF is at the southernmost end of the Sierra Nevada range in California and is in portions of Tulare, Kern, and Fresno counties. Refer to Map 7.9-1 for geographic depictions of the Project vicinity and nearby population centers.

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Land use within the FERC Project boundary includes hydropower generation, recreation, and grazing. Most of the land within the FERC Project boundary is federal land administered by the SQF in accordance with the 2023 SQF Land Management Plan (Forest Plan).

Sequoia National Forest Land Management Plan

In the SQF boundary, there are approximately 1.1 million acres of National Forest System land and 54,155 acres of land under state, private, and other ownerships. Elevations range from 790 feet in the lower Kern River Valley to 11,873 feet in the Golden Trout Wilderness (Forest Service 2022).

Every national forest managed by the Forest Service is required to have a Land Management Plan that is consistent with the National Forest Management Act of 1976[1] and other laws. This plan includes goals, objectives, direction, and prescriptions used to guide land management activities with respect to desired existing and future conditions.

On June 25, 2023, the current SQF Forest Plan went into effect, replacing the 1988 SQF Land and Resource Management Plan and its amendments (Forest Service 2023). The Forest Plan describes management of the forest for a variety of land uses, including recreation, wilderness use, maintenance and improvement of habitat, rangeland, timber production, and the exploration and development of mineral resources. The Forest Plan identifies and maps lands of specific character and defines boundaries of management areas or designated areas where the characteristics that define those lands exist. Forest Service lands of specific character, management areas, and designated areas within and surrounding the FERC Project boundary include various strategic fire management zones, Riparian Conservation Areas, Conservation Watersheds, Wild and Scenic Rivers, and Sustainable Recreation Management Areas (RMA). These areas are described as follows.

- **Strategic Fire Management Zones:** Strategic fire management zones support decision-making before a fire ignition occurs, by pre-assessing the risks and benefits from wildland fire (both wildfire and prescribed fire) to the landscape. The Strategic Fire Management Zones around the Project boundary are either Wildfire Restoration, General Wildfire Protection, or Community Wildfire Protection (illustrated on Map 7.9-2).

- **Riparian Conservation Areas:** Riparian conservation areas are lands adjacent to water resources and unstable and potentially unstable areas where special standards and guidelines direct land use. Management activities in riparian conservation areas are designed to protect, restore, or enhance water quality and the ecological health and function of aquatic and riparian ecosystems and associated resources. Riparian areas and aquatic habitat standards were developed to protect hydrologic processes, water temperatures, fens, connectivity,

[1] 16 U.S.C. 1604 – National Forest System Land and Resource Management Plans

aquatic species, shorelines, and occupied native cutthroat trout stream reaches (illustrated on Map 7.9-3).

- **Conservation Watershed:** Large-scale conservation watersheds allow for habitat connectivity, where appropriate, for species to shift their distributions in response to climate change. Conservation watersheds are intended to help protect and maintain the most intact aquatic systems and restore degraded watersheds of high importance for stewardship of fish, aquatic resources, and water quality over the long term (illustrated on Map 7.9-3).

- **Wild and Scenic Rivers:** The Forest Service identifies the lower Kern River from Lake Isabella 31 miles downstream to the canyon mouth above Bakersfield as an eligible (but not Congressionally designated) Wild and Scenic River. Additional details regarding this designation are provided below (illustrated on Map 7.9-3).

- **Sustainable Recreation Management Areas:** RMAs provide management direction for specific opportunities and activities. The SQF Forest Plan designates three RMAs: Destination Recreation Areas (High Use), General Recreation Areas (moderate use), Challenging Backroad Areas (Low Use). RMAs within the Project boundary include Challenging Background Area and Destination Recreation Area (refer to Section 7.10 for additional information regarding RMAs).

In addition, the Forest Plan establishes the following land use designations within and around the Project boundary.

- The Recreation Opportunity Spectrum designations are Semi Primitive Motorized and Roaded Natural.

- The Scenery Management Systems are High or Moderate.

Forest Service range allotments for livestock grazing around the lower Kern River, including within the FERC Project boundary, are active.

Wild and Scenic River Eligibility

A Wild and Scenic River is a river designated by Congress as part of the National Wild and Scenic Rivers System that was established in the Wild and Scenic Rivers Act of 1968 with the following characteristics:

- **Wild**—Those rivers or sections of rivers free of impoundments and generally inaccessible except by trail, with watersheds or shorelines essentially primitive and waters unpolluted. These represent vestiges of primitive America.

- **Scenic**—Those rivers or sections of rivers free of impoundments, with shorelines or watersheds still largely primitive and shorelines largely undeveloped, but accessible in places by roads.

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- **Recreational**—Those rivers or sections of rivers readily accessible by road or railroad that may have some development along their shorelines, and that may have undergone some impoundment or diversion in the past.

The Forest Service has identified the lower Kern River from Lake Isabella 31 miles downstream to the canyon mouth above Bakersfield (inclusive of the Project area) as a river that meets Wild and Scenic eligibility requirements. The lower Kern River meets these requirements under the classification of "recreational" river with identified outstanding remarkable values for scenery, recreation, wildlife, population and habitat, prehistory, and history (Forest Service 2022). The criteria for a Wild and Scenic Recreation River classification includes existing impoundments and diversions, as long as the waterway remains generally natural and riverine in appearance. The SQF Forest Plan manages eligible, suitable, or recommended Wild and Scenic rivers to protect free-flow and outstandingly remarkable values and maintain preliminary classifications (Forest Service 2023). Designated eligible Wild and Scenic River corridors are depicted on Map 7.9-3.

Shoreline Buffer Zones and Management Plans

The Project is operated in a run-of-river mode and does not include any reservoirs. The Democrat Dam Impoundment (also referred to as the "pond") is located upstream of Democrat Dam and covers approximately 27 acres; however, there is no usable storage capacity. Because Democrat Dam is a run-of-river dam and its whole crest is a spillway, the dam regularly spills and the impoundment and tailwater levels are governed by natural flows in the Kern River.

The FERC Project boundary represents a buffer zone around the impoundment. Aside from Democrat Hot Springs, which is privately owned by a third party and not open to the public, public access to the impoundment is not restricted by the Forest Service. There are no permitted public piers, boat docks, landings, bulkheads, or other shoreline facilities associated with the impoundment. Therefore, SCE does not maintain a shoreline management plan.

7.9.1.3 Land Use and Management Adjacent to the FERC Project Boundary

The lower Kern River is surrounded by National Forest System lands and some scattered private inholdings within the SQF boundary. The SQF is managed by the Forest Service in accordance with the SQF Forest Plan while private inholdings in Kern County are subject to the land management goals and policies of the Kern County General Plan. There are no other federal, state or local jurisdictions that own or manage land adjacent to the FERC Project boundary. The closest additional entities with land jurisdiction are the City of Bakersfield and Bureau of Land Management (BLM). Upstream from the Project boundary, closer to Lake Isabella, there are federal parcels under the jurisdiction of the BLM.

Kern County General Plan

The Kern County General Plan (Kern County 2009) includes goals, policies, and implementation measures to guide development in the county on a long-term basis. The county land use regulations do not apply to property administered by the state or federal

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government, defined by the County as Non-Jurisdictional Lands, in the absence of Memorandums of Understanding indicating otherwise. Private inholdings within the SQF are primarily resource lands (i.e., lands managed for limited, if any development). In the vicinity of the Project, identified land uses on county inholdings include resource use such as agricultural and mining. Several of the resource lands along the Kern River include environmental overlay designations, locations within which the development provisions of the underlying use (e.g., extensive agricultural) are augmented to address specific environmental constraints such as flood hazard or steep slopes (Kern County 2009). The land use designations for Kern County in the vicinity of the FERC Project boundary are included in the General Plan *Central Section Map* of the Kern County General Plan (Kern County 1982). The single parcel of private land that abuts the FERC Project boundary at the Democrat Dam impoundment is a placer mining claim identified in the *Central Section Map* as an agricultural parcel (Extensive Agriculture) with a steep slope environmental constraints overlay (Kern County 1982).

7.9.1.4 Specially Designated Areas

Aside from the SQF, there are no specially designated management areas in the vicinity of the Project, including lands under study for inclusion in the National Trails System or as a Wilderness Area, or any roads designated at the federal or state level as a scenic highway or byway. The lower Kern River does not include any state-protected river segments.

7.9.1.5 Fire History and Fuels Management

The Project is situated within the Kern River Valley, an area primarily characterized by grasslands and herbaceous cover in mountainous territory. Wildfires are common events throughout this region. The recent largest recorded fires within or adjacent to the FERC Project boundary include the following fires (Forest Service 2022, CAL FIRE 2025a and 2025b):

- The 2011 Breckenridge Complex was started by lightning and burned around 25,000 acres; the Kern River No. 1 Powerhouse and associated facilities were within the fire's perimeter.

- The 2017 Garden Fire was started by equipment and burned around 1,300 acres, including acreage immediately south and east of the Democrat Dam Impoundment.

- The 2024 Borel Fire was started by a car crash and burned around 59,300 acres, mostly upstream and east of the bypass reach, though its perimeter extended to State Route 178 near Cow Flat Creek.

- The 2025 Democrat Fire burned around 1,700 acres along the bypass reach uphill of the Upper Richbar Picnic Area.

Because most of the land in and around the FERC Project boundary is National Forest land, fire prevention and fuels management in the Project area is primarily provided by the

Forest Service. Kern County is a CAL FIRE Contract County – where CAL FIRE provides funding for fire prevention and response staffing, infrastructure, and equipment, and where CAL FIRE units provide responses to fires that cannot be addressed by the County's existing fire services. Therefore, on private lands in the vicinity, CAL FIRE is the primary entity responsible for fire prevention and fuels management.

According to the SQF Forest Plan (Forest Service 2023), fire management within and surrounding the FERC Project boundary falls within three strategic wildfire management zones based on wildfire risk within the forest: Community Wildfire Protection Zone; General Wildfire Protection Zone; or Wildfire Restoration Zone. The single parcel of private property that intersects with the Project boundary is identified as a High Fire Hazard Severity Zone by CAL FIRE (CAL FIRE 2007). The CAL FIRE fire severity classifications are "very high," "high" and "moderate."

To reduce fire hazards associated with Project facilities, SCE implements regular maintenance activities, including vegetation management and hazard tree removal. Vegetation management includes trimming by hand and with equipment, and herbicide use to provide adequate buffer around facilities. SCE removes trees posing a threat to facilities that could become a fire hazard. Refer to Section 5.1, *No-Action Alternative*, for a description of existing Project facility maintenance activities and the locations and timing of their implementation.

7.9.2 Proposed Environmental Measures

Under the Proposed Action, SCE proposes to implement PM&E measures associated with ongoing Project operation and maintenance activities. PM&E measures are designed to protect, maintain, or enhance environmental and cultural resources over the term of the new license. No PM&E measures related to land use are proposed as part of the Project. Appendix E.1 provides complete descriptions of measures SCE is proposing as part of the license application and to include in any new license issued for the Project.

7.9.3 Potential Project Effects

This section describes the potential effects to land use that could occur because of continued operation and maintenance activities to be implemented under the Proposed Action. Potential effects are determined by analyzing the changes in land use that may result from activities implemented under the Proposed Action (Section 5.2) compared to the No-Action Alternative (existing condition) (Section 5.1). Final effects determinations consider PM&E measures to be included under the Proposed Action (refer to Appendix E.1).

Under the Proposed Action, SCE would continue to operate and maintain the Project as described in Section 5.1, *No-Action Alternative*, with minor adjustments to Project operation and maintenance activities in response to implementing proposed PM&E measures. No new or upgraded facilities, structural changes, or operational changes to the Project are proposed.

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Consistent with FERC's Scoping Document 2 (FERC 2023), this section evaluates potential effects of continued Project operation and maintenance on the following:

- Land use in the project area; and
- Eligible Wild and Scenic Rivers.

7.9.3.1 Effects of Continued Project Operation and Maintenance on Land Use

Under the Proposed Action the FERC Project boundary would be modified (increased and/or decreased) to (1) include all lands necessary for Project operation and maintenance; (2) remove lands no longer necessary for Project operation and maintenance; and (3) correct known errors in the current Exhibit G, *Project Maps*, for the Project. These modifications are minor and would involve, for example, re-alignment of FERC Project boundary buffers around all facilities in accordance with FERC requirements, and removal of incorrectly depicted Project access trail features. These modifications would not change the Project's compatibility with the SQF Forest Plan.

Under the Proposed Action, SCE would continue to operate the Project as previously described, with minor adjustments to operation and maintenance activities to implement PM&E measures. Minor adjustments to operation and maintenance activities would not affect land management or use within or adjacent to the Project area. Therefore, there would be no effect to land use associated with continued Project operation and maintenance.

7.9.3.2 Effects of Continued Project Operation and Maintenance on Eligible Wild and Scenic Rivers

SCE would continue to operate the Project to generate power for SCE customers consistent with regulatory requirements (i.e., FERC License Articles as modified by conditions included in the Proposed Action and existing water rights held by SCE). This includes continuing to operate the Project in run-of-river mode generally consistent with water management practices described in Section 5.1.4, *Project Operations*, and Section 5.1.5, *Project Maintenance*, including continuation of the existing minimum instream flow requirement (refer to the Minimum Instream Flow Measure in Appendix E.1). Because there would be no change to Project operations under the Proposed Action, there would be no effects to the eligibility of the lower Kern River as an eligible Wild and Scenic River.

7.9.4 Unavoidable Adverse Effects

There are no unavoidable adverse effects to land use from continued operation and maintenance of the Project under the Proposed Action.

7.9.5 References

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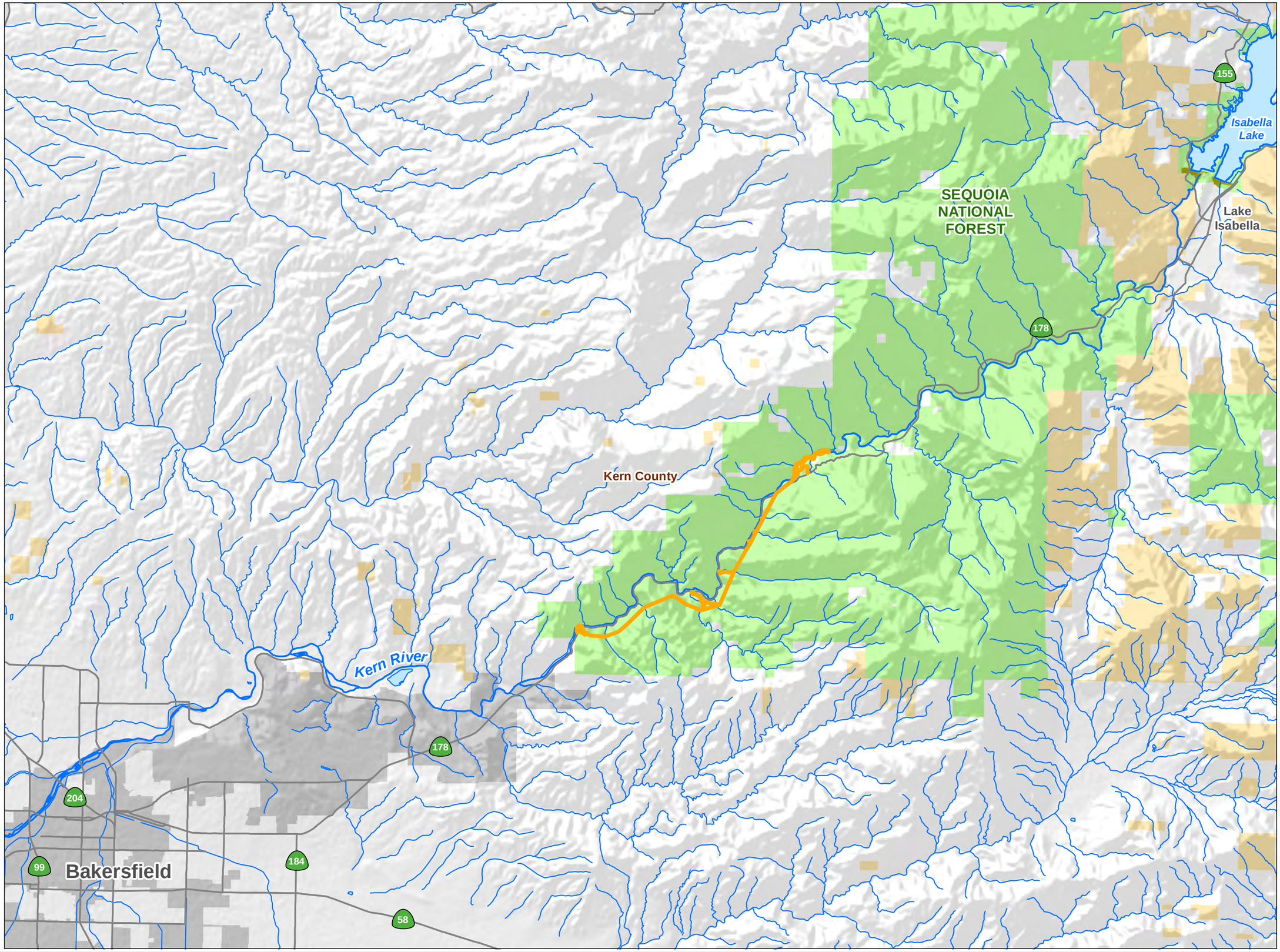
MAPS



FERC Project Boundary

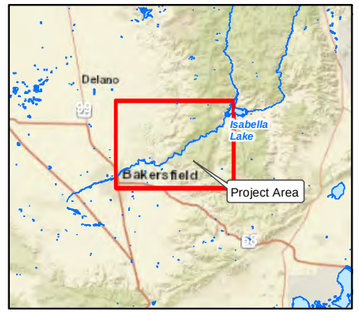
Other Features

- Highway
- Watercourse
- Water Body

Land Jurisdiction*

- U.S. Forest Service
- U.S. Bureau of Land Management
- U.S. Army Corps of Engineers
- Private (Blank)

*SOURCE: BLM 2021



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Kern River No. 1 Hydroelectric Project
FERC Project No. 1930

Map 7.9-1

Major Population Centers Near the Project

0 0.5 1 2 Miles

Projection: UTM Zone 11
Datum: NAD 83

Date: 7/3/2025

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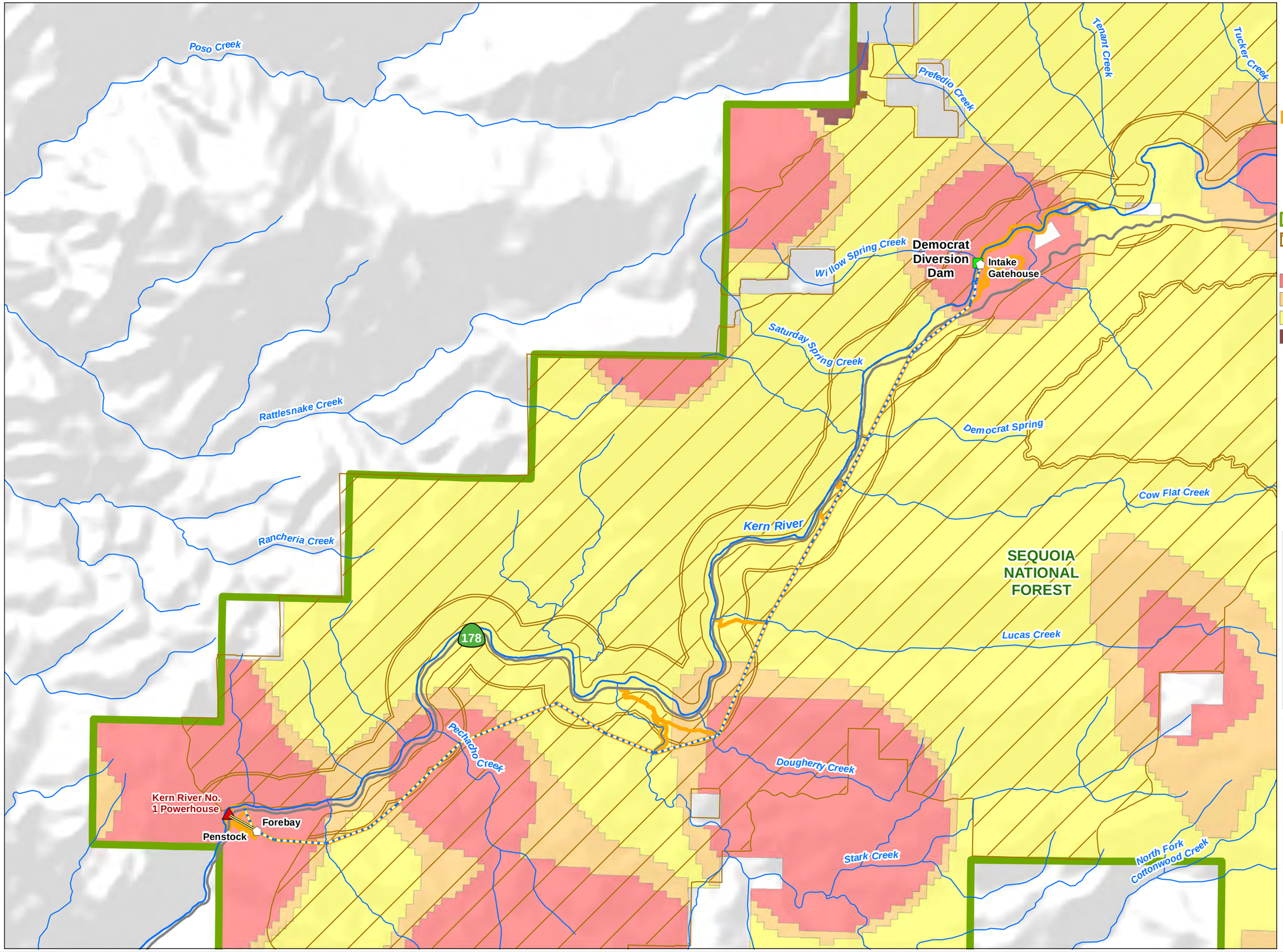


Facilities

- Dam
- Powerhouse
- Water Conveyence Feature
- Flowline
- Penstock
- FERC Boundary

Other Features

- Watercourse
- Highway

U.S. Forest Service Data

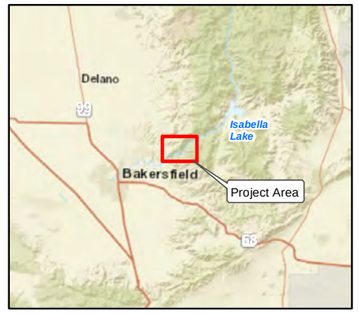
- Sequoia N.F. Administrative Boundary
- Inventoried Roadless Areas*

Strategic Fire Management Zones**

- Community Wildfire Protection
- General Wildfire Protection
- Wildfire Restoration
- Wildfire Maintenance

SOURCES:
*2001 Roadless Area Conservation Rule
(36 CFR 294, Subpart B)

**Sequoia National Forest Land
Management Plan, 2023



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Kern River No. 1 Hydroelectric Project
FERC Project No. 1930

Map 7.9-2

Project Facilities Relative to Roadless Areas and Strategic Fire Management Zones

0 0.25 0.5 Miles

Projection: UTM Zone 11
Datum: NAD 83

Date: 9/5/2025

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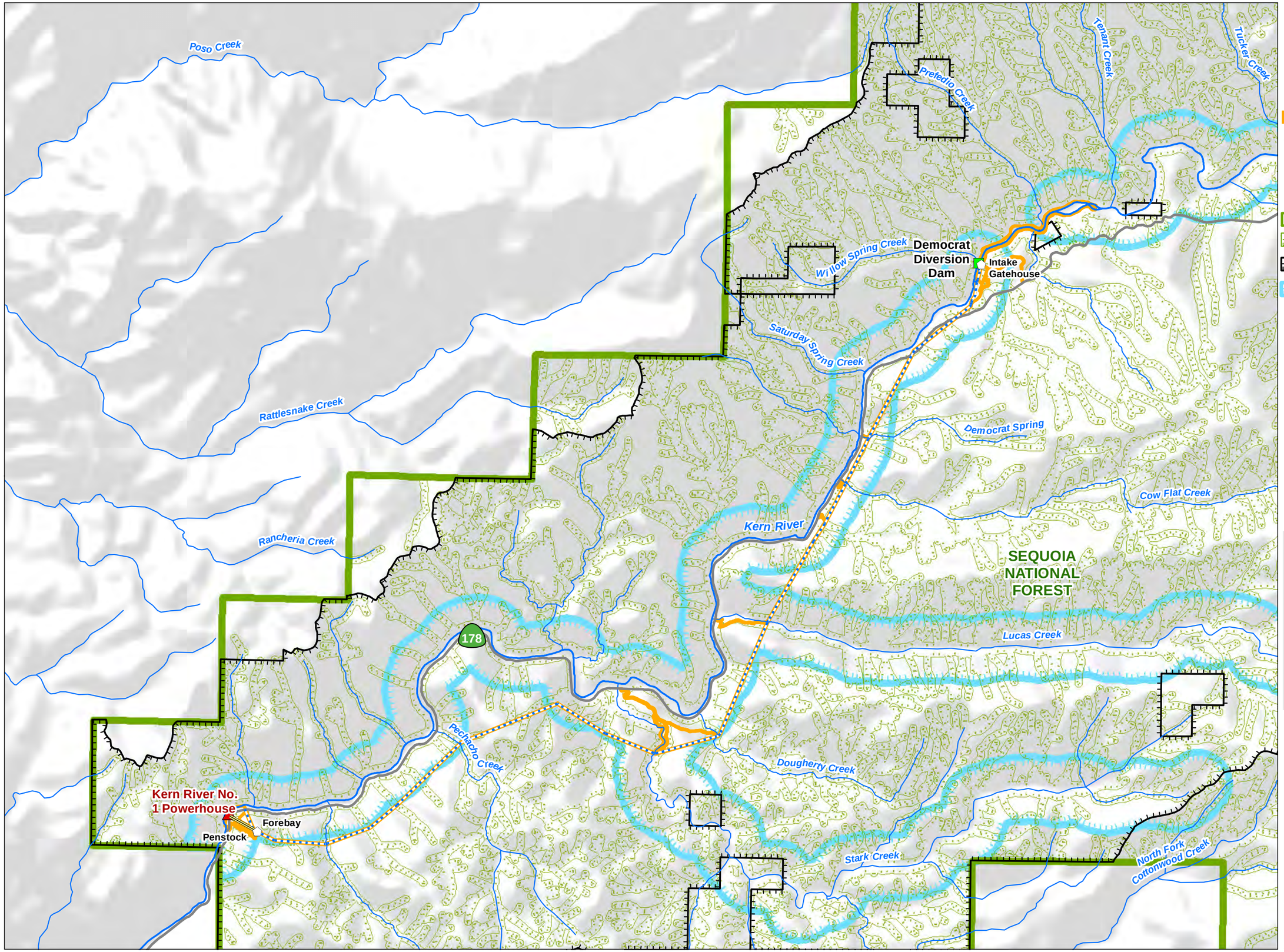


Facilities

- Dam
- Powerhouse
- Water Conveyence Feature
- Flowline
- Penstock
- FERC Boundary

Other Features

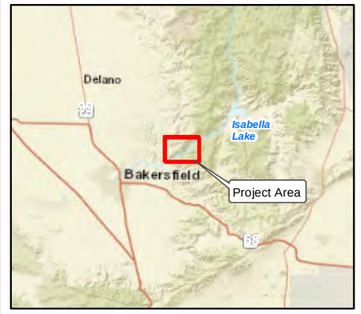
- Watercourse
- Highway

U.S. Forest Service Data

- Sequoia N.F. Administrative Boundary
- Riparian Conservation Areas*
- Conservation Watersheds Management Area**
- Eligible Wild and Scenic River Corridor**

SOURCES:
*Sierra Nevada Forest Plan Amendment Environmental Impact Statement, 2004

**Sequoia National Forest Land Management Plan, 2023



SOUTHERN CALIFORNIA EDISON
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Kern River No. 1 Hydroelectric Project
FERC Project No. 1930

Map 7.9-3

Project Facilities Relative to Conservation Watershed Management Areas, Riparian Conservation Areas and Eligible Wild & Scenic River Corridors

0 0.25 0.5 Miles

Projection: UTM Zone 11
Datum: NAD 83

Date: 8/21/2025

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LIST OF ACRONYMS

AQ 1 TM	AQ 1 – Hydrology Technical Memorandum
CDFW	California Department of Fish and Wildlife
cfs	cubic feet per second
FERC	Federal Energy Regulatory Commission
Forest Service	United States Forest Service
NVUM	National Visitor Use Monitoring
PM&E	protection, mitigation, and enhancement
Project	Kern River No. 1 Hydroelectric Project
REC 1 TM	REC 1 – Recreation Facility Condition Assessment Technical Memorandum
REC 2 TM	REC 2 – Recreation Facility Use Assessment Interim Technical Memorandum
REC 3 TM	REC 3 – Whitewater Boating Technical Memorandum
ROS	Recreation Opportunity Spectrum
SCE	Southern California Edison
SQF	Sequoia National Forest
SR-178	State Route 178
USACE	United States Army Corps of Engineers
USGS	United States Geological Survey
WY	water year

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7.10 RECREATION RESOURCES

This section describes recreation resources in the vicinity of Southern California Edison's (SCE) Kern River No. 1 Hydroelectric Project (Project). Federal Energy Regulatory Commission (FERC) regulations require the applicant to provide information regarding recreation and land use. This section provides information about the recreation resources in the vicinity of the Project. Information about land use within and outside of the FERC Project boundary, land management plans and policies, and specially designated areas is provided in Section 7.9, *Land Use*.

Section 7.10.1 describes the affected environment and resource conditions under current Project operation and maintenance (i.e., baseline condition). Section 7.10.2 identifies proposed environmental measures, management, and monitoring plans (collectively referred to as protection, mitigation, and enhancement [PM&E] measures) to be implemented under the Proposed Action (see Appendix E.1 for a full description of proposed PM&E measures). Section 7.10.3 includes an analysis of the potential environmental effects of the Proposed Action, including potential beneficial effects of proposed PM&E measures. Section 7.10.4 describes unavoidable adverse effects of the Proposed Action on recreation resources.

7.10.1 Affected Environment

7.10.1.1 Information Sources

This section was developed using existing, relevant, and reasonably available information in the following primary sources. Additional references are cited in the text, as appropriate.

- United States Forest Service (Forest Service) Final Environmental Impact Statement for Revision of the Sequoia and Sierra National Forests Land Management Plans (Forest Service 2022)
- Forest Service Land Management Plan for the Sequoia National Forest. Fresno, Kern, and Tulare Counties, California (Forest Service 2023)
- Five-Year Recreation Use Report, Kern River No. 1 Hydroelectric Project – FERC No. 1930 (TCW Economics 2005)
- SCE Technical Memoranda developed for the relicensing that are provided in Appendix E.2, including:
  - REC 1 – Recreation Facility Condition Assessment Technical Memorandum (REC 1 TM) (SCE 2025a)
  - REC 2 – Recreation Facility Use Assessment Interim Technical Memorandum (REC 2 TM) (SCE 2025b)

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- REC 3 – Whitewater Boating Technical Memorandum (REC 3 TM) (SCE 2025c)

- AQ 1 – Hydrology Technical Memorandum (AQ 1 TM) (SCE 2025d)

The REC 2 – Recreation Facility Use Assessment study is ongoing as of filing the Draft License Application. The information and analysis presented in this section includes study results through June 2025. The Recreation Facility Use Assessment Interim Technical Memorandum will be updated to include all study results and will be filed with the Updated Study Report in March 2026, and the Final License Application will include analysis of the complete study results.

7.10.1.2 Description of the Recreation Environment

The Project is located along a section of the lower Kern River[1] on the western slope of the Sierra Nevada, approximately 15 miles east of the City of Bakersfield in Kern County, California. The Project is entirely on land within the Sequoia National Forest (SQF).

SCE operates the Project in a run-of-river mode for hydroelectric generation. Water is diverted from the Kern River at Democrat Dam and directed through the Project's water conveyance system, comprised of approximately 8.5 miles of tunnels, flumes, and conduits. Water within the conveyance system is directed to a small concrete forebay, through a buried penstock, and into the Project powerhouse. Water exiting the powerhouse is returned to the Kern River via the Kern River No. 1 Tailrace.

Bypass Reach and Flows

The bypass reach[2] of the lower Kern River extends approximately 10.2 miles from Democrat Dam downstream to the Kern River No. 1 Tailrace. This segment is defined by swift currents and challenging rapids. Hydrology in the bypass reach is strongly influenced by operations at Lake Isabella, the largest reservoir in the Kern River Basin and managed by the United States Army Corps of Engineers (USACE). To meet agricultural demands, flows are high in summer when agricultural releases are made, and low in the winter when the USACE retains water to refill the reservoir.

In the AQ 1 TM (Appendix E.2), flow conditions for the Project are documented for the period from water year 1999 through water year 2024 (October 1, 1998, through September 30, 2023). This period represents Project operations since the issuance of the current FERC license in 1998. Total annual inflow into the Project in water years 1999–2024 ranged from approximately 136,000 acre-feet (2015) to over 1,903,000 acre-feet (2023). The median total annual inflow between 1999–2023 was approximately 614,000 acre-feet.

[1] The lower Kern River begins at Lake Isabella and travels down Kern Canyon to the City of Bakersfield.

[2] A bypass reach is a segment of a river downstream of a diversion facility where Project operations divert of a portion of the water from the river.

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Flows in the bypass reach are most consistently high in the April through August period. Mean monthly flows typically range from approximately 100 cubic feet per second (cfs) in November and December to more than 1,500 cfs in June; the maximum annual flow most often occurs in June or July. The highest mean daily flow measured in the bypass reach during the current license period was 7,620 cfs on May 26, 2023. The highest mean daily flow measured in the flowline during the current license period was 421 cfs on May 5, 2001, which is slightly greater than the Project's 412 cfs capacity, likely a result of minor measurement errors at the gage.

SCE holds diversion rights of up to 412 cfs, the maximum capacity of the Project's diversion. Under its existing license, the Project operates in a run-of-river mode and must meet minimum instream flow requirements in the bypass reach: at least 50 cfs, or inflow if less, from June 1 through September 30, and at least 15 cfs, or inflow if less, from October 1 through May 31 each year.

Refer to Section 7.2, *Water Use and Hydrology*, for more information about the flows and hydrology of the bypass reach.

Democrat Dam Impoundment

Democrat Dam Impoundment is located upstream of Democrat Dam and covers approximately 27 acres, with a gross storage capacity of 247 acre-feet when full. Because Democrat Dam is a run-of-river dam and its whole crest is a spillway, the dam regularly spills, and the impoundment water elevation is governed by inflow from the Kern River and downstream FERC minimum flow requirements.

Kern River Access

State Route 178 (SR-178) is the main transportation route between the Bakersfield area and the communities and recreation areas around Lake Isabella and is the primary road providing access to the lower Kern River and Project facilities. SR-178 parallels the lower Kern River along the river's southern bank from the Kern River No. 1 Powerhouse to the terminus of the FERC Project boundary above the Democrat Dam Impoundment, continuing easterly.

7.10.1.3 Recreational Facilities

SCE does not own or operate developed recreation facilities in the vicinity of the Project. Recreation facilities and improvements are relatively limited along the lower Kern River owing to the steep and rugged topography and the proximity of the highway. Developed recreation facilities along the bypass reach include four day-use areas and one privately owned recreation site at Democrat Hot Springs. The day-use areas are on SQF land and are administered by the Forest Service or a concessionaire to the Forest Service. The day-use areas are located on narrow flats of land between SR-178 and the river and are all accessed from SR-178. None of the day-use areas are included in SCE's license. Refer to Map 7.10-1a-b for the location of recreational facilities in relation to the FERC Project boundary.

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The Forest Service day-use areas are:

- Democrat Raft Take-Out Boating Site (at the Project's impoundment)
- Upper Richbar Day Use Area (bypass reach)
- Lower Richbar Day Use Area (bypass reach)
- Live Oak Day Use Area (bypass reach)

Democrat Raft Take-Out Boating Site

The Democrat Raft Take-Out Boating Site (Democrat Take-out) is located on the left bank of the impoundment approximately 0.8 mile upstream from the dam, just upstream of Prefedio Creek confluence. Democrat Take-out includes a paved access road leading to a paved whitewater access area with a two-lane carry-in boat launch. The boat ramp serves as a take-out for the boaters rafting upstream of the Project, and as a put-in for boaters fishing the impoundment. Parking is available in the dirt lot, located uphill from the bus turn around area. There is a pit-toilet available in the parking lot. Day-use hours are between sunrise and sunset daily. The Democrat Raft Take-Out Boating Site is not included in SCE's license.

Upper Richbar Day Use Area

The Upper Richbar Day Use Area is located approximately 20 miles northeast of Bakersfield along SR-178, just upstream of where Dougherty Creek flows into the Kern River. It has a paved road, picnic tables, toilets, and dumpsters. There is no potable water available. The elevation is 1,400 feet. It is open all year. Day-use hours are between sunrise and sunset daily. Use fees are $12 per day (Forest Service 2025a). The Upper Richbar Day Use Area is not included in SCE's license.

Lower Richbar Day Use Area

The Lower Richbar Day Use Area is located approximately 20 miles northeast of Bakersfield along SR-178, just upstream of where Dougherty Creek empties into the Kern River. It has a paved road, picnic tables, toilets, and dumpsters. There is no potable water available. The elevation is 1,400 feet. It is open from March to October. Day-use hours are between 6am until 10pm daily. Use fees are $12 per day (Forest Service 2025a). The Lower Richbar Day Use Area is not included in SCE's license.

Live Oak Day Use Area

The Live Oak Day Use Area, also known as Live Oak Picnic Area, is located approximately 19 miles northeast of Bakersfield along SR-178, about one-half mile downstream from the Lower Richbar site. It has a paved road, picnic tables, toilets, and dumpsters. There is no potable water available. The elevation is 1,400 feet. It is open May to October. Day-use hours are between 6am until 10pm daily. Use fees are $12 per day (Forest Service 2025a). The Live Oak Day Use Area is not included in SCE's license.

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7.10.1.4 Recreation Opportunities and Use

The lower Kern River is the key recreational attraction in the vicinity of the Project and the landscape of the river canyon supports three categories of recreation opportunities: (1) riverside recreation (including fishing) available at the four developed day-use facilities along the river, as well as at undeveloped river access points; (2) hiking, walking and/or biking along trails accessible from SR-178; and (3) non-commercial whitewater boating activities (primarily kayaking). Recreation use information about these three categories of recreation opportunities is provided below. Information presented relies on data collected as part of the REC 2 – Recreation Facility Use Assessment (SCE 2025b) and the REC 3 – Whitewater Boating Study (SCE 2025c). This data includes the following:

- Vehicle counts at the four day-use areas and at the undeveloped river access points between April 2024 and May 2025 (a complete year of data).

- Survey data from the four day-use areas and from five undeveloped river access points. This data is comprised of a complete year of intercept in-person surveys (April 2024 through May 2025), as well as data from physical self-survey boxes and responses to QR codes attached to the survey boxes (data collection ongoing). Information presented herein reflect data gathered from 408 survey forms representing 1,337 individual day-users.

- Trail use and survey data from the TrafX trail counters installed on Project trails (TrafX trail counters installed in November 2024 and data analysis ongoing), as well as from surveys administered via trailhead self-survey boxes and responses to QR codes attached to the survey boxes (survey boxes installed in January 2025 and data collection ongoing).

- Structured interviews with individuals from the whitewater boating community with direct experience boating the bypass reach (14 unique respondents completed the structured interview process).

- Boatable flow opportunities calculated using measured hourly flow data and modeled hourly flow data,[3] and the flow preference information collected from boater consultation.

Riverside Recreation

PRIMARY DAY USE AREA RECREATION ACTIVITIES

Visitors to the developed day-use areas and to undeveloped river access locations along the bypass reach come to the area to picnic (38 percent of visitors), fish (20 percent of

[3] Daily hydrology data is published by the United States Geological Survey (USGS) as USGS #11192000 - Kern River No 1 Conduit NR Democrat Springs CA and USGS #11192500 – Kern River NR Democrat Springs (River Only) CA. Hourly hydrology data is based on two SCE's gages (SCE is a USGS cooperator). Records are provided to USGS by SCE under the general supervision of the USGS in connection with FERC Project No. 2290.

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visitors) and hike, walk or use nearby trails (19 percent of visitors). Few visitors report visiting to swim or wade. The Forest Service discourages swimming due to powerful currents, cold water temperatures, and underwater hazards (Forest Service 2025b).

On average survey respondents reported they had visited the lower Kern River about 7 times over the last 12 months. Only 36 of the 408 surveys collected from day-use visitors indicated the survey respondent had no previous recreation trips in the last 12 months to the lower Kern River.

USE ESTIMATES

Across all developed recreation day-use facilities, there are a total of 91 designated parking spaces (refer to the REC 1 TM for details on parking capacity per facility). Additionally, approximately 25 vehicles may be accommodated at undeveloped river access points along SR-178.

Based on survey data collected between April 2024 and May 2025, existing available parking is adequate to meet day-use demand, particularly at developed recreation sites, which were never observed to fill to capacity during the survey period.[4] Based on the average number of vehicles counted per survey day (17), 15 percent of the total parking capacity was occupied on an average day when vehicle counts occurred. Parking capacity was exceeded at the two of the five undeveloped river access sites during some counts in the summer, though these sites only have capacity for between two to three vehicles at any one time. Upper Richbar receives slightly more visitation than other developed recreation sites and Live Oak Day Use area receives the least. Based on vehicle counts, June through October are the busiest months of the year, with vehicles counted averaging 20 per day during this time period.

DEMOGRAPHICS OF DAY-USERS

Most visitors to the area are local, with 75 percent of respondents surveyed as part of the REC 2 study indicating they were from either Bakersfield (65 percent) or from the Lake Isabella/Kernville area (10 percent). Most respondents identified their ethnicity as White (47 percent) or Latino (47 percent), followed by Asian (5 percent), other ethnicity (1 percent), and Black (less than 1 percent). Sixty-five percent (65 percent) of respondents indicated their total household income was between $41,000 and $80,000, while approximately 20 percent indicated their household income was less than $40,000, and approximately 14 percent indicated their household income was greater than $81,000.

FISHING

Fishing along the lower Kern River is open all year; however, most fishing occurs in the winter, spring and fall when water temperatures are cool (SCE 2025a). There are three

[4] Survey technicians counted vehicles parked at one of four developed day-use areas or at one of five undeveloped river access points along SR-178 on a total of 51 survey days between May 15, 2024, and April 11, 2025. A total of 864 vehicles were recorded during these vehicle counts, an average of 17 vehicles counted per day.

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sections designated by the California Department of Fish and Wildlife (CDFW) for fish planting: Section 1 is from Democrat Beach to Lower Richbar; Section 2 is from Sandy Flat to Democrat Beach; and Section 3 is from Sandy Flat to the Isabella Dam. Most of the lower Kern River consists of stocked rainbow trout with wild populations of bass and brown trout (Flyfishingthesierra.com 2021). Most anglers interviewed as part of the REC 2 study reported using spin rods with bait or lures as their gear and tackle. Thirty-three percent of anglers reported having fished along the lower Kern River previously.

Trail Use

Hiking trails are accessible from SR-178 and extend up slope from SR-178 along the south/southwest side of the river, with some informal trails and one Project access trail providing access to the river from SR-178 or feeder roads. As part of the REC 2 study, SCE conducted use counts and collected demographic and other data from users of Project access trails along the bypass reach. Project access trails selected for surveying were the single trail that provides access to the Kern River—the Democrat Gage Trail—and the four trails that connect to the Forest Service Powerhouse Trail: Cow Flat Creek Trail, Lucas Creek Trail, Dougherty Creek Trail, and Stark Creek Trail. The Powerhouse Trail itself is a mid-slope route that parallels the river several hundred feet above its banks, extending from a point uphill of the Project Powerhouse upstream to roughly Cow Flat Creek.

USE ESTIMATES

The following lists the average and median daily counts for each trail between November 2024 and June 2025. Because most of the trails are out-and-back hikes/walks, it is reasonable to assume that two counts (passes) represent one user going and then coming back along the trail.

- Democrat Gage Trail average daily count: 2.1 (representing an average of approximately one user per day); median count: 2.
- Cow Flat Creek Trail average daily count: 4.3 (representing an average of approximately two to three users per day); median count: 5.
- Lucas Creek Trail average daily count: 1.9 (representing an average of approximately one user per day); median count: 2.
- Dougherty Creek Trail average daily count: 3.4 (representing an average of one to two users per day); median count: 3.
- Stark Creek Trail average daily count: 3.7 (representing an average of approximately two users per day); median count: 3.

Respondents reported visiting Project trails in the last 12 months, and most frequently during the spring (35 percent of visits), followed by the winter (27 percent of visits) and the fall (26 percent of visits). Fewer respondents indicated they used the Project trails in the summer (12 percent of visits). March had the highest use by month with as many as

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356 individuals (712 total counts) accessing at least one of the five Project trails. The average length of time respondents planned to use the trail was 2.4 hours. Thirteen percent (13 percent) of respondents reported using Project trails to access another trail.

DESCRIPTIONS OF TRAIL USERS

Trails are accessed primarily by locals in the Bakersfield or Kernville area for hiking (90 percent) followed by biking (2 percent). Eight percent of respondents did not include user activity. The average user group size is two to three people. Most respondents identified their ethnicity as White (66 percent), followed by Latino (22 percent), Asian (4 percent), other ethnicity (5 percent), and Black (less than 1 percent). Respondents indicated the primary purpose of their trail visit was for exercise or to view wildlife and scenery.

Whitewater Boating within the Bypass Reach

Upstream of the Project, the lower Kern River is an important regional whitewater boating attraction, and summer irrigation flow releases from Lake Isabella provide relatively high flows for boating when other comparable resources in southern California have limited water. The Project bypass reach, however, is less frequently run and there is no commercial whitewater boating in the bypass reach. Private boaters are not required to obtain a permit.

WHITEWATER BOATING RUNS

The bypass reach is a 10.2-mile section of the lower Kern River characterized by swift-flowing water and difficult rapids. The bypass reach is divided into three distinct runs: Cadillacs (Class V), Richbar (Class IV), and Cataracts (Class V+).

- Cadillacs Run, the most upstream of the runs, starts below Democrat Dam and extends approximately 4.5 miles downstream. The run difficulty is Class V (Expert), and the average gradient is 87.1 feet/mile.

- In roughly the middle of the bypass reach is the Richbar Run. This run starts at the end of the Cadillacs Run and extends downstream for 3 miles. The run difficulty is considered a Class IV (Intermediate–Advanced), and the average gradient is 52 feet/mile.

- Cataracts Run, the farthest downstream of the runs, starts at the end of the Richbar Run and extends for 2.8 miles. Of the three runs along the bypass reach, the Cataracts Run is considered the most difficult; it is rated a Class V+ (Expert) and has the steepest gradient, of 143.9 feet/mile.

Refer to Map 7.10-2 for the locations of these runs.

There are no developed put-in sites below Democrat Dam. Rather, because SR-178 runs close to the river along this section, locations along the road are used for put-in and take-out access (informal river access). The Lower Richbar and Live Oak Day Use areas are sometimes also used by boaters as put-in and/or take-out locations. The lowest take-out is at the Project Powerhouse.

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MINIMUM ACCEPTABLE AND OPTIMUM FLOWS

As part of the REC 3 – Whitewater Boating Study, information was collected from boaters with direct experience boating the bypass reach to learn, among other information, boater flow preferences including minimum acceptable flow threshold[5] and optimum flow threshold. The study found that there is a large variance in boater preference for "minimum acceptable" and "optimal" flow thresholds. In the more pronounced cases, there was an overlap of one boater's "optimal" with another boater's "minimum." The following describes the overall "boatable flow range" for each run taking into account minimum acceptable and optimum flow preferences based on boater feedback for each of the three runs.

- **Cadillacs Run** – Boatable Flow Range: 1,000 cfs to 3,800 cfs
  - Minimum Acceptable Flow Threshold: 1,000 to 3,000 cfs
  - Optimum Flow Threshold: 1,500 to 3,800 cfs
- **Richbar Run** – Boatable Flow Range: 700 cfs to 3,500 cfs
  - Minimum Acceptable Flow Threshold: 700 cfs to 1,600 cfs
  - Optimum Flow Threshold: 1,000 to 3,500 cfs
- **Cataracts Run** – Boatable Flow Range: 500 cfs to 3,800 cfs.
  - Minimum Acceptable Flow Threshold: 500 to 2,800 cfs
  - Optimum Flow Threshold: 900 to 3,800 cfs

BOATABLE FLOW OPPORTUNITIES

Using the last 11 years of hydrology data (2014–2024) the number of boating days were identified for each run using the flow preference thresholds specific to that run as identified by the boaters interviewed as part of the REC 3 Study. A boating day was identified if there was flow in the bypass reach within the minimum boatable flow threshold and optimal boating flow threshold (specific for each run), for a minimum of four hours between 10:00 a.m. and 4:00 p.m.

- Cadillacs Run: During water years (WY) 2014 through 2024, the total number of boating days that occurred for the Cadillacs Run was 488 days (12 percent of days over 11 water years). The annual number of boating days ranged from 0 in multiple years (WY 2014, 2015, 2016, 2020, 2021, 2022), to a high of 143 in 2019 when inflow into Lake Isabella was 155 percent of average.

[5] The study defined minimum acceptable flow as the flow a boater would return to boat the run.

- Richbar Run: During water years 2014 through 2024, the total number of boating days that occurred for the Richbar Run was 649 days (16 percent of days over 11 water years). The annual number of boating days ranged from 0 in multiple years (WY 2014, 2015, 2016, 2021, 2022), to a high of 156 in 2019 when inflow into Lake Isabella was 155 percent of average.

- Cataracts Run: During water years 2014 through 2024, the total number of boating days that occurred for the Cataracts Run was 844 days (21 percent of days over 11 water years). The annual number of boating days ranged from 0 in two years (WY 2014, 2015), to a high of 211 in 2024 when inflow into Lake Isabella was 110 percent of average.

USE ESTIMATES

The 2005 Recreation Use Monitoring Study (TCW Economics 2005)[6] referenced data collected by Forest Service manifest forms to determine the number of boaters that run the bypass reach. The manifest forms are voluntary forms obtained at Forest Service offices or at designated popular put-ins and take-outs that boaters are encouraged to fill out prior to running the river. The manifest forms ask boaters to identify what part of the Kern River they will boat, the date of their run, and the number of people in their party. The current manifest form separates the lower Kern River into four distinct runs: the Jungle Run, the Miracle Run, the Big 5 Run, and the Cataracts Run. The Cataracts Run identified in the manifest forms is the Project bypass reach and comprises the Cadillacs Run, Richbar Run, and Cataracts Run.

Based on the data collected by the manifest forms and documented in the 2005 Recreation Use Monitoring Study, between three and seven boaters ran the Cataracts Run each year between 2001 and 2005. Boating use in the other runs along the Kern River during the same span of years ranged from several hundred boaters per year to more than 2,000 boaters per year.

The 2005 Recreation Use Monitoring Study suggested that the low boating use in the Project bypass reach compared to the other runs along the Kern River is due to the extreme difficulty of the rapids in the reach. However, because permits are not required to boat the bypass reach, and because no use data are collected for this section of the river, an accurate estimate of current use is not available. While SCE assumes that boating use in the bypass reach has increased since 2005 due to an overall increase in whitewater boating activity and due to more advanced equipment and increased skill levels, evidence gathered during the REC 2 and REC 3 studies indicates that whitewater boating on the Project bypass reach remains limited. The individuals who do boat the reach are generally highly skilled expert or expedition level boaters drawn to the uniqueness and difficulty of the whitewater. For example, over the course of the year during which in person intercept surveys were conducted along the bypass reach and

[6] Following release of the 2005 Recreation Use Monitoring Study, FERC determined that no additional monitoring or modifications to the Project's existing operations were warranted or recommended, and therefore recreation monitoring was discontinued (FERC 2006).

impoundment (part of the REC 2 study, April 2024 through May 2025) survey technicians collected or received 374 survey forms representing 1,251 individual day-users, yet none reported whitewater boating the bypass reach. Further, a 60-day public online survey, combined with targeted outreach to 35 boaters believed to have firsthand experience on the reach, yielded input from only 14 individuals who had boated one or more of its runs.

7.10.1.5 Sequoia National Forest Land Management Plan and Visitor Data

Except for some scattered private inholdings, most of the land in the vicinity of the Project is within the SQF administered by Forest Service. Forest Service manages land within the SQF in accordance with the goals, objectives, and prescriptions outlined in the Land Management Plan (Forest Plan) for the SQF (Forest Service 2023). The Forest Service uses the Recreation Opportunity Spectrum (ROS) to classify lands on the SQF. ROS is a system by which existing and desired recreation settings are defined, classified, inventoried, and monitored. The ROS is a combination of physical, biological, social, and managerial conditions that give value to a place. The Final Environmental Impact Statement for the 2023 Forest Plan (Forest Service 2022) describes the ROS as a tool to ensure that a diversity of opportunities and experiences are provided across the forest. The ROS includes six distinct recreation settings/ROS classes along a continuum primitive, semi-primitive nonmotorized, semi-primitive motorized, roaded natural, rural, and urban.

The ROS class the SQF assigns most of the land immediately adjacent to the Kern River between Democrat Dam and the powerhouse tailrace is “rural,” indicating a physically altered landscape with naturally appearing backdrops. Land further away from the immediate river corridor is classified as either “roaded natural” or “semi-primitive motorized.” “Roaded natural” is defined in the Forest Plan as a naturally appearing landscape with nodes and corridors of development such as campground, trailheads, boat launches and rustic, small-scale resorts. “Semi-primitive motorized” is a predominantly natural-appearing landscape where motorized use is visible and audible.

Map 7.10-3 displays the ROS classifications Forest Service assigns to lands in the vicinity of the Project.

7.10.1.6 Current and Future Recreation Needs

The Forest Service’s National Visitor Use Monitoring (NVUM) program has two goals: (1) produce estimates of the volume of recreation visitation to national forests and grasslands and (2) produce descriptive information about that visitation, including activity participation, demographics, visit duration, measures of satisfaction, and trip spending connected to the visit (Forest Service 2025c). The most recent visitor use report for the SQF (January 11, 2025) summarizes data collected during fiscal year 2016 (Forest Service 2025d). The following is a summary of results of that report.

Total visits[7] to the SQF in fiscal year 2016 are estimated at approximately 777,000 individuals. Many people frequent more than one site during their visit, so estimates are further broken down by site visits.[8] Site visits in 2016 totaled approximately 1.0 million. Compared to prior SQF NVUM data (available for 2006 and 2011) the total number of visits to the SQF increased over the decade (2006–2016) by approximately 21 percent (Forest Service 2022) and sets trend expectations that the number of forest visits will continue to rise over time. This expectation is supported by population growth projections for Kern County, where most visitors to the lower Kern River area originate (per data collected during the REC 2 study 75 percent of visitors to day-use sites and 90 percent of trail users are local to Kern County). Recent demographic forecasts suggest a modest increase in population of the county over the next quarter century. The household population of Kern County in 2024 was 890,000. This number is projected to increase to 998,000 by 2050, a 12 percent growth rate (Kern Council of Governments 2024). As such, it is reasonable to assume that the number of individuals heading to the lower Kern River canyon to recreate will also continue to grow moderately over time.

In 2016 the most frequented site or area associated with the SQF was general forest area (609,000 visits), followed by overnight use developed (223,000 visits), day-use developed (189,000 visits), and designated wilderness (25,000 visits). Site visits are further broken down by each activity in which the individual participated during that visit. The most common activities selected by survey participants were hiking/walking, relaxing, viewing natural features, and driving for pleasure. Of those, hiking/walking was chosen the most frequently as the main activity by survey participants.

7.10.2 Proposed Environmental Measures

Under the Proposed Action, SCE proposes to implement PM&E measures associated with ongoing Project operation and maintenance activities. PM&E measures are designed to protect, maintain, or enhance environmental and cultural resources over the term of the new license. SCE proposes implementing the following PM&E measures related to recreation resources:

- Project Access Roads and Trails Management Plan
- Vegetation Management Plan
- Minimum Instream Flow Measure

[7] The NVUM Program defines a National Forest “visit” as the entry of one person upon a national forest to participate in recreation activities for an unspecified time. A national forest visit can be composed of multiple site visits. The visit ends when the person leaves the national forest to spend the night somewhere else.

[8] The NVUM program defies a “site visit” as the entry of one person onto a National Forest site or area to participate in recreation activities for an unspecified period of time. The site visit ends when the person leaves the site or area for the last time on that day.

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Appendix E.1 provides complete descriptions of measures SCE is proposing as part of the license application and to include in any new license issued for the Project.

7.10.3 Potential Project Effects

This section describes the potential effects to recreation resources that could occur because of continued operation and maintenance activities to be implemented under the Proposed Action. Potential effects are determined by analyzing the changes in recreation resources that may result from activities implemented under the Proposed Action (Section 5.2) compared to the No-Action Alternative (existing condition) (Section 5.1). Final effects determinations consider PM&E measures to be included under the Proposed Action (refer to Appendix E.1).

Under the Proposed Action, SCE would continue to operate and maintain the Project as described in Section 5.1, *No-Action Alternative*, with minor adjustments to Project operation and maintenance activities in response to implementing proposed PM&E measures. No new or upgraded facilities, structural changes, or operational changes to the Project are proposed.

Consistent with FERC's Scoping Document 2 (FERC 2023), this section evaluates potential effects of continued Project operation and maintenance on the following:

- Recreation resources.
- Adequacy of existing recreation facilities to meet current and future recreation demand.
- Adequacy of existing project access to project waters and trails to meet current and future recreation demand.
- Recreational whitewater boating use in the bypass reach.

7.10.3.1 Effects of Continued Project Operation and Maintenance on Recreation Resources

Under the Proposed Action, SCE proposes to continue operating the Project to generate power for SCE customers consistent with regulatory requirements (i.e., FERC License Articles as modified by conditions included in the Proposed Action and existing water rights held by SCE). This includes continuing to operate the Project in a run-of-river mode generally consistent with water management practices described in Section 5.1.4, *Project Operations*, and Section 5.1.5, *Project Maintenance*, including continuation of the existing minimum instream flow requirement (refer to the Minimum Instream Flow Measure in Appendix E.1). Because the Proposed Action would not change Project operations, FERC's approval of this license application would not change river flows or the associated recreational environment affected by river flows compared to the No-Action Alternative.

SCE is proposing minor modifications to the FERC Project boundary under the Proposed Action. These modifications include adding lands necessary for Project operation to the

FERC Project boundary, removing lands no longer necessary for Project operation and maintenance from the FERC Project boundary, and correcting known errors in the current Exhibit G, *Project Maps,* for the Project. These modifications are minor and would involve, for example, re-alignment of FERC Project boundary buffers around all facilities in accordance with FERC requirements, corrections (removals/reductions) such that only those lands necessary for operation and maintenance of the Project are retained, including changes to incorrectly depicted Project access trails.

Under the Proposed Action, SCE will implement the Project Access Roads and Trails Management Plan and Vegetation Management Plan (refer to Appendix E.1). The Project Access Roads and Trails Management Plan describes SCE's responsibilities for routine operation and maintenance of Project roads and trails and identifies measures for soil stabilization and erosion control during road and trail maintenance activities. These measures are similar or identical to measures to stabilize soil and control erosion in the current license (SCE 2004). The Vegetation Management Plan memorializes existing practices related to vegetation management and includes measures to protect special-status plant species and native vegetation communities, as well as measures to prevent the introduction or spread of non-native invasive plants.

Because continued operation of the Project would have no substantive change to the existing recreation environment or recreation opportunities compared to existing conditions, continued Project operation and maintenance would have no effect on recreation resources compared to the No-Action Alternative.

7.10.3.2 Effects of Continued Project Operation and Maintenance on Adequacy of Existing Recreation Facilities to Meet Current and Future Recreation Demand

SCE does not own or operate developed recreation facilities in the vicinity of the Project. The three developed day-use areas along the bypass reach and the raft take-out site on the impoundment (four day-use sites in total) currently provide capacity to meet present and foreseeable future demand (e.g., associated with a 12 percent increase in Kern County's population by 2050). REC 2 study results show that even on summer holiday weekends no site reached parking capacity and that, on average, only about 15 percent of available parking was occupied on monitored days (at least two weekend days and two weekdays each month from April 2024 through May 2025). Continued Project operation and maintenance would not alter these developed recreation facilities or any informal river access locations. Accordingly, existing riverside recreation opportunities along the bypass reach and at Democrat Impoundment are expected to remain sufficient to meet both current and future recreation needs. Continued Project operation and maintenance would have no effect compared to the No-Action Alternative.

7.10.3.3 Effects of Continued Project Operation and Maintenance on Adequacy of Existing Project Waters and Trails to Meet Current and Future Recreation Demand

The only waters associated with the Project include the impoundment above Democrat Dam. Recreation access at the impoundment is associated with the Democrat Raft Take-

Out Boating Site, which may also be used by recreators seeking a location from which to fish, or from which to launch small fishing craft. As discussed in effect 7.10.3.2, the REC 2 study indicates that the developed recreation facilities in the vicinity of the Project, inclusive of the Democrat Raft Take-Out Boating Site, are adequate to meet current and future recreation demand. Continued Project operation and maintenance would have no effect on existing Project waters to meet recreation demand compared to the No-Action Alternative.

Project roads and trails—developed and maintained by SCE to access Project facilities and generally located within the FERC Project boundary on SQF land—are available for public use. Results from the REC 2 study show light recreation use of these trails, averaging only two to three users per trail per day, indicating that current capacity is adequate and overuse is not an issue. The Proposed Action does not include changes to these roads or trails that would restrict recreational access. Some trails used by SCE for operation and maintenance of the Project that are currently outside the existing FERC boundary will be added to the Project boundary under the Proposed Action. Based on these findings, continued Project operation and maintenance is not expected to limit the ability of Project trails to meet either present or foreseeable future recreation demand (e.g., associated with a 12 percent increase in Kern County's population by 2050). Continued Project operation and maintenance would have no effect on the adequacy of Project trails to meet recreation demand compared to the No-Action Alternative.

7.10.3.4 Effects of Continued Project Operation and Maintenance on Recreational Whitewater Boating Use in the Project Bypass Reach.

Evidence suggests the bypass reach is not frequently boated, and when it is boated that boaters are mostly expert or expedition-level paddlers. Whitewater opportunities are naturally constrained both by the difficulty of the whitewater and also by the limited periods when flows are within a boatable range. Because Project inflow is almost entirely regulated by upstream operations at Isabella Dam, save for accretion flows from a few small tributaries between Isabella and Democrat dams, suitable flows occur only part of the year—and in some years not at all—depending on individual boaters' minimum and preferred flow levels.

The Project has diversion rights of up to 412 cfs, with the current license requiring minimum instream flows of 50 cfs from June 1 through September 30 and 15 cfs released from October 1 through May 31, or inflow if lower than the seasonal flow requirement. Diversion volumes depend on Lake Isabella releases, flowline and powerhouse capacities, and minimum instream flow requirements. The Proposed Action would maintain existing minimum instream flow requirements and does not propose any other changes that would affect whitewater boating opportunities. As such, continued Project operation and maintenance is not expected to have any effect on whitewater boating opportunities on the bypass reach, and conditions are anticipated to remain similar into the foreseeable future. Continued Project operation and maintenance would have no effect compared to the No-Action Alternative.

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7.10.4 Unavoidable Adverse Effects

There are no unavoidable adverse effects to recreation resources from continued operation and maintenance of the Project under the Proposed Action.

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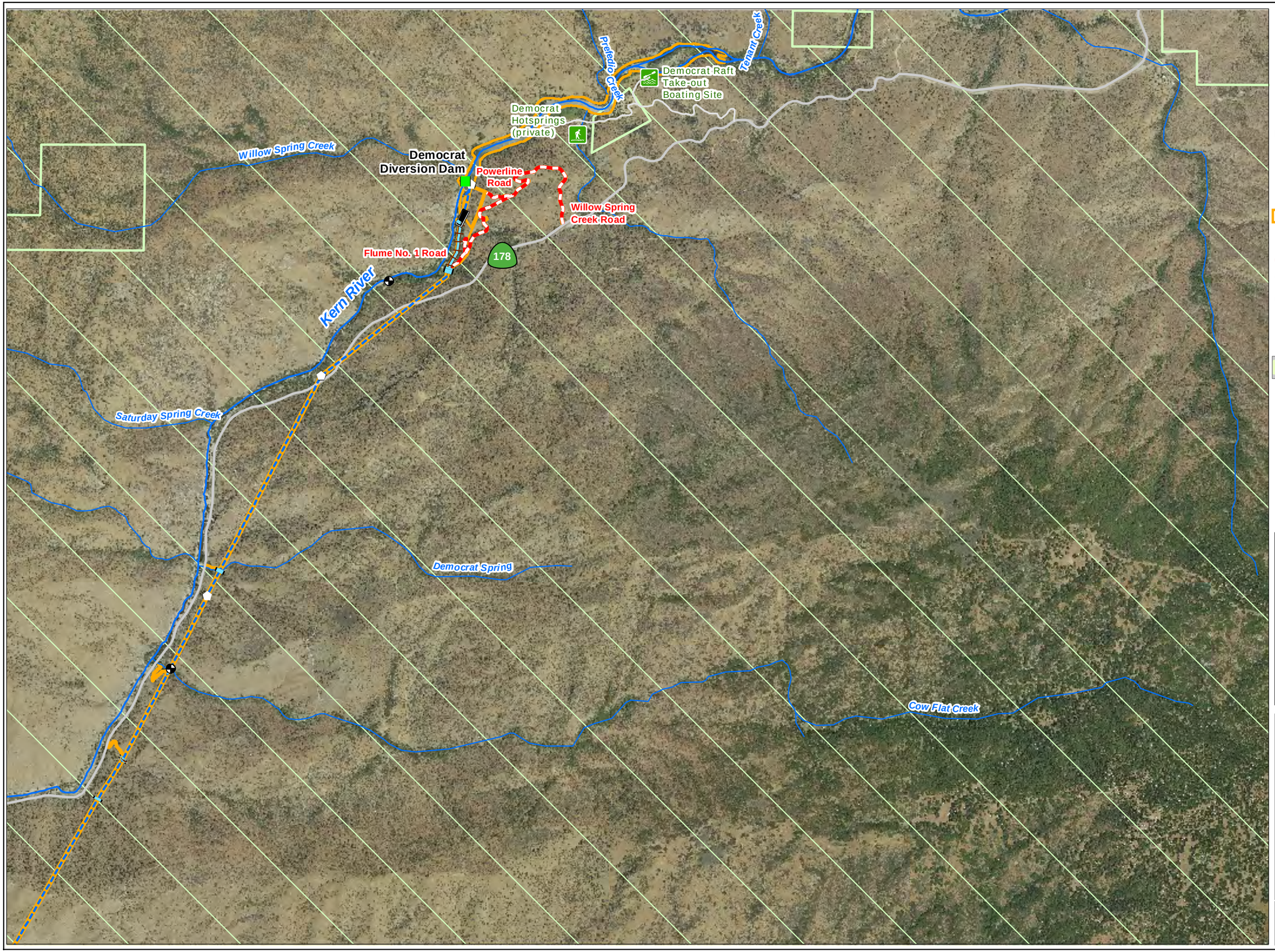
MAPS



Facilities

- Dam
- Powerhouse
- Water Conveyence Feature
- Tunnel
- Flume
- Conduit
- Sandbox
- Penstock
- Spillway
- Tailrace
- Gage
- FERC Boundary

Transportation

- Project Road
- Other Road

Other Features

- Watercourse

Land Jurisdiction*

- U.S. Forest Service

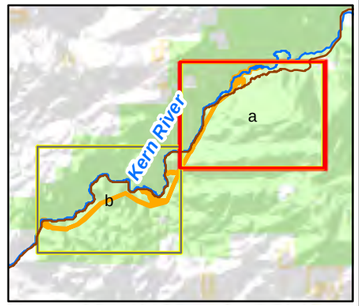
*SOURCE: BLM 2021

Forest Service Recreation Sites

- Raft Takeout
- Day Use Area

Private Recreation Sites

- Democrat Hotsprings



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Kern River No. 1 Hydroelectric Project
FERC Project No. 1930

Map 7.10-1a

Recreation Facilities in the Vicinity of the Project

0 1,000 2,000
Feet

Projection: UTM Zone 11
Datum: NAD 83

Date: 10/13/2025

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Rancheria Creek
178
Kern River
Live Oak Day Use Area
Upper Richbar Day Use Area
Lower Richbar Day Use Area
Stark Creek Road
Dougherty Creek Road
Lucas Creek
Dougherty Creek
Kern River No. 1 Powerhouse
Forebay
Upper & Lower Powerhouse Roads
Pechacho Creek
Stark Creek

Facilities
- Dam
- Powerhouse
- Water Conveyence Feature
- Tunnel
- Flume
- Conduit
- Sandbox
- Penstock
- Spillway
- Tailrace
- Gage
- FERC Boundary

Transportation
- Project Road
- Other Road

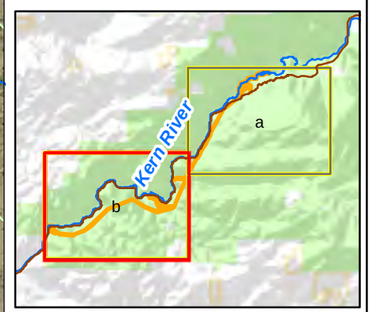
Other Features
- Watercourse

Land Jurisdiction*
- U.S. Forest Service

*SOURCE: BLM 2021

Forest Service Recreation Sites
- Raft Takeout
- Day Use Area

Private Recreation Sites
- Democrat Hotsprings



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Kern River No. 1 Hydroelectric Project
FERC Project No. 1930

Map 7.10-1b

Recreation Facilities in the Vicinity of the Project

0 1,000 2,000
Feet

Projection: UTM Zone 11
Datum: NAD 83

Date: 10/13/2025

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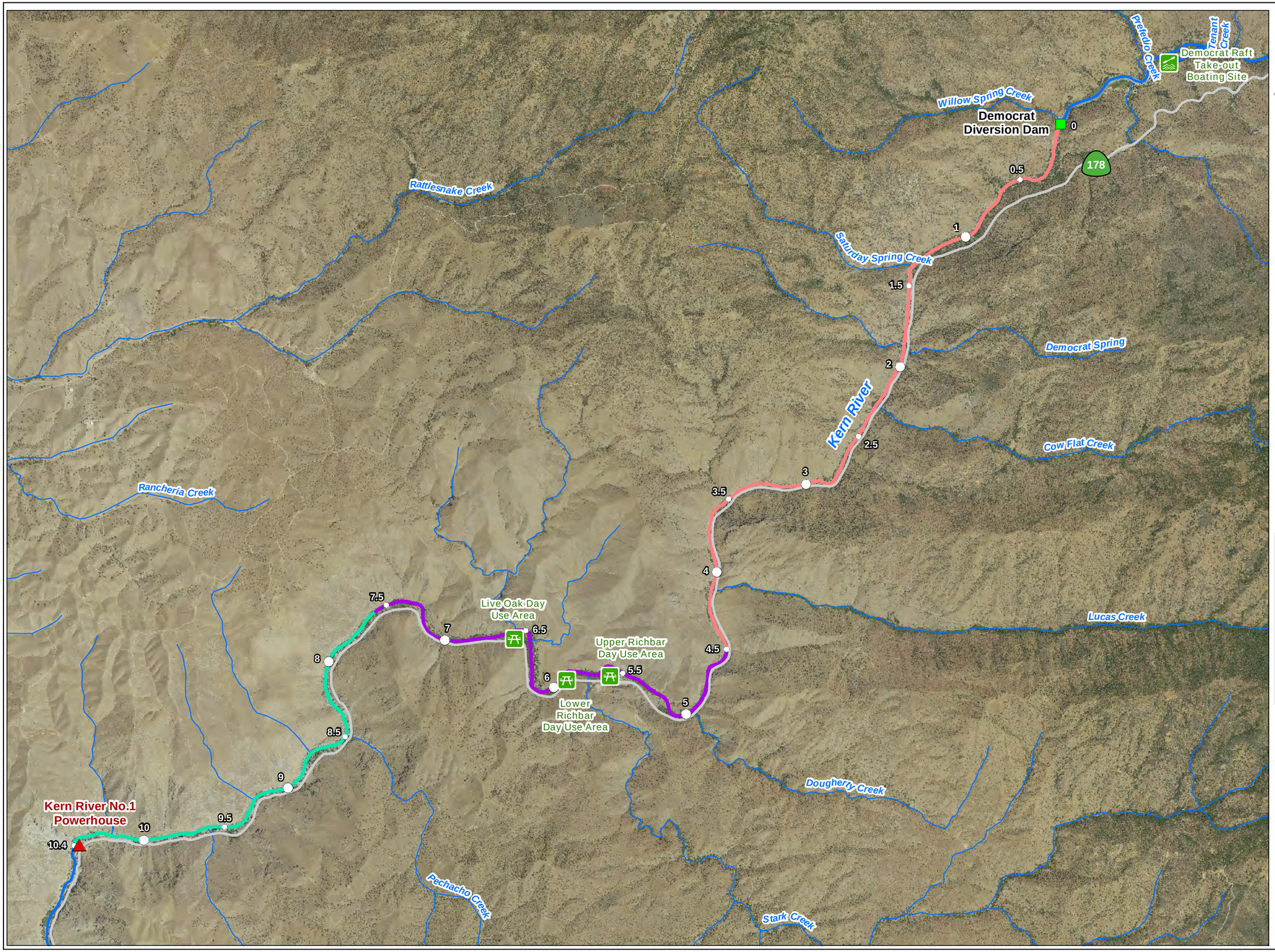


Facilities

- Dam
- Powerhouse

Transportation

- Major Road

Hydrology

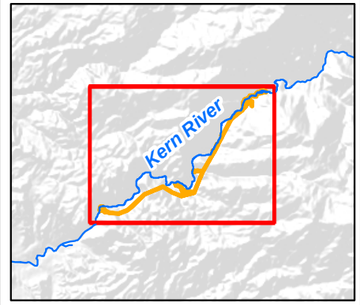
- Watercourse

Forest Service Recreation Sites

- Raft Takeout
- Day Use Area

White Water Runs

- Mile marker
- Half-mile Marker
- Cadillacs Run
- Richbar Run
- Cataracts Run



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Kern River No. 1 Hydroelectric Project
FERC Project No. 1930

Map 7.10-2

Whitewater Run Overview

0 1,500 3,000
Feet

Projection: UTM Zone 11
Datum: NAD 83

Date: 9/24/2025

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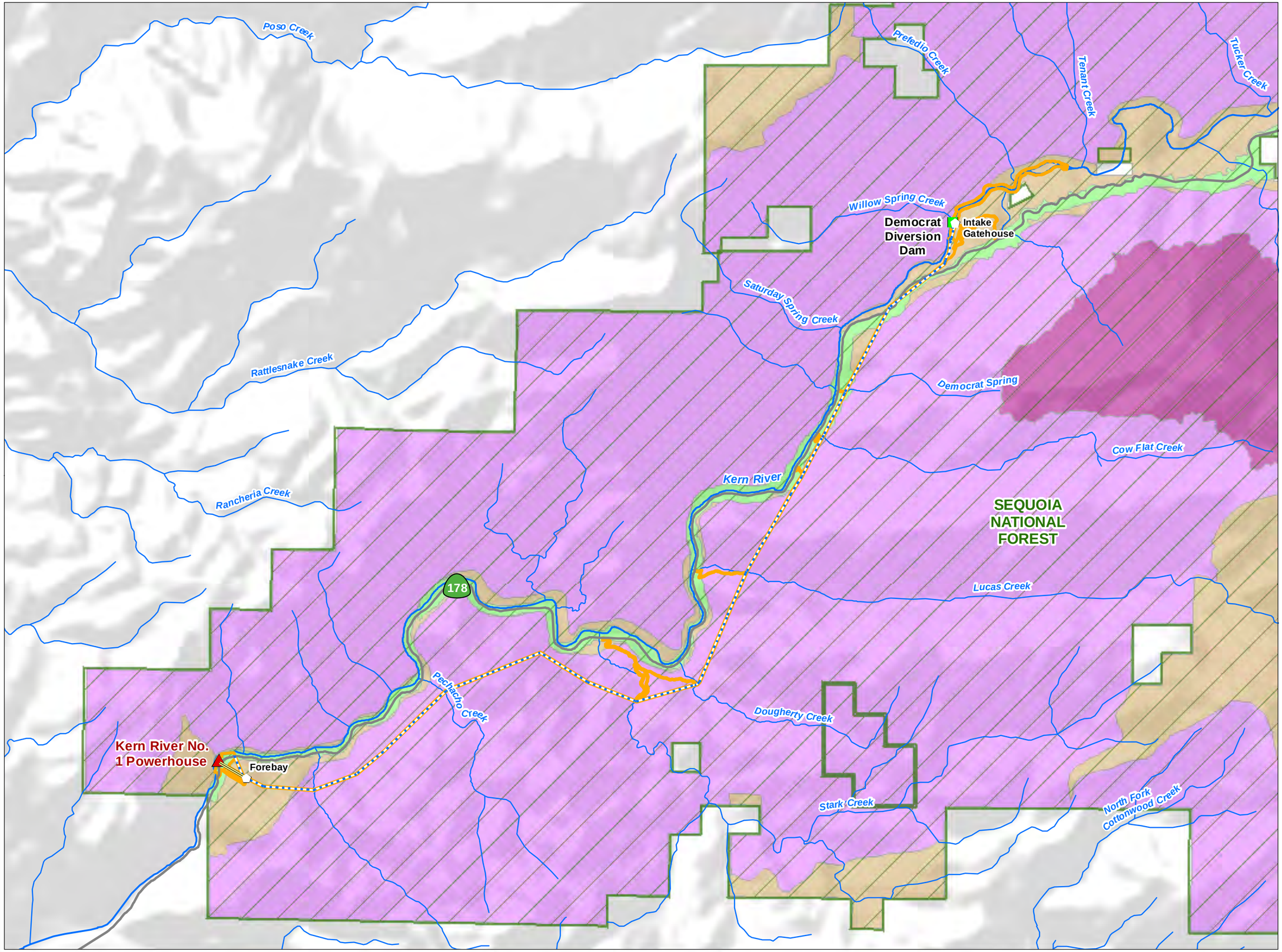


Facilities

- Dam
- Powerhouse
- Water Conveyence Feature
- Flowline
- Penstock
- FERC Boundary

Other Features

- Watercourse
- Highway

Recreation Opportunity Spectrum*

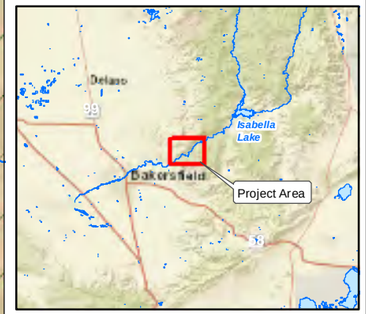
- Non-Applicable
- Rural
- Roaded Natural
- Semi-Primative Motorized
- Semi-Primitive Non-Motorized

*SOURCE: USDA-FS, Recreation Opportunity Spectrum, Sequoia National Forest, LMP, 2023

Land Jurisdiction**

- U.S. Forest Service

**SOURCE: BLM 2021



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Kern River No. 1 Hydroelectric Project
FERC Project No. 1930

Map 7.10-3

Recreation Opportunity Spectrum in the Vicinity of the Project

0 0.5 1 Miles

Projection: UTM Zone 11
Datum: NAD 83

Date: 10/13/2025

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APPENDICES

Appendix 7.11-A Representative Photographs

LIST OF ACRONYMS

cfs	cubic feet per second
FERC	Federal Energy Regulatory Commission
Forest Plan	Sequoia National Forest Land Management Plan
Forest Service	United States Forest Service
H	high
kV	kilovolt(s)

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L	low
M	moderate
PM&E measures	protection, mitigation, and enhancement measures
Project	Kern River No. 1 Hydroelectric Project
SCE	Southern California Edison
SIO	Scenic Integrity Objectives
SMS	Scenery Management System
SQF	Sequoia National Forest
SR-178	State Route 178
VH	very high
VL	very low
VMS	Visual Management System
VQO	Visual Quality Objectives
VRPP	Visual Resources Protection Plan

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7.11 AESTHETIC RESOURCES

This section describes aesthetic resources in the vicinity of Southern California Edison's (SCE) Kern River No. 1 Hydroelectric Project (Project). The information presented in this section focuses on the Project facilities that are visible to the public from primary travel corridors or developed recreation facilities.

Section 7.11.1 describes the affected environment and resource conditions under current Project operation and maintenance (i.e., baseline condition). Section 7.11.2 identifies proposed environmental measures, management, and monitoring plans (collectively referred to as protection, mitigation, and enhancement [PM&E] measures) to be implemented under the Proposed Action (see Appendix E.1 for a full description of proposed PM&E measures). Section 7.11.3 includes an analysis of the potential environmental effects of the Proposed Action, including potential beneficial effects of proposed PM&E measures. Section 7.11.4 describes unavoidable adverse effects of the Proposed Action on aesthetic resources.

7.11.1 Affected Environment

7.11.1.1 Information Sources

This section was developed using existing, relevant, and reasonably available information in the following primary sources. Additional references are cited in the text, as appropriate.

- Federal Energy Regulatory Commission (FERC) Final Environmental Assessment for Hydropower License, Kern River No. 1 Hydroelectric Project, FERC Project No. 1930-014 (FERC 1998)

- United States Forest Service (Forest Service) Final Environmental Impact Statement for Revision of the Sequoia and Sierra National Forests Land Management Plans (Forest Service 2022a)

- Forest Service Land Management Plan for the Sequoia National Forest. Fresno, Kern, and Tulare Counties, California (Forest Service 2023a)

- SCE Application for New License, Kern River No. 1 Hydroelectric Project, FERC Project No. 1930 (SCE 1994)

- SCE Kern River No. 1 Hydroelectric Project (FERC No. 1930) Resource Plans: Plan for the Design and Construction of Project Facilities in Order to Preserve or Enhance Visual Quality (SCE 2004)

- SCE Pre-Application Document for the Kern River No. 1 Hydroelectric Project (SCE 2023)

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7.11.1.2 Visual Setting

The Project is located on the Kern River in the foothills along the western slope of the Sierra Nevada mountain range in Kern County, California. The section of the Kern River from Lake Isabella Dam downstream to the mouth of the Kern River Canyon is known as the lower Kern River. The canyon of the lower Kern River is narrow, steep, and dry with occasional foothill pines, buckeye, oaks, and grasses. The river's edge supports large sycamores and willows.

The lower Kern River is close to the City of Bakersfield and is a popular recreation area for local residents (Forest Service 2022b). The Forest Service identifies the lower Kern River from Lake Isabella 31 miles downstream to the canyon mouth above Bakersfield as an eligible (but not Congressionally designated) Wild and Scenic River. The lower Kern River meets this eligibility designation under the classification of "recreational" river with identified outstanding remarkable values for scenery, recreation, wildlife, population and habitat, prehistory, and history (Forest Service 2022a). The Forest Service considers the surrounding landscape as distinctive because of the scenic interest created by perennial flowing water and riparian vegetation, as well as vertical canyon walls and prominent rock boulders and outcroppings (FERC 1998).

As shown on Map 5-1 in Section 5, *Proposed Action and Alternatives*, the FERC Project boundary encompasses Democrat Dam Impoundment, facilities around Democrat Dam, the water conveyance system that runs along the eastern hillslope above the Kern River, and the powerhouse and forebay operations areas. Project facilities range in elevation from 1,913 feet at Democrat Dam to 975 feet at the powerhouse. Project facilities, in relation to the FERC Project boundary, are shown on Maps 5-3a–g.

State Route 178 (SR-178) is the main transportation route between the Bakersfield area and the communities and recreation areas around Lake Isabella. SR-178 is the primary road to access the lower Kern River and Project facilities. SR-178 closely parallels the lower Kern River along the river's southern bank from the powerhouse east to the terminus of the FERC Project boundary above the Democrat Dam Impoundment.

The landscape in the Project area (from the Democrat Dam Impoundment downstream to the powerhouse) consists of a narrow canyon with dense vegetation along the riverbank, granitic outcroppings, and steeply angled grass-covered slopes rising as much as 1,500 feet above the riverbed. The grey/tan rock outcroppings vary in size from small boulders to dramatic vertical cliffs. At the upper end of the Project, the grassy slopes above the river are dotted with mixed evergreens and oaks. At the lower end of the Project, the canyon opens and the landscape changes to open rolling foothills vegetated with sparse grasses.

The river itself is perennial, though water flow fluctuates significantly over the course of the year. SCE operates the Project in a run-of-river mode and has no water storage. As such, while SCE's existing license for the Project includes minimum instream flow requirements, flows within the bypass reach are most influenced by storage and releases at Lake Isabella (upstream), which captures spring runoff and releases water throughout the summer and fall for downstream uses. Flows in the bypass reach are most

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consistently high in the April through August period. Mean monthly flows typically range from approximately 100 cubic feet per second (cfs) in November and December to more than 1,500 cfs in June. Elevated flows impart the river with movement and sound, immersing many rock boulders. Lower flows still cover the channel bed with water and maintain the character of the bypass reach as a riparian corridor.

7.11.1.3 Visual Descriptions of Project Facilities

The existing Project facilities are described in detail in Section 5.1.2, *Existing Project Facilities*, and include (from upstream to downstream) Democrat Dam and its 27-acre impoundment (the impoundment is also referred to as the "pond"); an intake structure upstream of the diversion dam, which includes two steel trash racks; an 8.5-mile water conveyance system consisting of sandbox, flowline, forebay, and penstock that connects the intake structure at Democrat Dam with the powerhouse; the powerhouse and associated equipment; access roads and trails; power/communication lines; gaging stations; and ancillary and support facilities. Project facilities are painted in earth tones to blend into the surrounding landscape, and road cuts have either naturally revegetated or have been revegetated to obscure the effects of road construction (SCE 2004).

The most visually predominant Project features consist of the following, which are described below: Democrat Dam and impoundment, and associated features (including intake structure and powerline); the powerhouse, switchyard, and associated equipment; the forebay operations area; and the access roads and trails. Appendix 7.11-A includes representative photographs of the Project facilities and surrounding landscape.

Democrat Dam and Impoundment

Democrat Dam and intake structures are located on the Kern River approximately 10.2 miles upstream of the powerhouse. The dam, one-story control house, concrete flume, and ancillary facilities are all visible from SR-178 and from nearby riverbanks used for recreation (SCE 1994). The dam is a 58-foot high cyclopean-concrete overflow gravity dam. The crest of the dam is at an elevation of 1,913 feet and approximately 29 feet is exposed above the stream bed. The dam crest is approximately 204-feet long and 7-feet wide. The crest of the dam also serves as a spillway and is designed to spill all river flows that are not diverted for power production. A crane with claw attachment is mounted on the top of the dam and is used to remove large woody debris and maintain the intake racks.

The Democrat Dam Impoundment covers approximately 27 acres and has a gross storage capacity of 247 acre-feet at an elevation of 1,913 feet. Because Democrat Dam is a run-of-river dam and its whole crest is a spillway, the dam regularly spills and the impoundment and tailwater levels are governed by flows in the Kern River, as released

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from upstream Isabella Dam.[1] A 329-foot-long drainage tunnel with a 72-inch electric motor operated sluice gate is provided for draining the impoundment.

The Erskine 12 kilovolt (kV) Distribution Line is an 1,844-foot-long (0.35 mile) powerline that extends from the Democrat Dam Intake Gatehouse to an outlet box near the southern end of Flume No. 1 and provides power for appurtenances during tunnel outages.

The visual character and contrasts of Democrat Dam vary with the amount of water in the Kern River. When water cascades over the concrete dam, the facility creates a waterfall. Water cascades over the dam during much of the spring and summer – when releases from Lake Isabella are high to support downstream water demands during the irrigation season. During months of lower flows (winter and late fall), when water is not spilling over the dam the light tan industrial concrete structure contrasts with the surrounding natural environment.

Powerhouse, Switchyard, and Associated Equipment

The powerhouse, switchyard, and the adjacent powerline on steel lattice towers are the most visually predominant Project features. All of these facilities are located immediately adjacent and west of SR-178. The features are viewed by highway travelers for a short distance because they are located on a curve. The powerhouse is an approximately 80-foot by 170-foot concrete structure located on the east bank of Kern River. The switchyard is located directly adjacent to and south of the powerhouse.

The adjacent powerline (Camp 2.4 kV distribution/communication line) is a 1,665-foot-long (0.32 mile) communication line that extends from the powerhouse to the forebay at the upper end of the penstock. The same poles which carry the communication line also carry a powerline which is used for the remote control of the gate at the upper end of the penstock. Other ancillary facilities located near the powerhouse include a machine shop, office, and restroom facilities.

Forebay Operations Area

Several buildings located on the east side of SR-178 support forebay operations activities, including the old administrative building, two garages, and the old Ice House. There is also a large parking lot, the aerial cable tower, and an aerial tram hoist house and lower landing. A hoist cable extends from the aerial tram hoist house and lower landing to the upper landing near the forebay. All of these facilities are visible from SR-178. Similar to the powerhouse features, the facilities located at the forebay operations area are only viewed by highway travelers for a short distance because they are located on a curve.

[1] Lake Isabella is located approximately 20 miles upstream of the Project. Water released from Isabella Dam enters the lower Kern River and is undiverted until reaching the Project diversion at Democrat Dam. Project inflow is almost entirely regulated by upstream operations at Isabella Dam, save for accretion flow from a few small tributaries between Isabella and Democrat dams.

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Access Roads and Trails

Project facilities are accessed via Project roads and trails that extend from SR-178. All Project access roads and trails are located on federal lands within the Sequoia National Forest (SQF) and are administered by the Forest Service but maintained by SCE. There are eight Project access roads, and 11 Project access trails. Five of the Project access roads are paved or aggregate and the other three are native soil (unimproved dirt). All of the Project access trails are native soil. Table 5-3 in Section 5 provides descriptive information about each access road and trail and Map 5-3a–g illustrates their location.

7.11.1.4 Public Views of Project Facilities

The visibility of Project facilities and structures to the public is variable and based on viewing location, vegetation, and topography. This section describes which Project facilities are visible from publicly accessible locations: SR-178, developed recreation facilities, and trails.

State Route 178

Project facilities visible from SR-178 include the following:

- Democrat Dam and impoundment.
- Powerhouse area, including the two-story powerhouse, adjacent switchyard, and ancillary support buildings.
- Forebay operations area, including ancillary support buildings, the aerial tram, and the forebay overflow spillway pipe.
- Various Project access roads and trails.

Developed Recreation Areas

Project facilities are not visible from the four Forest Service developed day use areas along the bypass reach.

Trails

Project facilities are intermittently visible from some trails near the Project. Facilities that may be seen from trails include the gated intake structure, sandbox, forebay, and portions of the water conveyance system (aboveground flumes and conduits). Most of the water conveyance system (approximately 8.5 miles) is comprised of underground tunnels. The penstock is also buried and not visible.

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7.11.1.5 Visual Resources Management Plans

All land within the FERC Project boundary is federal land within the SQF and administered by the Forest Service in accordance with the SQF Land Management Plan (Forest Plan; Forest Service 2023a).[2] An overview of the SQF Forest Plan is provided below.

Sequoia National Forest Land Management Plan

The Forest Plan uses the Scenery Management System (SMS) to integrate the scenic quality of landscapes into land management planning and project decision making.[3] The SMS uses Scenic Integrity Objectives (SIO) to define the desired scenic quality and diversity of a landscape based on the physical and sociological characteristics of the area. The Forest Service identifies scenic integrity as a continuum ranging over five levels: Very High, High, Moderate, Low, and Very Low. A landscape with very minimal visual disruption is considered to have very high scenic integrity. Those landscapes having increasingly discordant relationships among scenic attributes are viewed as having diminished scenic integrity. Descriptions of each scenic integrity level, as defined in the Forest Service Handbook for Scenery Management (Forest Service 1995), include the following:

- **Very High (VH) scenic integrity** refers to landscapes where the valued landscape character "is" intact with only minute if any deviations. The existing landscape character and sense of place is expressed at the highest possible level.

- **High (H) scenic integrity** refers to landscapes where the valued landscape character "appears" intact. Deviations may be present but must repeat the form, line, color, texture, and pattern common to the landscape character so completely and at such scale that they are not evident.

- **Moderate (M) scenic integrity** refers to landscapes where the valued landscape character "appears slightly altered". Noticeable deviations must remain visually subordinate to the landscape character being viewed.

- **Low (L) scenic integrity** refers to landscapes where the valued landscape character "appears moderately altered". Deviations begin to dominate the valued landscape character being viewed but they borrow valued attributes such as size, shape, edge effect and pattern of natural openings, vegetative type changes or architectural styles outside the landscape being viewed. They should not only appear as valued character outside the landscape being viewed but compatible or complimentary to the character within.

[2] The 2023 Forest Plan replaces the 1988 Forest Plan. The Record of Decision for the 2023 was signed on May 15, 2023. The 2023 Forest Plan went into effect June 25, 2023.

[3] Guidance for the use of the SMS is contained in the Forest Service 1995 handbook, Landscape Aesthetics: A Handbook for Scenery Management. Use of the SMS replaced use of the prior method to establish the visual management goals and policies for Forest Service administered lands, which was the Forest Service Visual Management System (VMS; Forest Service 1974). The VMS was the system in place during development of SCE's previous relicensing application (SCE 1994).

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- **Very Low (VL) scenic integrity** refers to landscapes where the valued landscape character "appears heavily altered". Deviations may strongly dominate the valued landscape character. They may not borrow from valued attributes such as size, shape, edge effect and pattern of natural openings, vegetative type changes or architectural styles within or outside the landscape being viewed. However, deviations must be shaped and blended with the natural terrain (landforms) so that elements such as unnatural edges, roads, landings, and structures do not dominate the composition.

SIOs were assigned to the management areas that comprise the SQF as a part of the Forest Plan. A map identifying the SIO for each management area of the SQF is included in Appendix A of the Forest Plan.

The SIO for most of the land within the FERC Project boundary is "High" with some scattered sections of "Moderate." The powerhouse, switchyard and forebay operations area are in an area with "High" SIO. Democrat Dam is in a section with "Moderate" SIO. Map 7.11-1 shows the designated Forest Service SIO with respect to the Project facilities within the SQF. The SIO data was obtained from the 2023 SIO dataset available from the Sequoia National Forest Land Management Plan 2023 Data Viewer (Forest Service 2023b).

Previous Visual Resources Assessment

The Project existed before there was a Forest Plan for the area, and therefore precedes any guidelines established by the Forest Service for desired scenic conditions of the landscape. Nevertheless, as part of SCE's previous relicensing application (SCE 1994), an aesthetic resource assessment was completed to assess the visual compatibility of Project facilities with the surrounding landscape.

At the time, the applicable Forest Service management plan, the 1988 Forest Plan (Forest Service 1988), used the Visual Management System (VMS) to identify the desired scenic conditions of the landscape in which the Project was located. The VMS used four categories of scenic designations (referred to as Visual Quality Objectives [VQO]): Preservation, Retention, Partial Retention and Modification. While these designations do not translate directly to the SIO designations, there is substantial parallel. For example, a "Retention" VQO is generally equivalent to a "High" SIO and a "Partial Retention" VQO is generally equivalent to a "Moderate" SIO. The VQO map in the 1988 Forest Plan indicated that the VQO for the area along the Kern River, inclusive of the FERC Project boundary, was Retention. The area immediately adjacent to the boundary was Partial Retention.

The 1994 aesthetic resource assessment found that the visual impacts of the Project facilities were not consistent with the Retention or Partial Retention VQOs assigned to the landscape, but did not conclude that the visual impacts of the Project were significant despite this inconsistency. As part of the 1994 application process, the Forest Service reviewed the aesthetic resource assessment and concluded that the Project facilities

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were in fact compatible with desired scenic conditions of the landscape (SCE 1994 and FERC 1998[4]).

Because the Project has not been substantially altered since the 1994 assessment, the Project facilities and features that were assessed in 1994 were not reassessed as part of the current relicensing effort. The Project facilities remain inconsistent with the "High" and "Moderate" SIO designations assigned to the landscape in the 2023 Forest Plan.

7.11.2 Proposed Environmental Measures

Under the Proposed Action, SCE proposes to implement PM&E measures associated with ongoing Project operation and maintenance activities. PM&E measures are designed to protect, maintain, or enhance environmental and cultural resources over the term of the new license. SCE proposes implementing the following PM&E measure related to visual resources:

- Visual Resources Protection Plan

Appendix E.1 provides complete descriptions of measures SCE is proposing as part of the license application and to include in any new license issued for the Project.

7.11.3 Potential Project Effects

This section describes the potential effects to aesthetic resources that could occur because of continued operation and maintenance activities to be implemented under the Proposed Action. Potential effects are determined by analyzing the changes in visual resources that may result from activities implemented under the Proposed Action (Section 5.2) compared to the No-Action Alternative (existing condition) (Section 5.1). Final effects determinations consider PM&E measures to be included under the Proposed Action (refer to Appendix E.1).

Under the Proposed Action, SCE would continue to operate and maintain the Project as described in Section 5.1, *No-Action Alternative*, with minor adjustments to Project operation and maintenance activities in response to implementing proposed PM&E measures. No new or upgraded facilities, structural changes, or operational changes to the Project are proposed.

Consistent with FERC's Scoping Document 2 (FERC 2023), this section evaluates potential effects of continued Project operation and maintenance on the following:

- The aesthetic quality of the Project area.

[4] Letter from Erik Ostly, Forest FERC Coordinator, FS, Porterville, California, September 28, 1994.

7.11.3.1 Effects of Continued Project Operation and Maintenance on Aesthetic Resources

SCE proposes to continue operating the Project to generate power for SCE customers consistent with regulatory requirements (i.e., FERC License Articles as modified by conditions included in the Proposed Action and existing water rights held by SCE). This includes continuing to operate the Project in a run-of-river mode generally consistent with its existing license and the water management practices described in Section 5.1.4, *Project Operations*, and Section 5.1.5, *Project Maintenance*, including continuation of the existing minimum instream flow requirement. Because the Proposed Action would not change Project operations, FERC's approval of this license application would not change river flows or the associated quality of the visual environment affected by river flows compared to existing conditions.

The Project includes existing facilities and structures that are visible from certain public viewpoints. As described above, SCE's previous aesthetic resource assessment (SCE 1994) concluded that, despite the use of neutral paint colors (earth tones) and vegetative screening where feasible, Project facilities were inconsistent with the desired scenic conditions established by the Forest Service. Since that 1994 assessment, Project facilities have not substantially changed and therefore remain inconsistent with the desired scenic conditions (i.e., High and Moderate SIO designations in the 2023 Forest Plan). Despite this inconsistency, as part of the previous relicensing process, the Forest Service determined that Project facilities were compatible with desired scenic conditions (FERC 1998). In addition, the Project facilities were constructed before adoption of the Forest Plan and therefore predate any guidelines established by the Forest Service related to desired scenic conditions.

SCE is not proposing changes to Project facilities with this license application. As such, visual resources under the Proposed Action would be unchanged from existing conditions, and the inconsistency with Forest Plan scenic objectives would continue. To ensure that future maintenance activities, such as minor facility modifications, are consistent with guidelines for visual and aesthetics resources for the SQF, SCE will implement a Visual Resources Protection Plan (VRPP). The VRPP incorporates relevant conditions and Forest Service requirements from the current license to maintain consistency between ongoing Project operations and appliable Forest Service land management direction, and to minimize effects of Project features on the scenic landscape. The VRPP sets expectations that if, over the term of the new license, new structures or replacement structures are needed that SCE will consult with the Forest Service prior to installation, place structures within the footprint of or very near areas where existing structures are located. In addition, the VRPP requires that SCE paint facilities (new or existing) with earth tones that blend into the surrounding landscapes.

Because there would be no change to the existing visual environment compared to existing conditions, and because SCE would implement a VRPP, continued Project operation and maintenance would have no effect on the aesthetic quality of the Project area compared to the No-Action Alternative (existing conditions).

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7.11.4 Unavoidable Adverse Effects

There are no unavoidable adverse effects to aesthetic resources from continued operation and maintenance of the Project under the Proposed Action.

7.11.5 References

FERC (Federal Energy Regulatory Commission). 1998. Final Environmental Assessment for Hydropower License, Kern River No. 1 Hydroelectric Project. FERC Project No. 1930-014. June 17.

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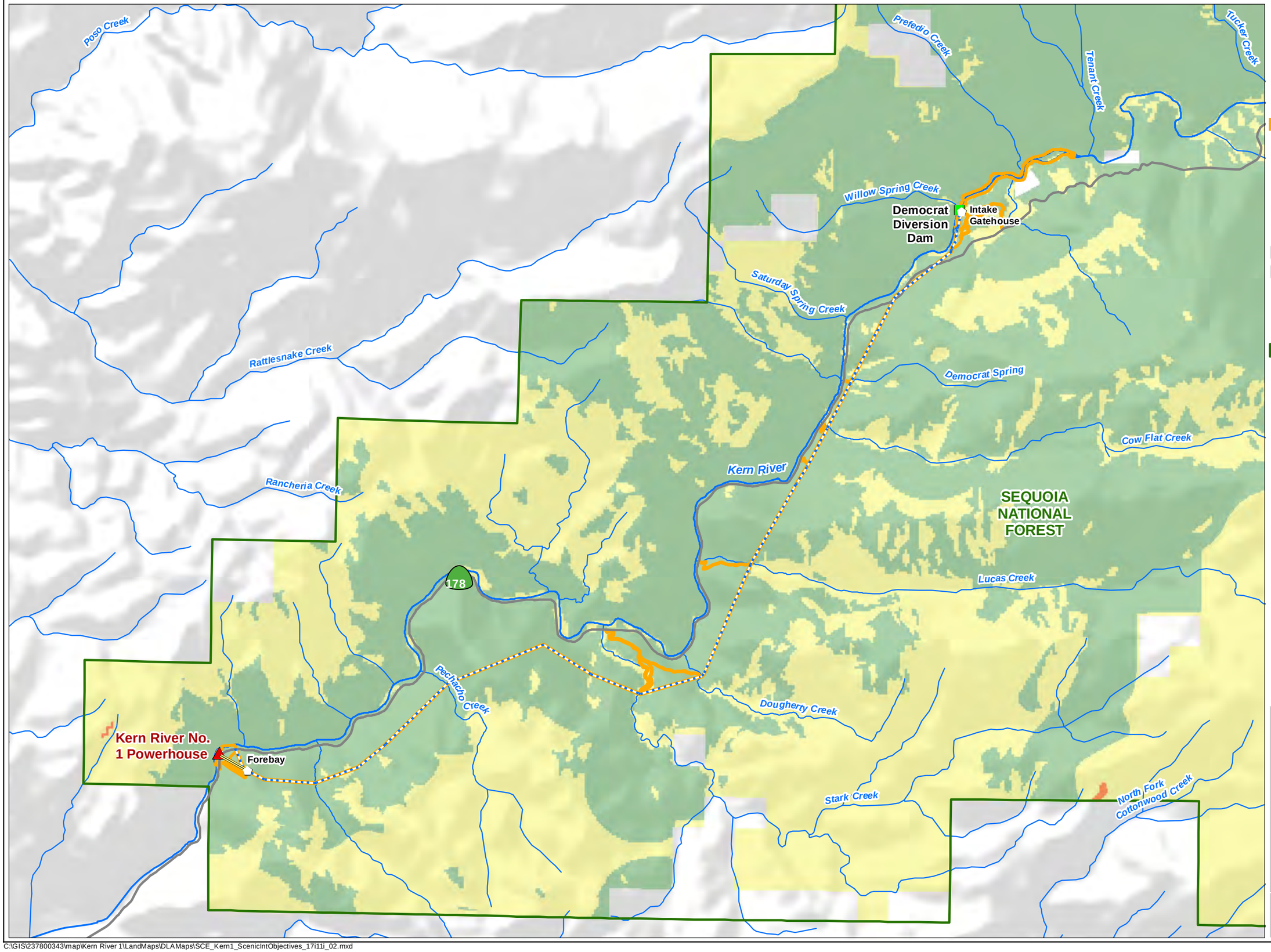
MAPS



Facilities

- Dam
- Powerhouse
- Water Conveyence Feature
- Flowline
- Penstock
- FERC Boundary

Other Features

- Watercourse
- Highway

Scenic Integrity Objectives*

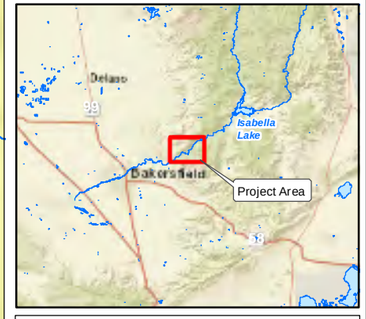
- Low
- Moderate
- High

*SOURCE: USDA-FS, Scenic Integrity Objectives, Sequoia National Forest, LMP, 2023

Land Jurisdiction**

- U.S. Forest Service

**SOURCE: EDW Forest Administrative Boundaries



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Energy for What's Ahead

Kern River No. 1 Hydroelectric Project
FERC Project No. 1930

Map 7.11-1

Scenic Integrity Objectives in the Vicinity of the Project

0 0.5 1 Miles

Projection: UTM Zone 11
Datum: NAD 83

Date: 10/13/2025

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APPENDIX 7.11-A

Representative Photographs

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Photo 7.11-A-1. Democrat Dam and elevated steel walkway on top of Flume No. 1 as seen from SR-178.

Photo 7.11-A-2. Democrat Dam when spilling.

Photo 7.11-A-3. Democrat Dam when dry.

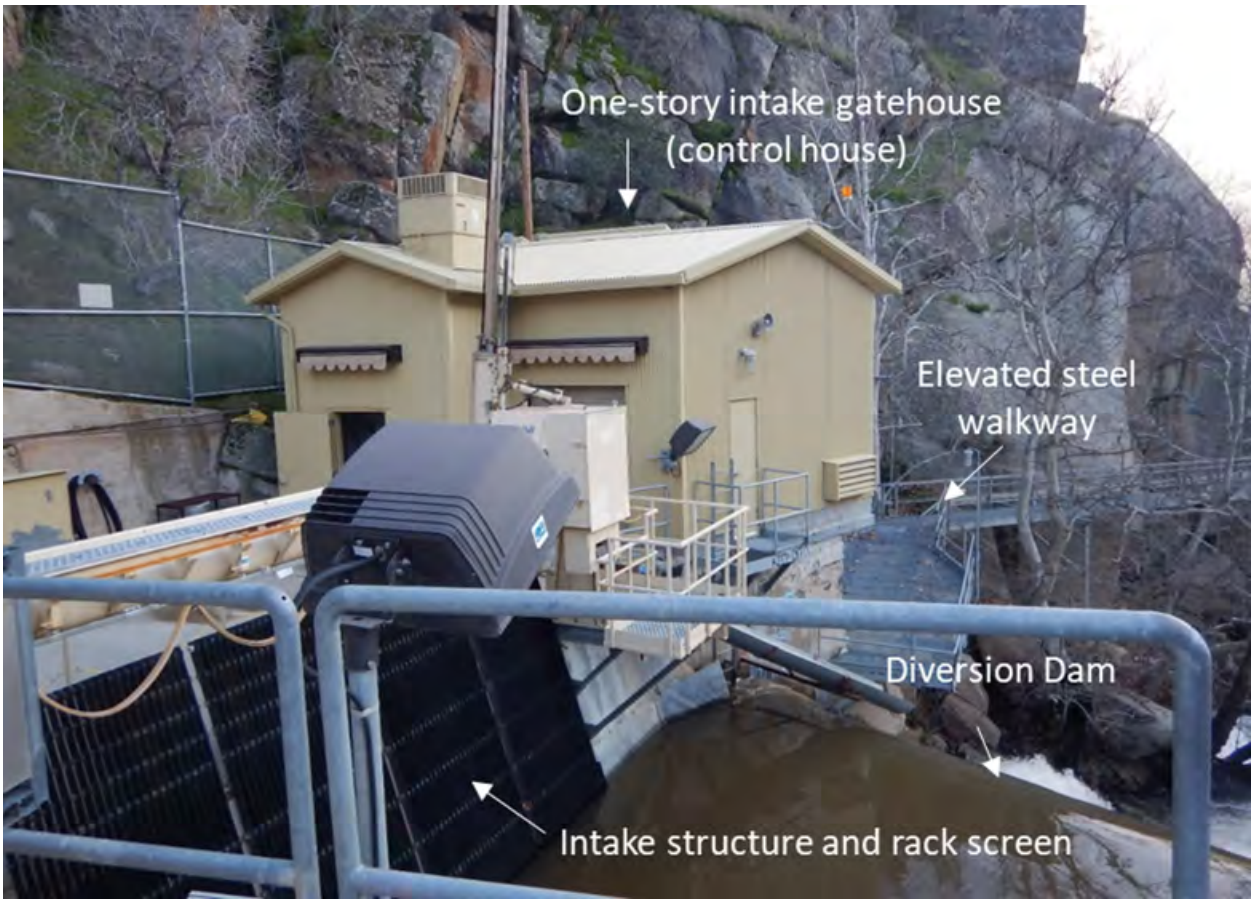

Photo 7.11-A-4. Democrat Dam intake structure and trash rack.

Photo 7.11-A-5. Slide gate valve house at the downstream end of the sandbox (approximately 700 feet downstream of the Diversion Dam at the head of the flowline).

Photo 7.11-A-6. Looking upstream at the Diversion Dam (spilling) from the slide gate valve house.

Photo 7.11-A-7. Democrat Dam Impoundment and buoy line, looking upstream from the dam.

Photo 7.11-A-8. Kern River No. 1 Powerhouse and Tailrace.

Photo 7.11-A-9. Kern River No. 1 Powerhouse and Switchyard.

Photo 7.11-A-10. Lucas Creek Trail looking north (upstream).

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Photo 7.11-A-11. View of the Kern River No. 1 Powerhouse and Switchyard and Forebay Operations Area as seen from the Aerial Tram Upper Landing. The aerial hoist cable is visible in the foreground.

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LIST OF ACRONYMS

ACHP	Advisory Council on Historic Preservation
amsl	above mean sea level
APE	Area of Potential Effects
BP	years before present
ca.	circa
Caltrans	California Department of Transportation
CDMG	California Division of Mines and Geology
CFR	Code of Federal Regulations
CHRIS	California Historical Resources Information System
FERC	Federal Energy Regulatory Commission

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FLA	Final License Application
Forest Service	United States Forest Service
HPMP	Historic Properties Management Plan
KR1HD	Kern River No. 1 Hydroelectric Project Historic District
KR1HS	Kern River No. 1 Hydroelectric System
NHPA	National Historic Preservation Act
NRHP	National Register of Historic Places
O&M	operations and maintenance
OHP	Office of Historic Preservation
PM&E	protection, mitigation, and enhancement measures
Project	Kern River No. 1 Hydroelectric Project
SCE	Southern California Edison
Section 106	Section 106 of the National Historic Preservation Act
SHPO	California State Historic Preservation Officer
SR 178	State Route 178
SQF	Sequoia National Forest
Tribes	American Indian Tribes
TSP	Technical Study Plan
TSR	Technical Study Report
USDA	United States Department of Agriculture
USGS	United States Geological Survey

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7.12 CULTURAL RESOURCES

This section describes cultural resources (archaeology and built environment resources) in the vicinity of Southern California Edison's (SCE) Kern River No. 1 Hydroelectric Project (Project). Section 7.12.1 describes the Area of Potential Effects (APE) and Study Area. Section 7.12.2 describes the affected environment and resource conditions under current Project operations and maintenance (O&M) (i.e., baseline condition). This includes a description of the known cultural resources and historic properties within the Federal Energy Regulatory Commission (FERC) Project boundary, including identification of properties that are listed on, or eligible for listing on, the National Register of Historic Places (NRHP). Section 7.12.3 identifies proposed environmental measures, management, and monitoring plans (collectively referred to as protection, mitigation, and enhancement measures [PM&E measures]) to be implemented under the Proposed Action (see Appendix E.1 for a full description of proposed PM&E measures). Section 7.12.4 includes an analysis of the potential effects of the Proposed Action.

Preliminary information regarding implementation of the CUL 1 – Built Environment Technical Study Plan (TSP) and CUL 2 – Archaeology TSP is presented here. Preliminary information from the TRI 1 – Tribal Resources TSP can be found in Section 7.13, *Tribal Resources*. The CUL 1 – Built Environment Technical Study Report (TSR) (Riggs et al. 2026) and CUL 2 – Archaeology TSR (Rossi et al. 2026) are being completed and will be submitted to the United States Forest Service (Forest Service) and other stakeholders who can receive confidential cultural reports before the Final License Application (FLA). More complete information will be provided in the FLA.

Section 106 of the National Historic Preservation Act of 1966 (Section 106) (NHPA) directs federal agencies to take into account the effects of their undertakings on historic properties within the APE and to afford the Advisory Council on Historic Preservation (ACHP). The regulations implementing Section 106 define "historic properties" as any precontact or historic period district, site, building, structure, or individual object included in or eligible for inclusion in the NRHP. This term includes artifacts, records, and remains that are related to and located within historic properties, as well as traditional cultural properties (TCPs) that meet the NRHP criteria.

7.12.1 Area of Potential Effects and Study Area

Under Code of Federal Regulations (CFR) Title 36 § 800.16(d), an APE is defined as "the geographic area or areas within which an undertaking may directly or indirectly cause changes in the character or use of historical properties, if any such properties exist." Additionally, the ACHP and California Office of Historic Preservation have provided guidance for federal agencies and their delegated licensees to consider potential effects that:

- May occur immediately and directly;
- Are reasonably foreseeable or may occur later in time;
- Are farther removed in distance and potentially affected indirectly; and

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- Include cumulative effects that may result from the undertaking.

During Cultural Resources Working Group meetings including the Forest Service and American Indian Tribes (Tribes), the proposed APE was discussed, and comments were incorporated into the revised CUL 1 and CUL 2 TSPs.

The APE for the Project contains all lands within the FERC Project boundary, a 25-foot buffer from the centerline of the access trails located outside of the FERC Project boundary, and a 50-foot radius around FERC ancillary facilities such as gauges located outside of the FERC Project boundary. The study area is defined as the APE plus a 0.5-mile buffer (see Map 7.12-1).

SCE, as the non-federal representative for NHPA Section 106 consultation for FERC, submitted the proposed APE and study area to the State Historic Preservation Officer (SHPO) on July 16, 2024. The SHPO agreed in letter dated August 30, 2024, with the delineation of the current APE and study area but reserved the right to consult on its expansion should planned studies or consultation identify cultural resources that extend beyond the FERC Project boundary or otherwise are found to be affected by the Project (Office of Historic Preservation [OHP] 2024).

7.12.2 Affected Environment

7.12.2.1 Information Sources

This section was developed using existing, relevant, and reasonably available information from the following primary sources. Additional references are cited in the text, as appropriate.

- Aerial photographs
- Bureau of Land Management General Land Office surveys and patents
- California Historical Landmarks
- California Register of Historical Resources
- California State Library, California History Room, Sacramento
- Huntington Digital Library, SCE Records, and Photographs and Negatives Collection
- Kern County Library, Local History Room, Bakersfield
- Kern River Valley Historical Society, Kernville
- Native American Heritage Commission Sacred Lands File Search
- NRHP listings

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- Mining thematics and historic contexts (Kelly 2018, n.d.)
- Office of Historic Preservation Built Environment Resources Directory
- Online research, including periodicals
- SCE ArcGIS Online database, which includes a heritage record for Forest Service Region 5 within the SCE service territory as well as subscription data and records searches from the California Historical Resources Information System (CHRIS)
- SCE Cultural Resources Management Plan for Kern River No. 1 Hydroelectric Project (Taylor 1993)
- SCE engineering drawings and historical records
- United States Geological Survey (USGS) Topographic Quadrangles

7.12.2.2 Physical Environment and Climate and Cultural Contexts

Environmental Context

This review of environment, climate, geology, and flora and fauna of the study area is drawn largely from relevant sections of the Pre-Application Document (SCE 2023). See Section 7.1 *Kern River Basin*, 7.4, *Fish and Aquatic Resources, and 7.5 for Botanical and Wildlife Resources* of the Draft License Application for additional information on the environmental context for the Project.

PHYSICAL ENVIRONMENT AND CLIMATE

This section provides an overview of the environment as needed to contextualize cultural resources. The APE is located in the lower Kern River Canyon, a deep canyon cut by the Kern River, on the southern edge of the Greenhorn Mountains in Kern County, California. The Greenhorn Mountains are located at the southernmost end of the Sierra Nevada and merge with the mountains east of Bakersfield, the largest city near the study area and APE, 15 miles to the southwest. The terrain within and surrounding the study area and APE is composed of rugged, steep, rocky hillsides that descend into narrow drainages; the hillsides are vegetated in annual grasses, some chaparral, and few trees. State Route (SR 178) follows the corridor of the canyon.

Elevations of ridges in the headwaters of the Kern River watershed reach 14,491 feet above mean sea level (amsl) at Mount Whitney on the Inyo National Forest and Sequoia & Kings Canyon National Parks. The main branch of the river is often referred to as the North Fork Kern River. The North Fork and South Fork of the Kern River converge at Lake Isabella, a previous natural lake that is now a reservoir formed by Isabella Dam. The lower Kern River flows in a southwesterly direction from Lake Isabella through the narrow, steep-walled Kern River Canyon (2,500 feet of vertical relief from the river to nearby ridge tops) until it reaches the mouth of the canyon. The Project uses water diverted from the lower Kern River in the Democrat Dam area to produce power at the Kern River No. 1 Powerhouse downstream. The river ends on the west side of Kern County, where it is

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diverted into canals to irrigate the farms of the southern San Joaquin Valley and for Bakersfield's municipal water supplies. Prior to the diversion of water, the Kern River spread out into vast wetlands and seasonal lakes (Kroeber 1925).

Elevations surrounding the study area and APE range from approximately 924 feet amsl at the Powerhouse to 1,913 feet amsl at Democrat Dam. The upstream drainage area at the powerhouse and dam are 2,300 and 2,258 feet, respectively. The climate is Mediterranean, characterized by cool, wet winters and hot, dry summers. Average precipitation averages between 25 and 40 inches, generally falling as rain below 4,500-foot elevation.

GEOLOGY

Topographically, the Project area consists of steep slopes along both sides of Kern River Canyon ranging from 15 to 75 percent. Both ends of the river have some relatively flat areas, predominantly the northwest side of the river within the Project area. There are vertical to near-vertical rock and cliff faces along the southeast portion of the river. The Project area is located within a broad zone of Mesozoic granitic rock with exposed granodiorite, tonalite, and diorite. The bedrock within the immediate Project area is mainly made up of quartz diorite. Landforms in the area typically transition quickly from weakly formed soils—Chualar, Cienaba, and Livermore soil series—on active fluvial terraces and bars at the river bottom to similarly weak development on the veneer of colluvium on active hillslopes. Steep drainages hold pockets of sediment in small riparian terraces where steps in canyon cascades allow sediment and vegetation to take hold.

FLORA AND FAUNA

The southern Sierra Nevada supports a diverse and extensive set of flora and fauna communities, though not all would have been of interest to precontact peoples. The more important precontact resources are detailed below.

The study area and APE are within the Blue Oak Woodland (Ritter 1988; Barbour et al. 2007) or Foothill Woodland (Schoenherr 1992), which are dominated by blue oak (*Quercus douglasii*), foothill pine (*Pinus sabiniana*), California buckeye (*Aesculus californica*), valley oak (*Q. lobata*), interior live oak (*Q. wislizenii*), canyon live oak (*Q. chrysolepis*), and California black oak (*Q. kelloggii*) (Barbour et al. 2007). The understory is dominated by annual grasses, with common species including soft brome (*Bromus hordeaceus)*, ripgut brome (*B. diandrus*), annual ryegrass (*Lolium multiflorum)*, and foxtail (*Hordeum leporinum)*. An array of seed, nut, and bulb- or corm-producing plants were exploited by Native American populations during their annual round. Some shrub species include poison-oak (*Toxicodendron diversilobum*), California coffeeberry (*Rhamnus californica*), and species of California lilac (*Ceanothus)* and manzanita *(Arctostaphylos*) (Barbour et al. 2007).

Among mammalian fauna, artiodactyls were among the more important animal species to precontact peoples. Black-tailed deer (*Odocoileus hemionus*) are the most common large herbivore in the Sierra Nevada, with year-round resident populations at lower elevations and seasonal herds in higher-elevation areas. They were also one of the taxa

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more frequently exploited by Indigenous peoples (Voegelin 1938). Three distinct mule deer herds—the Greenhorn Deer Herd, the South Sierra Foothill Deer Herd, and the Piute Deer Herd—are present in the vicinity of the Project (California Department of Fish and Wildlife 2022).

Large-bodied omnivores and carnivores were once found throughout the mountains and foothills. Larger predators such as grizzly (*Ursus arctos*) and black bear (*U. americanus*), puma (*Felis concolor*), coyote (*Canis latrans*), bobcat (*Lynx rufus*), and gray fox (*Urocyon cinereoargenteus*) would have competed with humans for resources, including artiodactyls, small mammals, and larger rodents. Other common predators include weasels and relatives (*Mustelidae*), skunks (*Mephitidae*), and badgers (*Musteloidea*). None of these carnivores were regularly exploited for food.

Small mammals, in contrast, were eaten regularly and, along with artiodactyls, were ranked among the more commonly consumed resources ethnographically (Voegelin 1938). Rabbits (*Sylvilagus* spp.) and hares (*Lepus* spp.) are common throughout the high Sierra and foothills. Frequently encountered taxa include white-tailed jackrabbit (*L. townsendii*), black-tailed jackrabbit (*L. californicus*), brush rabbit (*S. bachmani*), and mountain cottontail (*S. nuttallii*), depending on elevation and habitat.

Rodents are the largest, most diverse group of mammals by far and are known to have been consumed by Native Americans, particularly the larger taxa. The western gray squirrel (*Sciurus griseus*) and other squirrel species (*Otospermophilus* spp., *Tamasciuris* spp.) are residents of the area, as are porcupine (*Erethizon dorsatum*), woodrat (*Neotoma* spp.), several species of chipmunk (*Tamias* spp.), and various species of pocket gopher (*Thomomys* spp.), rats, and mice.

Hundreds of bird species can be found in the southern Sierra Nevada, although many are more common or exclusively found in lower-elevation areas. Taxa commonly found in montane settings include California quail (*Callipepla californica*), woodpeckers (*Picidae*), red-tailed hawks (*Buteo jamaicensis*), turkey vultures (*Cathartes aura*), and an array of smaller songbirds. Several species of geese and ducks (*Anatidae*) were also reportedly taken by Tübutulabal hunters (Voegelin 1938).

Only three native fish were found in the upper reaches of the Kern River—the endemic golden trout (*Oncorhynchus mykiss aguabonita*), the Kern River rainbow trout (*O. m. gilberti*), and the Sacramento sucker (*Catostomus occidentalis*) (Moyle 2002). Golden trout appear to have evolved in the upper Kern River drainage while rainbow trout are native to streams throughout the elevational range in the Sierran streams below 6,000 feet amsl. Kern River rainbow trout were once widespread in the upper Kern Basin and grew to large sizes, but over-exploitation, habitat degradation, and, most importantly, hybridization with other trout since the nineteenth century have reduced populations to a small fraction of historical numbers. Sacramento suckers are part of a broader San Joaquin Valley assemblage and Kern River watershed. Prior to extensive fish planting in the nineteenth and twentieth centuries, many areas above 6,000 feet amsl lacked fish (Moyle 2002). Local Native American peoples report harvesting all these species from the Kern River and adjacent tributary streams and creeks.

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Cultural Context

The following sections include a review of precontact and post-contact history as well as a summary of the Native American ethnography of the study area. Complete cultural contexts will be included in the forthcoming TSRs for CUL 1, CUL 2 and TRI 1.

PRECONTACT SETTING

People have inhabited the southern Sierra Nevada for at least 10,000 to 12,000 years. The archaeological record for the region is poorly understood, and only a minimal outline of cultural chronology and process is known. Much of the watershed was inhabited by the Tübatulabal, while two Yokuts groups to the north (Paleumni Yokuts) and west (Yowlumne Yokuts) lived primarily on the portion of the lower Kern River in the APE and study area on the lower foothills and the plains. Kawaiisu, their neighbors to the south, also used portions of the study area. Limited archaeological work has been reported for the southern Sierra Nevada, and, consequently, few data on the regional prehistory are available. General summaries of southern Sierra Nevada prehistory are available in Schiffman and Garfinkel (1981), Moratto (1984), and Garfinkel (2007). The following is a generalized account of the prehistory of the area.

The precontact chronology for the southern Sierra Nevada can be divided into five phases: Kennedy, Lamont, Canebrake, Sawtooth, and Chimney (Moratto 1984; Garfinkel 2007). This general sequence was initially developed based on work along the Pacific Crest Trail (located along the eastern edge of the Sierra Nevada) in the late 1970s and early 1980s (Garfinkel et al. 1980, Garfinkel et al. 1984; McGuire 1981, 1983; McGuire and Garfinkel 1980) and later expanded by Garfinkel (2007). It is briefly outlined below.

The initial appearance of people in the southern Sierra Nevada was during the Kennedy Phase (circa [ca.] 13,000–6000 years before present [BP]). However, the only reported evidence of such a presence has been a few isolated Clovis projectile points (Glennan 1971; Zimmerman et al. 1989). To date, no evidence has been found of any permanent occupation of the region during Paleoindian times. The latter part of the Kennedy Phase is identified by the appearance of stemmed (e.g., Lake Mojave) points. There is very little evidence of a Kennedy Phase occupation of the region (Garfinkel 2007:45), and it seems likely that Kennedy Phase groups used the area sporadically.

The Lamont Phase (ca. 6000–3200 BP) is marked by the appearance of Pinto series projectile points, and several examples have been recovered (McGuire and Garfinkel 1980). McGuire and Garfinkel (1980) suggested that the Lamont Phase settlement and subsistence systems in the southern Sierra Nevada were focused on small groups from the valley to the east (e.g., Indian Wells and Owens) or west (the San Joaquin) using the area for occasional resource procurement (e.g., to hunt or gather pine nuts).

The subsequent Canebrake Phase (ca. 3200–1500 BP) is marked by Elko series points and may reflect an occupation focused on the exploitation of pinyon (McGuire and Garfinkel 1980). They suggest that Canebrake Phase groups made use of resources such as pine nuts, seeds, bulbs, and animals (large and small).

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The Sawtooth Phase (ca. 1500–650 BP) is marked by the presence of Rose Spring points (reflecting the introduction of the bow and arrow), manos and metates, bedrock mortars, stone beads, and *Olivella* spire-ground beads (Class A; Bennyhoff and Hughes 1987). Sawtooth Phase sites are more numerous compared to the previous phase, and both pinyon gathering and hunting camps have been found. This suggests that the use of upland habitats increased and became more regular during the Sawtooth Phase.

The Chimney Phase (ca. 650–150 BP) is characterized by Desert Side-notched and Cottonwood Triangular points, brownware pottery, glass beads, and *Olivella* rough-disk beads (Class H; Bennyhoff and Hughes 1987). Moratto (2011) suspected that brownware pottery diffused into the southern Sierra Nevada from the north after about 500 years ago. It appears that Chimney Phase site intensity further increased from the Sawtooth Phase, reflecting a generalized hunting and gathering economic system similar to that practiced during ethnographic times.

NATIVE AMERICAN ETHNOGRAPHY/ETHNOHISTORY

A full ethnographic context and ethnohistory is included in the TRI 1 TSR (Tiley and West 2025).

Ethnographic Background

Much of the watershed was inhabited by the Tübatulabal, while two Yokuts groups to the north and west lived primarily on the portion of the lower Kern River in the APE and study area on the lower foothills and the plains. The ethnogeography of the area is somewhat contradictory. Smith (1978) in his chapter on the Tübatulabal suggests that the Tübatulabal range extended from near Mount Whitney to 41 miles below the junction of the forks of the Kern River. This would indicate that Tübatulabal territory extended to the canyon mouth. Voegelin, in her 1930s monograph, specifies that the territory ended at a set of rapids about 0.5 miles from the mouth of the gorge (Voegelin 1938).

The Yokuts groups' boundaries, at least, are clearer. Paleumni Yokuts lived on the north side of the Kern River, with their territory extending into the northern foothills. Although their lands were near the north bank of the Kern River, this was far from their core area along Little Poso Creek (Spier 1978). Kroeber asserts that they, as well as the Yowlumne, visited the Kern River Canyon as far up as Kern Falls "and adjacent sites on the Kern River" (1925).

Yowlumne Yokuts territory extended from near the mouth of the Kern River gorge to encompass a large territory on the valley floor centered on Bakersfield (Gayton 1948). Latta describes the upstream limits of the Yowlumne as "about where the second powerhouse" is located, presumably the Kern River No. 1 Powerhouse (Latta 2014:275).

Kawaiisu, their neighbors to the south, sometimes joined Tübatulabal and Yokuts people in the study area for communal hunts and ceremonial/trade gatherings.

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TÜBATULABAL ETHNOGRAPHY

The following section primarily draws upon information from Voegelin (1938) and Smith (1978). Modern ethnographic accounts subsume three Uto-Aztecan groups as Tübatulabal: the Palagewan of the Kern River; Tübatulabal "proper" (or Pahkanapil) of the South Fork of the Kern River; and Toloim (often referred to as Bankalachi) of the Greenhorn Mountains and Poso Creek (Smith 1978; Voegelin 1938). The latter is likely a transitional Yokuts–Tübatulabal group, consisting of an intermarried and bilingual community. Neighboring Tribes consist of the Western Mono and Yokuts (especially Yowlumne and Paleumne) to the west and south, the Kawaiisu and Coso Shoshone to the south and east, and the Owens Valley Paiute to the north.

Tübatulabal territory consisted of almost the entire watershed of the Kern River in the southern Sierra Nevada, nearly down to the San Joaquin Valley, plus a portion of the western foothills of the southern Sierra Nevada (Smith 1978). This territory occupies the Sierran Biotic Province with diverse communities encompassing at least five plant belts (Foothill, Mixed Conifer, Upper Montane, Subalpine, and Alpine; Munz and Keck 1959; Storer et al. 2004). The mountainous terrain has a large elevation span from about 2,500 feet amsl to nearly 14,500 feet amsl at the Sierra Nevada crest. This varied landscape provided a diversity of edible, material, medicinal, and other resources for the people.

Subsistence

There is no detailed Tübatulabal ethnobotany, but considerable information has been presented by Voegelin (1938), who reported that the Tübatulabal used some 220 plant species, 130 of which were of economic or medicinal use. Of those, 56 were obtained in the "foothill floral area," 40 in the "desert floral area," and 10 in the "Great Basin floral area."

Both the Bankalachi (mixed Yukuts and Tübatulabal group from Poso Flat) and Yokuts came into Tübatulabal territory to gather pine nuts (Driver 1937). In May, while the cones of the grey pine were still green and unopened, the cones would be knocked down, gathered, and roasted to open so the nuts could be collected (Voegelin 1938). This "green cone" procurement system prevented animals from getting the nuts before people did. The same procedure was used for pinyon in August.

Their diet was supplemented by deer, rabbits and hares, and fish, along with nuts, seeds, corms, greens, berries, and mushrooms. Pronghorn antelope (extinct since 1900) abounded in the valley and foothills, and mountain sheep roamed higher elevations. Wild game birds were formerly plentiful, and the golden eagle nested in the area (Voegelin 1938:10). Additives to the diet include their own special sugar collected as aphid honeydew, tobacco (largely chewed rather than smoked), a milkweed chewing gum, and salt scraped from salt grass leaves. They obtained lime from natural deposits, using it as an emetic with tobacco, and as a trade item. Traditional use of controlled burning selected some plants over others, altered the competition, created more browse in chaparral, and raised the deer population (Voegelin 1938).

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Settlement

Tübatulabal winter hamlets tend to be found on the Kern River or major tributaries. Palegewan winter hamlets occur in lower elevations along the North Fork of the Kern River and its main stem below its junction with the South Fork. Permanent villages were regularly revisited to cache food and basketry materials during the seasonal round. Some of the elderly or infirm remained there year-round and were visited and resupplied on these occasions (Gehr and Conlan 1984:685). Winter was spent in warmer valley locations near the Kern River in substantial winter houses consisting of mud-covered thatch, sometimes with a sudatory (sweathouse) in the hamlet. Warm summers required simpler brush shelters for temporary quarters. Other structures included camp corrals, large brush circles for communal summer camping and dances, and ceremonial brush shelters.

Material cultural remains reflect subsistence and residence patterns, with bedrock milling features and rock mortars indicative of seed and nut processing, tools reflecting scraping, cutting, and smoothing of items, architectural features related to hamlet winter homes, locally made unpainted gray ceramics (from a red clay) used for cooking in particular, and stone tools made of local materials as well as imported or gathered obsidian. Wooden mortars were used, along with hopper baskets. Baskets were multi-functional, serving as containers, cooking pots, and cradle boards. Tübatulabal basket markers were experts at this art and made both twined and coiled varieties in several functional types and dimensions. Pottery was made from red clay and was unpainted. Stone tools were made from both local and imported materials.

Travel and Trade

Tübatulabal families visited Tulare Lake in the San Joaquin Valley to fish and hunt ducks (Voegelin 1938), covering a distance of about 55 miles as the crow flies from Kernville to Alpaugh. This would have entailed a multiday, or perhaps multiweek, trip and interacting with the Yokuts and perhaps other visiting groups.

Travel to the pinyon grounds in the mountains to the east and northeast would have involved a fairly large number of people carrying equipment to the locations(s) and carrying quantities of pinyon nuts back, likely an arduous task. Still, people returning from pinyon collection also traveled to Indian Wells Valley in the Mojave Desert to collect grapes (Voegelin 1938).

The cordial relationships between Tribes facilitated a long-distance trade route connecting the Pacific Ocean to the Great Basin; subsistence strategies were also affected by the potential for resource sharing. The Tübatulabal participated in a multicultural (with the Yokuts, Kitanemuk, Kawaiisu, and others) communal pronghorn hunt in the Southern San Joaquin Valley in July (Voegelin 1938). There appears also to have been a cooperative fishing agreement in the vicinity of the Project, with Native peoples from all over coming to harpoon fish on the main stem of the Kern River.

A complex system of trails connected the Tübatulabal world. However, relatively few of those trails have been documented. Trails within the Tübatulabal core area would have

interconnected all the hamlets, ritual locations, fishing spots, springs, river crossings, and resource-procurement localities (e.g., acorn and pinyon areas, deer habitat, places for basketry material, and tobacco fields). In addition, trails would have connected the Tübatulabal area to Yokuts territory to the west and south.

YOKUTS ETHNOGRAPHY

Much of the following information is from Latta (2014), who specifically discusses Yowlumne lifeways; additional general information is from Wallace (1978) on Southern Valley Yokuts and Spier (1978) on Foothill Yokuts. The Yowlumne are treated as Valley Yokuts by Wallace. The Yokuts are part of the vast Penutian language family, whose speakers inhabited inland California from the Kern Lake area of the Southern San Joaquin Valley to nearly the Oregon border at the north. The Yowlumne Tribe, with lands within the study area, held the largest amount of land of any Yokuts group. Their land stretched along the eastern boundary of the San Joaquin Valley, encompassing both the lower foothills and the valley floor. Their lands abutted Tübatulabal territory near the mouth of the Kern River Canyon.

Palewyami Yokuts, considered a Foothill Yokuts group, occupied a territory extending south from Little Paso Creek to the headwaters of Rattlesnake Creek (Spier 1978:471). Rattlesnake Creek parallels the Kern River, and Democrat Dam lies only 1.5 miles southeast of Palewyami Yokuts lands. Archaeological sites for this group have been recorded along the ridge separating the two drainages (White and Taylor 1984).

The dense population and social complexity of Yokuts groups have been in part attributed to an “inexhaustible supply” of plant and animal foods from the wetlands, lowland sloughs, lakes, and lower stream courses of rivers and creeks, notably the Kern River (Wallace 1978). Abundant ducks and geese, fish, turtle, and mussels came from these environments, while the drier plains supported large herds of pronghorn antelope and tule elk. Roots and seeds were also gathered. While fishing was a year-round activity, seeds and nuts were gathered as they ripened. Tule roots and seeds, grass seeds, and greens, particularly clover, were relished and formed a substantial portion of the diet. Rabbits and elk were hunted in communal drives, and small mammals were shot or caught in snares.

Although tule mat-covered houses were used in summer, the mild lowland environment allowed permanent houses to be built, sometimes arranged in a single row and sometimes joined together as a single, communal residence. As among the Tübatulabal, material goods were dominated by multi-functional baskets, rabbit skin robes, and stone and bone tools. Tule canoes were the preferred mode of transportation on lakes and sloughs.

An essential part of Yokuts practice was the conduct of trade. Professional traders traveled from the coast to Owens Valley. Relationships with adjacent Tübatulabal people was generally cordial, facilitating this practice.

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KAWAIISU ETHNOGRAPHY

Kawaiisu territory is extensive and diverse, extending along the southern Sierra Nevada, from the Tehachapi Mountains to the southwestern Great Basin and western Mojave Desert. Earle (2004) noted that the variety of mountain and desert ecosystems influenced different lifeways and expressions of Kawaiisu culture. Mountain Kawaiisu core territory included Bear Valley, Brite Valley, Cummings Valley, Tehachapi Valley, Kelso Valley, and Walker Basin (Garfinkel and Williams 2011:15). This territory lies just south and east of the study area and APE.

As is the case with their Tübatulabal neighbors, Mountain Kawaiisu territory is characterized by sharp elevational differences, with resulting access to multiple environmental zones. Subsistence activities were significantly enhanced by access to acorns and pine nuts, both calorie rich and storable resources. A wide variety of other plant species provided seeds and greens in spring and summer. Their territorial location also positioned them next to critical aboriginal trade routes. Walker Pass provided access to the desert biomes.

Kawaiisu people interacted with Yokuts and Tübatulabal people along the lower Kern River. Their relationship with the Yowlumne Yokuts appears to have been especially strong and long-lasting. The Bakersfield area is included in traditional narratives about Jackrabbit's attendance of a festival there (Zigmond 1980:52); Coyote travelled to Bakersfield in a separate story about Coyote and Mountain Lion (Zigmond 1980:70).

Kawaiisu joined various local groups to hunt antelope near the mouth of the Kern River Canyon (Garfinkel and Williams 2011:61) and traded acorns with the valley Yowlumne. Other than references to visits to adjacent Tribal territories, no sites or place names were previously recorded within the study area, in spite of an extensive ethnogeography in Garfinkel and Williams (2011).

ETHNOHISTORY OF THE LOWER KERN RIVER

Early Contact

The early ethnohistoric period was experienced differently by the Yowlumne Yokuts and Tübatulabal people. For the lower Kern River area, the expedition of Francisco Garcés in 1776 may have been the first European contact (Coues 1900). Arriving from the south along Cottonwood Creek, the group was assisted by Indians to safely ford the Kern River, a place name commemorated as Garces Crossing on maps. This was just upstream of the village of Wawcoyo and near the headquarters of the Rio Bravo Ranch. After crossing, Garcés attended a feast at a village on the north shore, probably Hawsu, and gifted people with glass beads and tobacco. Garcés also interacted with Kawaiisu people near Cottonwood Creek (Galvin 1965:56–58).

More meaningful contact occurred during Yokuts and Tübatulabal traditional coastal trading trips, particularly with groups at San Buenaventura Mission in Ventura. Arkush (1993:623) argues that these trading parties were "instrumental" in the spread of Spanish and Mexican material culture to areas remote from the missions.

Later Tensions

Later visits had a less friendly intent as the area was scouted for mission locations, encouraged by the area's dense populations. Though no local mission was ever established, runaways from the existing mission came frequently, introducing some mission lifeways along with those of their own cultures. Mr. Gomez, Chairman of the Tübatulabal, reported that 58 "Kern River" or Tübatulabal were taken into the missions as well (Gomez 2024). The horse was accepted first as a food item and later as transportation. As punitive expeditions were mounted to recover escaped neophytes, an adversarial relationship resulted. So common was the raiding of horses that the Yokuts began to be called the "Horsethief Indians."

The relative paucity of information on the Yowlumne and Paleumni groups is undoubtedly due to the reduction or relocation of these populations during various historic disease epidemics. The best-known event is the 1833 malaria epidemic, which decimated Yokuts Valley groups by 50 to 90 percent (Cook 1978:91). Wallace (1978:449) derives an estimate for the Yowlumne population from Cook's data, placing their aboriginal population at 1,300, which was reduced to 280 by 1850.

The Bankalachi, a related Numic group from Poso Flat and White River, had moved into the area around historic Kernville to escape the malaria-infested lowlands (Powers 1976:393). They seem to have merged with the Palagewan after 1850. Some Yokuts people also fled the valley, some settling for a brief period before the Gold Rush among the Palegewan people near the site of Old Kernville (Powers 1976:394).

As started elsewhere in California in 1848, the discovery of gold in the Kern River in 1857 brought the first profound disruption of the lifeways of Native peoples, though settlers had been impinging upon Tübatulabal territory from about 1850. By 1858, Pahkanapil people had moved from Hot Springs Valley due to white settlement. Two natural disasters greatly increased conflict to the Tübatulabal in the Kern River Valley. First, a 32-year-long drought caused the neighboring Shoshone and Paiute people to relocate to Tübatulabal territory. Second, the local environment was damaged by the Great Flood in the winter of 1861–1862.

Some settlers and miners became fearful and suspicious of the influx of non-local Indians, some of whom were actively at war. Settlers in Keysville[1] had appealed for assistance to the Major Army Command of the western states. In early April, Lieutenant Colonel William Jones received a petition from citizens of Keysville and its vicinity asking for military protection from "Indian depredations." They asserted that "Tehachapi" (Kawaiisu) and Owens River Native people involved in raiding the settlers were hiding in the Kern River Valley in local villages. The resulting encounter between the military and local Native people became known as the Keysville or Whiskey Flat massacre. Some 35 to 40 local

[1] The community's name is often spelled "Keyesville." However, given that the earliest inhabitants, including the Keys brothers spelled the name without the second "e," this report will use the Keysville spelling except in quotations derived from primary documents.

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Palagewan, and some Yokuts and Kawaiisu, were killed without provocation (Smith 1978; Voegelin 1938).

In the 1890s, some Tübatulabal obtained allotments and land grants and began to farm. Tübatulabal and Yokuts people also worked in ranching, in households, and as field labor, and supplemented their income by selling pine nuts and crafts, such as rope, beadwork, and baskets. After 1900, many Tübatulabal moved to the Tule River Reservation (Smith 1978). Remaining members of the Southern Valley Yokuts were sent to the Sebastian Reservation at Tejon and then removed to the Tule River Reservation near Porterville. The survivors seem to have been in the greater part Yowlumne individuals, and the Yowlumne dialect became the lingua franca there. Some Tübatulabal went to the Tule River Reservation as well, although many were able to stay in the area around the South Fork of the Kern River and eventually received allotments.

No Tribal lands have been identified within the study area. The Tejon Indian Tribe is the only federally recognized Tribe in Kern County, but the United States holds no lands in trust in Kern County for the Tribe. The Tule River Indian Tribe is the only federally recognized Tribe in Tulare County, with reservation lands of nearly 50,000 acres. There are some Indian allotment (federal trust) lands remaining in Kern County, but these are not near the Project.

HISTORIC-ERA CONTEXT

The traditional lifeways of Native peoples who first made the lower Kern River Valley their home are discussed in previous sections; however, they also participated in historic-era activities such as mining, agriculture, ranching, and development of transportation and hydroelectric power. These roles are typically undocumented in historic records.

In the early 1830s, Joseph Reddeford Walker and his party of fur trappers were the first non-Native explorers to traverse the mountains of present-day Kern County. Later, in response to the California Gold Rush and advertised fertile arable lands, an influx of settlers to the region resulted in the incorporation of Kern County in 1866. By 1874, the quickly-growing town of Bakersfield supplanted Havilah as the Kern County seat (Kyle 2002:133–134).

In the Sierra Nevada, the multitude of mining camps in the 1850s and 1860s drastically increased the demand for agricultural products and meat (Cooper 1979:4; Ryan and Breschini 2024). The products sold to the miners were brought by teams along rough terrain from the San Joaquin Valley (Cooper 1979:4). Soon ranchers and farmers established properties in the mountains near mining enclaves (Lemke and Kraus 2021:18).

During the Gold Rush, early explorers recognized the scenic value of the Sierra Nevada and spread word of its beauty. While many prospectors departed the Sierras in search of work, recreation in the region grew. The early years of recreation in the area were concentrated around the lower foothill region and the Kern River Valley due to accessibility of stage lines. This easily accessed area included the natural hot springs

found along the Kern River in the Kern River Canyon (Theodoratus 1984:304–305), including the Democrat Hot Springs resort, located within the APE.

By the 1880s, immigration to southern California increased dramatically, sparking the race for more advanced technology. The Kern River and Kern River Canyon provided an optimal location for the implementation of hydroelectric power. The Kern River No. 1 Hydroelectric System (KR1HS) was constructed between 1902 and 1907 as part of the increased demands for electricity. As mining, agriculture, and recreation in the study area continued into the 1900s, the need for easily traversed routes through the Sierra Nevada foothills climbed, and the first segment of SR 178, the Kern River Highway, was constructed by 1925 from Bakersfield to Democrat Hot Spring, by 1931 the road reached Isabella.

Mining

The California Gold Rush coincided with the end of the Mexican-American War, as prospectors discovered gold near Sutter's Mill in Northern California. Word quickly spread, and thousands of would-be miners headed to the area and then spread out to locate potential placer claims in the region (Bradley 1915; Morgan 1914). Gold was first discovered in Kern County near the mouth of Greenhorn Gulch, also known as Greenhorn Creek, which drains into the Kern River, outside of the study area between Miracle Hot Springs and Democrat Hot Springs (CDMG 1962). A member of the John C. Frémont party located the deposit in 1851. Frémont, an early explorer of the western United States, had recently been elected as one of the first two senators of California. The discovery led to a rush of prospectors to the area, including Prospector Peter Gardett, who established the town of Petersburg in the vicinity of the Greenhorn Creek gold deposit. In 1858, with gold mining continuing to prevail, the Greenhorn Mining District was founded and included large and small mining claims. The Greenhorn Mining District remained fruitful for over 30 years but declined before 1890 (Clark 1970).

The Kern River (mining) District (also known as the Kern River Canyon Area) began approximately 10 miles east of Bakersfield and extended along the Kern River for roughly 20 miles to Bodfish, located northeast of the study area. Both placer and lode gold mining deposits are distributed in this area (CDMG 1962). The district falls within the APE and study area and was adjacent to the Greenhorn Mining/Mountain District; however, gold was not as abundant within the river as it was within its tributaries (Clark 1970).

Lode mining, where the gold deposits are extracted from quartz veins, also took place in the APE and study area. One of the most productive lode mining operations was the Gem Mine, located within the study area. The Gem Mine began operations during the first decade of the twentieth century and was shut down in 1942 when a national closure of all operating gold mines occurred. Attempts to re-open the mine in the 1950s were made (Storm 2004). The Red Cloud Mine, also located within the study area, began its small gold mining operations in 1930 with mining activities terminating at an unknown date (Ptomey 1993), likely 1942, and resurging in the 1950s, like the Gem Mine. In 1972, as part of a legal case against the mine, the Forest Service removed all small buildings associated with the Red Cloud Mine from the premises (Ptomey 1993).

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The Nellie K. Lode Mine (also Nellie K. Prospect) is partially located within the APE and falls within what is described above as the Kern River (mining) District; however, it is listed as falling within the Democrat Mining District (BLM 1955).

Uranium mining also became important by the 1950s, and the Miracle Mine, the Kergon Mine, and Little Sparkler Mine were in or near the study area (Wilkerson 2017).

The quick growth of mining was generally followed by quick decline. Overall, mining decreased by the turn of the twentieth century due to low payouts and the prohibitive cost of refining the ore (Kyle 2002:132–133). The region was rich in minerals, but developers and settlers turned away from mining and the mountains and instead focused on the growing ranching and agriculture in the San Joaquin Valley (Kyle 2002:132–133).

Ranching

Early settlement of the San Joaquin Valley began with the departure of pioneers from the Sierra Nevada. Prospectors arrived in the mountains in search of gold, but many were quickly disillusioned by the low mining returns and chose to travel west to the valley. The valley was unfenced and had few land claims that impeded settlement and livestock grazing. The foothills of the valley became the location of several ranches. Ranch owners, who collectively owned approximately 60,000 cattle and several thousand sheep in the southern San Joaquin Valley, actively dissuaded farming of the land. Ranchers erroneously claimed the land was only good for grazing and allowed their cattle to graze on farms that were planted (Boyd 1997).

In the Sierra Nevada, the multitude of mining camps in the 1850s and 1860s drastically increased the demand for agricultural products and meat (Cooper 1979:4; Ryan and Breschini 2024). The products sold to the miners were brought by teams along rough terrain from the San Joaquin Valley (Cooper 1979:4). Ranchers and farmers soon established properties in the mountains near mining enclaves, like the Smith Ranch and A. Brown Ranch near Isabella, to reduce the distance to mining markets (Lemke and Kraus 2021:18).

By the mid-1850s, the sheep industry in the state had grown and driven down the price of cattle (Ryan and Breschini 2024). The demand for mutton and wool for mining camps in the state led to an increase in sheep ranching. Men from the Basque Country of Spain and France who immigrated to California brought institutional knowledge of sheep ranching and established several successful ranches. As the economy and land ownership in the San Joaquin Valley shifted to agriculture in the 1860s, sheep ranching was forced into the foothills of the Sierra Nevada (Roth 1965:1). The ranching industry helped sustain local economies after the mining industry faded (Lemke and Kraus 2021:18; Morgan 1914:189). In 1870, 90,200 sheep roamed Kern County, more than all other livestock combined, and produced 281,100 pounds of wool (United States Department of the Interior 1870).

Eventually soil erosion, particularly in meadows, harmed the reputation of the sheep ranching industry (Roth 1965:2–3). Subsequent restrictions on grazing in the national forests tapered large-scale sheep grazing in the region (Roth 1965:5). The Forest Service

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began regulation of grazing in the Kern River Valley in the early 1900s, a practice that continues today (Lemke and Kraus 2021:28). Into the 1980s, Kern County remained at the forefront of sheep ranching and was home to the largest sheep population in California (Corwin 1989). Livestock grazing still exists on the Forest Service today, including in the Sequoia National Forest (SQF), which authorizes grazing permits, allowing local ranchers to drive cattle to the high-country on SQF lands located within the APE and study area each summer to graze (SQF 2025).

Agriculture

The earliest settlers of Kern Island (present-day Bakersfield) brought western subsistence agricultural practices to the southern San Joaquin Valley. In the 1850s, the Kern River had no defined channel as it left the confined canyon to the east. Instead, the river meandered through a series of drainages and created a fertile alluvial fan. It was in this western fan of the river that the first agricultural settlements in the valley were established (Cooper 1979:2).

Concurrently, farms were established near mining towns in the Sierra Nevada. When mining began in the early 1850s, food and supplies were brought to the remote mining camps using teams driven on rocky trails (Gates 1948:53). Several supporting activities followed the growth of mining communities in the foothills in the 1850s, including lumbering, farming, and ranching. Many settlers arrived as prospectors began to farm in the region. Farmers logged the land and cleared brush to make way for crops of cereal grains, hay, potatoes, and other vegetables and orchards of peaches and apples. Ditches built by mining companies irrigated the nearby farmlands (Momsen 1996:500).

Transportation

Transportation access was an essential component of every aspect of Kern River development and resource use, from mining to agriculture, ranching, and logging. Trails first used by Native Americans brought the earliest explorers into the region and were then followed and expanded by the miners to search for and ultimately locate their claims (Theodoratus 1984).

The steep and rugged terrain of Kern Canyon posed several challenges for early travelers (Boyd et al. 1982). Early settlements in the southern San Joaquin Valley and Sierra Nevada were serviced by a network of stagecoach stops and trails. Stages were developed between settlements and mining camps ca. 1854, shortly after the mines were established. Large stage companies were soon incorporated, including John Butterfield's Overland Mail. The mining town of Havilah located outside of the study area particularly benefited from several routes operating to and from Visalia in Tulare County via Kernville in the 1860s. The stage brought trade and new prospectors to the mines located outside of the study area (Boyd 1957:365, 369).

In areas where the trains did not reach and the stagecoaches could not navigate, pack trains remained a reliable method of transportation in the Sierra Nevada. Pack trains carried supplies and equipment over narrow and rocky trails between towns and mining camps, often using mules. Commercial pack companies developed and regularly serviced

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the area. When mining declined, pack companies were sustained by the growing tourism industry (Roeser 2024).

The Edison Electric Company constructed the first roads and trails in the lower Kern River Canyon. The roads were necessary for the construction of the proposed KR1HS (discussed in the following sections). Road construction was initiated between 1901 and 1902 by the California Power Company, a subsidiary of the Redlands Electric Light and Power Company and the predecessor of the Edison Electric Company, whom took over work on the road in 1902 (Powers n.d.).

The company constructed three roads for the Project. The first alignment constructed spanned 2 miles from the mouth of the Kern River Canyon to the powerhouse site (Powers n.d.; Taylor 1994:5; Tinsley Becker 2020:1). To reach the headworks, the company constructed a second road, the Cow Flat Road, which began at the Breckenridge Road and traversed the southern canyon wall to the headworks, below Democrat Hot Springs. The Cow Flat Road was the only way to reach the headworks at the time (Powers n.d.). The third road started at the edge of the canyon above the powerhouse site and followed the topography of the canyon east, where it tied into the Cow Flat Road (Powers n.d.). This road served construction Camp 2 (Powers 1979:86). All roads for the KR1HS were completed by 1903 (Powers n.d.).

Recreation

Natural hot springs along the Kern River became a popular form of tourism beginning in the 1860s. The mineral properties of the springs were believed to have many health benefits. By the 1880s, several resorts were constructed near hot springs and were accessible via stage lines. Resorts typically had bathing pools, a hotel and camping sites, and a restaurant or cookhouse (Theodoratus 1984:305). The natural hot springs and subsequent resorts encouraged road development and brought tourism to mining communities like Isabella and Kernville in the Kern River Valley. Entrepreneurs constructed new hotels and stores for the new clientele (Lemke and Kraus 2021:18).

Other forms of tourism, outside of resorts, did not pick up until the late 1800s. Hiking, camping, fishing, and related activities, particularly in areas not accessible by stagecoach, were spurred by the formation of the Sierra Club in 1892. The club encouraged such activities by developing trails and camps for public use. Residents also helped develop hiking and backpacking by offering services as camping and fishing guides. The Sierra Forest Reserve was established in 1893, and subsequently, the Forest Service became active in the area. The Sierra Club helped the agency clear trails and otherwise aided the rangers. In exchange for the work of the Sierra Club, the Forest Service facilitated tourism by posting signs, establishing lookouts, and fencing pastures to delineate areas for recreational use (Theodoratus 1984:307–308).

The Democrat Hot Springs resort is within the APE. The springs, named for the Democratic political party, were first advertised as a destination in 1902. The springs were accessible via stagecoaches that operated along the Cow Flat Road from Bakersfield. A roundtrip ticket cost $5, and a day at the hotel, including board, room, and access to the baths, cost $1.50 (*Morning Echo* 1902a). Despite the presence of a hotel operating as

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early as 1902, the resort is widely recorded as having been established in 1904 (Facebook 2025; Ludiker 2025). The property was developed over time to include several cabins and outbuildings, including a bath house (California State Library 2025; Huntington Digital Library n.d. [Call No. 02 – 01243]). Visitors benefited from the "unexcelled hot mineral water" that was said to cure a number of ailments (*Morning Echo* 1910).

After the Kern River Highway (SR 178) was built in the mid-1920s, the Forest Service constructed day-use sites along the river that today include restrooms, picnic tables, and water access (United States Department of Agriculture [USDA] 2024a). In the 1930s, Civilian Conservation Corps members built new recreation facilities in the region and removed the remnants of old logging operations (Lemke and Kraus 2021:2).

Lake Isabella, the reservoir created by a dam built for flood control by the Army Corps of Engineers on the Kern River in 1953, also created new water-based recreational potential, including boating, water skiing, and wind surfing (Powers 2003). Tourism took over as the main economic driver of the area, and by the 1980s, many old ranches in the Kern River Valley had been sold for tourism development (Lemke and Kraus 2021:2). SR 178 still provides access to tourist and recreational activities in the Kern River Canyon (Theodoratus 1984:309–310). Today, most of these recreational areas are managed by the SQF and the United States Army Corps of Engineers (USACE) (Powers 2003).

Sequoia National Forest

As mining, agriculture, and eventually the timber industry drove California's economy, concerns were raised about conservation of natural resources at the national level. The *Forest Reserve Act* of 1891 was passed in response to these concerns and similar issues throughout the United States The act set aside forest reserves for responsible use of natural resources (Utley and Mackintosh 1989).

Freely grazing sheep and cattle on public lands along the Kern River and in the surrounding mountains resulted in overgrazing by the turn of the twentieth century (Lemke and Kraus 2021:28). In response, President Benjamin Harrison established the Sierra Forest Reserve in 1893. At the time, it was the largest forest reserve in the state (Godfrey 2005:38). In 1907, forest reserves were renamed national forests (Utley and Mackintosh 1989). The SQF was formed from a portion of the Sierra National Forest in July 1908 (Godfrey 2005:88). Today, the boundary of the forest nearest the Project area begins at the mouth of the Kern River Canyon, and it encompasses more than 1.3 million acres, including the KR1HS (USDA 2024b; USGS 1914).

Early Hydroelectric Development

Beginning in the 1880s, immigration to Southern California increased dramatically. Newly built railroads improved the accessibility of the region, and large ranches were replaced by subdivisions and small farms. Residents who arrived in Southern California from the eastern United States and Northern California strongly advocated for their newfound communities, towns, and cities to have the same amenities they had become accustomed to elsewhere, namely streetcars, potable water, telephones, and streetlights (Myers 1983:10–11). Many of the amenities used electricity. Small steam-powered plants were

constructed to meet demand. Early plants included those constructed in Santa Barbara in 1886, in Visalia in 1887, and in Pasadena in 1888 (Hinson 1956:1–2).

Hydroelectricity was first introduced to Southern California in 1886 (SCE 1972). The Pomona Plant, in the San Antonio Canyon east of Los Angeles, was pivotal to hydroelectric development in California. The plant was constructed by the San Antonio Light and Power Company in 1892. The plant took advantage of the natural high flow and constriction of San Antonio Creek within the canyon. The Pomona system was also able to achieve long-distance transmission, sending electricity approximately 29 miles from the power source. The system was the first use of the modern transmission principle in America (Hinson 1956:4–9; Tinsley Becker et al. 2015).

Hydropower in the Kern River Canyon

The Kern River was a prime location for hydroelectric construction in the Sierra Nevada. In 1894, the Power Development Company (later absorbed by the Power, Transit and Light Company) began construction on the first hydroelectric plant on the Kern River (Pacific Gas & Electric 1975; Gibson and McGurty 2011). The new plant near the mouth of the Kern River Canyon, which went into operation in 1897, conveyed water from the river to a waterwheel via a wood flume (Theodoratus 1984:310). The plant produced 2,000 horsepower and transmitted power at a rate of 10,000 volts to Bakersfield, 20 miles away (*Los Angeles Sunday Times* 1905). The power was directed to L.P. St. Clair's Bakersfield Gas and Electric Light Company, which provided power for 40 arc lamps in Bakersfield (Pacific Gas & Electric Company 1975).

During the construction of the plant at the mouth of the canyon, the competing Kern River and Los Angeles Electric Power Company obtained water rights on the Kern River but were unsuccessful in constructing a hydroelectric plant. In 1897, the Kern River and Los Angeles Electric Power Company tried again to harness the power of the river, this time by constructing a canal near Bodfish. The project, although minor, allowed the company to maintain its water rights to the river (Gibson and McGurty 2011).

By the turn of the twentieth century, after the success of the Power, Transit and Light Company plant, the attention of several power companies focused on the Kern River. In 1900, surveyor and engineer F.C. Finkle explored the upper Kern River Valley to assess its hydroelectric potential. Working for the California Power Company, a subsidiary of the Redland Electric Light & Power Company, Finkle realized the potential of the river near Kernville. He posted a notice of intent for the California Power Company to develop a power plant on the river approximately 12 miles from the mouth of the canyon (Anonymous n.d.:1). Unlike earlier, smaller hydroelectric plants, improvements in technology allowed the proposed plant to be set far away from urban centers.

Advances in long-distance transmission technology brought entrepreneurs and investors to the Kern River from as far away as Los Angeles and San Bernardino. In 1902, mogul Henry E. Huntington of Los Angeles founded the Pacific Light and Power Company to power his latest venture: electric streetcars. That year, the Pacific Light and Power Company took over construction of the project near Bodfish. Construction was completed in 1904, and the project was named Borel after Huntington's business partner Antoine

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Borel (Gibson and McGurty 2011; Hinson 1956:36; SCE 1972; Tinsley Becker et al. 2015).

During the construction of the Borel Hydroelectric Project, another power project began on the Kern River. In 1901, the California Power Company began preliminary construction of a hydroelectric power plant in the Kern River Canyon. The project, 2 miles upriver from the mouth of the canyon, would become the KR1HS (Anonymous n.d.:1; *Daily Times-Index* 1901).

Kern River No. 1 Hydroelectric System

Construction of the KR1HS was started by the California Power Company. A subsidiary of the Redlands Electric Light & Power Company, the California Power Company was organized in 1900 to supply power from the Kern River Canyon to Los Angeles and cities in Los Angeles, San Bernardino, Riverside, Orange, and Kern counties (*Los Angeles Times* 1900). Prior to the KR1HS, most electric systems were built for local demand without long-distance transmission or integration into a regional grid (Mikesell 1988:12). Work commenced on July 31, 1901, when chief engineer F.C. Finkle, who had previously surveyed the area, and 18 laborers left Bakersfield bound for the Kern River Canyon. The proposed Project was set to be the largest electrical plant ever constructed in the state (*Daily Times-Index* 1901).

Work progressed slowly on the system until the Edison Electric Company took over in 1902. Although the Redlands Electric Light and Power Company, parent company of the California Power Company, was acquired by the Edison Electric Company in May 1901, work in the Kern River Canyon that year continued under the California Power Company (*Daily Times-Index* 1901). The Edison Electric Company formally absorbed the California Power Company in August 1901, but the latter company retained its name for hydroelectric work on the Kern River (*Los Angeles Daily Times* 1901; Myers 1983; Tinsley Becker et al. 2015). When the KR1HS was formally conveyed to the Edison Electric Company in September 1902, the California Power Company had completed some tunnel excavation and road construction (Anonymous n.d.:2; *Morning Echo* 1902b).

In simplified form, the KR1HS under construction would be composed of a headworks, a conveyance system, and a powerhouse. Water would enter the KR1HS at the headworks, where the flow of the river would be diverted by a dam across the canyon. The water would enter a conveyance of tunnels and flumes that would extend 8.66 miles through the south wall of the canyon. Once the water reached the forebay above the powerhouse site, it would be conveyed through a penstock down the canyon and into the powerhouse. At the powerhouse, the force of the water would be converted to electricity for transmission to Los Angeles (McIntosh 1907:26–39). Soon after the Edison Electric Company acquired the partially constructed KR1HS, four construction camps were established along the Project area (SCE Drawing No. 7333-0). The camps were connected by a temporary telephone line, power line, and 12 miles of trail constructed along the south wall of the canyon (Anonymous n.d.:4; Powers 1979:86–87). Headquarters Camp (Camp 1) was near the powerhouse site, at the present Forebay Operations Area. Camps 2 (near Tunnel No. 11) and 3 were within the canyon along the Project area, and Camp 4 was at the headworks site (Powers 1979:86; SCE Drawing No.

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7333-0). Roads serviced all camps except for Camp 3, which was only accessible by trail or an aerial cable from the road above (McIntosh 1907:44, 59; Powers 1979:86). At each camp, a commissary, cookhouse, bunkhouses, workshops, and tents were erected (Anonymous n.d.:4; *Visalia Delta* 1907).

Each work camp grew into an enclave for the hundreds of laborers employed on the Project. The commissaries and cookhouses were contracted to the company of Glass & Fischer, who employed close to 35 men (*Los Angeles Sunday Times* 1905). Many of those employed to support the work camps were Chinese immigrants. Chinese cooks helped feed the laborers and supervisors three meals a day and completed other tasks around the work camps, like dishes and laundry. Lunches at the cookhouse were loaded onto carts and hauled by mules to the work locations throughout the Project area. Efforts were made to make the work camps comfortable for the workers. The chefs served specialties like homecooked pies, fresh loaves of bread, and apple sauce (Powers 1979:92).

All roads used to construct KR1HS were completed by 1903. The roads—a 2-mile road between the mouth of the canyon and the powerhouse site, the Cow Flat Road, and a road above the powerhouse site—supplemented the trail system established for construction. To access areas not serviced by roads, systems of hoists, cables, and specially designed sleds lowered heavy machinery down into the canyon from the roads above. The roads were kept busy with horses and pack and wagon trains (Powers 1979:86).

Work on the KR1HS was evidenced by the cacophony of sound produced within the canyon. The most notable sound was the use of pneumatic drills and dynamite to complete the tunnel system on the canyon's south wall. Tunnels were worked from both ends, through features called adits, to expedite construction (*Los Angeles Sunday Times* 1904). The drills used power from the temporary construction power plant. After drilling, charges were inserted into 2-inch-diameter holes drilled deep into the stone. Once the charges were detonated, the spoils were dumped down the canyon wall and became a notable feature of the landscape (*Los Angeles Sunday Times* 1905). A blacksmith shop was erected every couple of tunnels to sharpen and otherwise maintain the drill bits, among other projects. The blacksmith shops used compressed air from the construction power plant to stoke the forges (*Los Angeles Sunday Times* 1905).

The tunnel system was labor-intensive and expensive to build. Laborers worked in two 10-hour shifts each day to carve the tunnels (*Los Angeles Sunday Times* 1905). The use of tunnels, instead of flumes or canals, accounted for the nuances of the landscape and environment. The course of the river from headworks to powerhouse is 12.5 river miles, but the tunnel system reduced the distance to approximately 8.66 miles. The fall of the tunnels was minimal and provided for a final drop of 878 feet from the forebay to the powerhouse via a buried penstock (Powers 1979:87). The tunnels also reduced evaporation, which in such an environment as the Kern River Canyon could reach a rate of 20 percent (*Los Angeles Sunday Times* 1905).

KR1HS began power transmission in May 1907 (*Independent* 1907; *Model Railroader* 1975). The Project more than doubled the power output of the Edison Electric Company,

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and reduced power rates in Los Angeles and other cities (*Independent* 1907; *Los Angeles Daily Times* 1906; SCE n.d.). The company produced most of its power from hydroelectric sources and only relied on steam power for reserve or emergency energy (Myers 1997:148).

Completely within the SQF, the current KR1HS operates as a run-of-the-river mode to maintain adequate water level in the river for habitat and recreation (Bradigan 1988; Mikesell 1988:3). The KR1HS has four generators at the powerhouse that transmitted power at a rate of 75,000 volts to Los Angeles (SCE n.d.). The success of the Project is often credited to Edison Electric Company's Chief Hydraulic Engineer F.C. Finkle, Vice President H.H. Sinclair, Superintendent of Power Construction F.E. Miller, President J.B. Miller, and the contracting firm Glass & Fischer, which also supported the construction of other Edison Electric Company power plants (McIntosh 1907:16–18).

Today, KR1HS is one of four hydroelectric systems constructed on the Kern River. Although not the first constructed on the river, the Project played a substantial role in the development of the Edison Electric Company and later SCE. When constructed, KR1HS was the first "big" plant, relative to other projects. It had the highest power output of any project and was modern and innovative in design (Mikesell 1988:10–13). The KR1HS was the largest plant in SCE's system until the completion of the Long Beach Steam Plant in 1914, and it was the largest capacity hydroelectric plant in the system until the company acquired the Big Creek Project in 1917 (Taylor 1994:5–6). The facility is an intact example of a hydroelectric project from the early twentieth century and continues to provide power to SCE's system (Mikesell 1988:10–13).

7.12.2.3 Archaeological Resources

This section provides a summary of the known archaeological resources within and adjacent to the APE and a summary of efforts completed to date to identify and evaluate archaeological resources for the NRHP per study objectives in the CUL 2 – Archaeology TSP. Updated information on archaeological resources and NRHP eligibility will be included in the FLA.

Background research and archaeological surveys of the APE were conducted in July and November 2024 and in July 2025 under a Forest Service Organic Act Permit SQF03012018 and pursuant to the CUL 2 – Archaeology TSP.

Notable previous archaeological surveys of the APE included a 1984 inventory and evaluation of cultural resources along Kern River near the Democrat Hot Springs Resort by White and Taylor (1984), cultural investigations conducted for the California Department of Transportation (Caltrans) SR 178 widening in 1988–1990, and a 2012 inventory of KR1HS access roads and flume sections to support future SCE O&M activities (Kovak and Jackson 2012).

The 1988 Caltrans investigations evaluated the KR1HS and determined it to be eligible for the NRHP as a historic district (Mikesell 1988). The cultural field investigations completed in 1989 and 1990 had negative results for cultural resources (Riley and Kennedy 1990; Riley and Martin 1989).

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The precontact sites in the APE consist of bedrock milling features and associated lithic scatters.

The historic-period sites within the APE include archaeological resources related to the development, maintenance, or use of the KR1HS, construction of SR 178, or mining activities.

A total of six previously recorded archaeological sites are located within the APE. Of these, three are precontact sites and three are historic-period sites. Three new sites were recorded as part of the July and November 2024 CUL 2 surveys. The results of the 2024 and 2025 pedestrian surveys are currently being reviewed by SCE; results will be included in the FLA.

All nine of the recorded archaeological sites are located on lands administered by the SQF.

7.12.2.4 Built Environment Resources

This section provides a summary of the known built environment resources within and adjacent to the APE and a summary of efforts completed to date to identify and evaluate built environment resources for the NRHP per study objectives in the CUL 1 – Built Environment TSP. Archival research and a built environment resource survey of the APE were conducted in June 2024 and pursuant to the CUL 1 – Built Environment TSP. Updated information on built environment resources and NRHP eligibility will be included in the FLA.

Through Section 106 consultation for the proposed SR 178 curve correction project adjacent to the powerhouse, most facilities associated with the KR1HS were evaluated to determine the system's eligibility for the NRHP. The evaluation methods and results are documented in the "Historic Resource Evaluation Report: Kern River No. 1 Power House, 6-Ker-178, 15.3, 06-275701" (Mikesell 1988).

Based on the evaluation undertaken, the KR1HS includes a hydroelectric-themed NRHP Historic District, the Kern River No. 1 Historic District (KR1HD). The SHPO concurred with this finding by letter dated January 9, 1989 (SHPO Reference No. FHWA881212A; Gualteri 1989). As documented, the historic district included 23 built resources, 14 of which were contributing to the significance of the district and 9 of which were noncontributing. The KR1HD was found to qualify as a significant resource at the local level in the areas of Commerce and Engineering. The district was deemed eligible for listing in the NRHP under Criterion A, broad patterns of history, and Criterion C, distinctive characteristics of the type, period, and method of construction that represent the work of a master. The period of significance was documented as 1902 to 1907, the period in which the contributing resources within the district were constructed. Within this period, the system played a key role in the development of SCE and was the first "big" plant built under company president John B. Miller. The output of the system exceeded the needs of the local market, and enabled SCE to market surplus power to other companies. The district represents an intact example of a state-of-the-art early twentieth century

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hydroelectric facility that was highly innovative in key areas of technological breakthrough that occurred in the nineteenth century.

All built environment resources associated with the KR1HD were revisited as part of the CUL 1 – Built Environment TSP implementation and re-evaluated as contributing or noncontributing features of the district. Additional built environment resources not previously recorded were also recorded and evaluated as part of the KR1HD or as stand-alone built resources. These results are currently being reviewed by SCE; results will be included in the FLA.

7.12.3 Proposed Environmental Measures

Under the Proposed Action, SCE proposes to implement PM&E measures associated with ongoing Project O&M activities. PM&E measures are designed to protect, maintain, or enhance environmental and cultural resources over the term of the new license. SCE proposes implementing the following PM&E measures related to cultural resources:

- Historic Properties Management Plan (HPMP)

An adverse effect is defined in the regulations implementing Section 106 (36 CFR § 800.5(a)(1)). Pursuant to that definition, an adverse effect is found when an undertaking may alter, directly or indirectly, any of the characteristics of a historic property that qualify the property for inclusion in the NRHP in a manner that would diminish the integrity of the property's location, design, setting, materials, workmanship, feeling, or association. A resource that has not yet been evaluated for the NRHP is assumed eligible for listing and treated as historic property until determined otherwise.

Section 106 requires that every federal agency "take into account" how each of its undertakings could affect historic properties. Historic properties are districts, sites, buildings, structures, TCPs, and objects significant in American history, architecture, engineering, and culture that are eligible for inclusion in the NRHP. SCE currently implements a Cultural Resources Management Plan (Taylor 1993) to manage potential effects to cultural resources from Project O&M activities. SCE will develop an HPMP as an update to the Cultural Resources Management Plan that will incorporate the results from cultural resource studies conducted for relicensing, concurrence on eligibility received from the SHPO and measures to avoid, minimize, or mitigate adverse effects to cultural resources from O&M activities. The Draft HPMP will be developed and reviewed in consultation with the Forest Service, Tribes, and SHPO and will outline implementation procedures such as management roles and responsibilities, Tribal and agency consultation, Project review requirements, annual meetings and reporting, as well processes for revision of the HPMP and dispute resolution.

7.12.4 Potential Project Effects

This section describes the potential effects to cultural resources that could occur because of continued O&M activities to be implemented under the Proposed Action. Potential effects are determined by analyzing the changes in cultural resources that may result

from activities implemented under the Proposed Action (Section 5.2) compared to the No-Action Alternative (existing condition) (Section 5.1). Final effects determinations consider PM&E measures to be included under the Proposed Action (refer to Appendix E.1).

Under the Proposed Action, SCE would continue to operate and maintain the Project as described in Section 5.1, *No-Action Alternative*, with minor adjustments to Project O&M activities in response to implementing proposed PM&E measures. No new or upgraded facilities, structural changes, or operational changes to the Project are proposed.

Consistent with FERC's Scoping Document 2 (FERC 2023), this section evaluates potential effects of continued Project O&M on the following:

- Historic or archaeological resources, and TCPs that may be eligible for inclusion in the NRHP, or on other areas or places of religious, cultural, and traditional importance to Tribes.[2]

Refer to Section 7.13, *Tribal Resources* for a discussion of the effects to Tribal resources.

7.12.4.1 Potential Effects to Cultural Resources from Continued Operation and Maintenance of Project Facilities

To ensure system operability and efficiency, Project facilities are subject to ongoing maintenance, including general repair, replacement of constituent components, electrical and mechanical upgrade, and structural or material reinforcement. The Project itself is a NRHP-eligible historic district (KR1HD) and many operational facilities are contributing elements. Therefore, there is a potential for such activities to have an effect upon any built environment resources that are contributing to the KR1HD. Maintenance activities may affect archaeological and built environment resources if the activity involves ground disturbance or has the potential to cause indirect effects such as erosion and visual effects.

To protect cultural resources during maintenance activities, SCE will develop and implement an HPMP that includes measures to avoid, minimize, or mitigate adverse effects to cultural resources from maintenance activities. The HPMP will be developed in consultation with the Forest Service, Tribes, and SHPO.

[2] As discussed earlier in this section, the CUL 1 – Built Environment TSR (Riggs et al. 2026) and CUL 2 – Archaeology TSR (Rossi et al. 2026) are being reviewed by SCE and will be submitted to the Forest Service and SHPO for review and concurrence with findings. FERC, as the lead agency, makes the final effects determination. The SHPO concurs on the effects determination.

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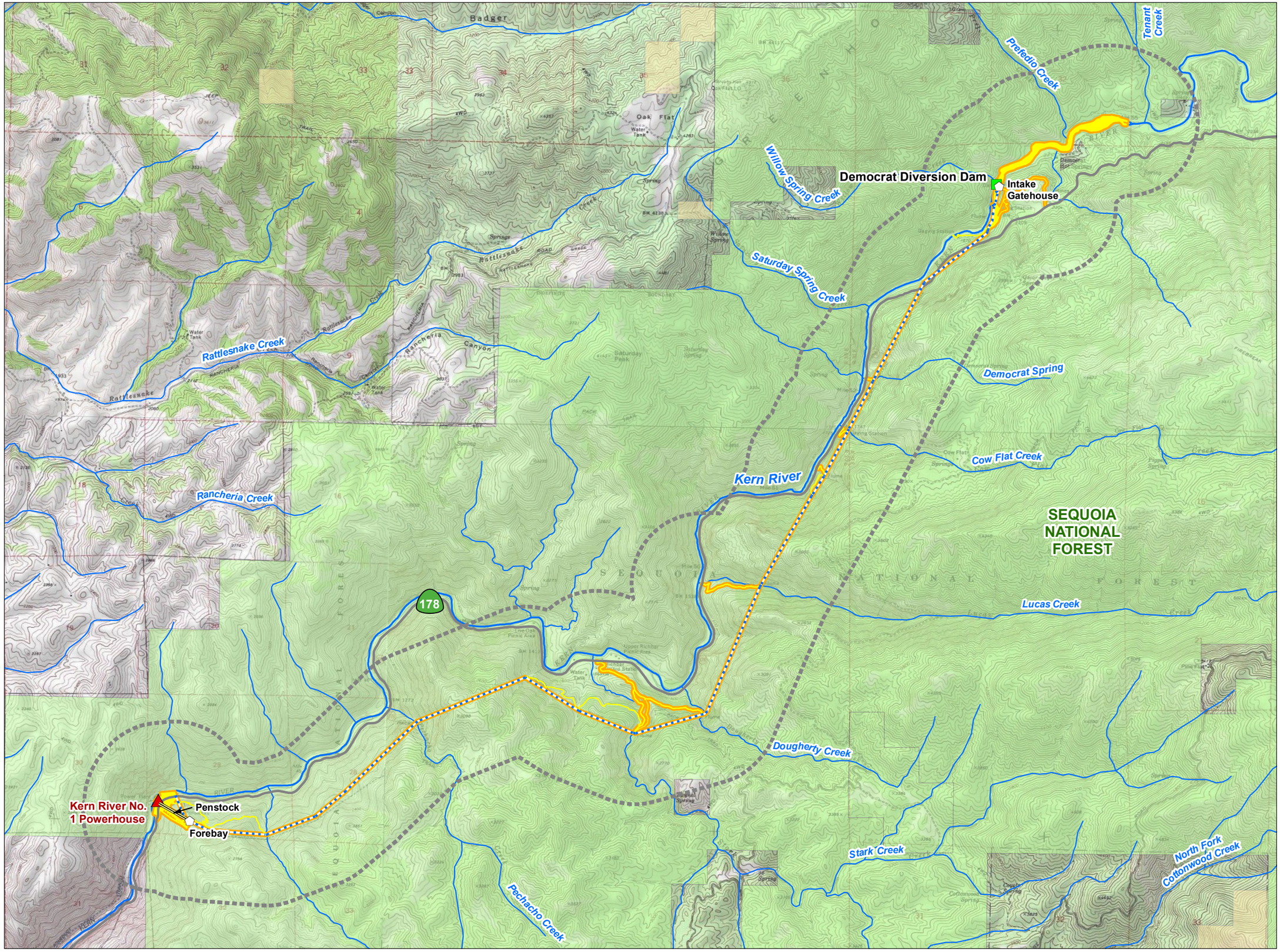
MAPS



Facilities

- Dam
- Powerhouse
- Water Conveyence Feature
- Flowline
- Penstock
- FERC Boundary

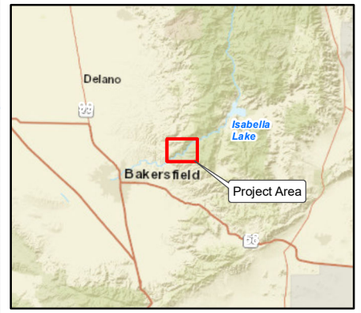
Other Features

- Watercourse
- Highway
- Project APE
- 0.5 Mile Study Area

Land Jurisdiction*

- U.S. Forest Service
- U.S. Bureau of Land Management
- Private (Blank)

*SOURCE: BLM 2021



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Energy for What's Ahead℠

Kern River No. 1 Hydroelectric Project
FERC Project No. 1930

Map 7.12-1

Cultural Resources APE and Study Area

0 0.25 0.5 Miles

Projection: UTM Zone 11
Datum: NAD 83

Date: 3/30/2023

Southern California Edison (SCE) has no reason to believe that there are any inaccuracies or defects with information incorporated in this work and make no representations of any kind, including, but not limited to, the warranties of merchantability or fitness for a particular use, nor are any such warranties tobe implied, with respect to the information or data, furnished herein. No part of this map may be reproduced ortransmitted in any form or by any means, electronic or mechanical, including photocopying and recording system, except as expressly permitted in writing by SCE.

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LIST OF ACRONYMS

ACHP	Advisory Council on Hisoric Preservation
APE	Area of Potential Effects
BIA	United States Bureau of Indian Affairs
CFR	Code of Federal Regulations
FERC	Federal Energy Regulatory Commission
FLA	Final License Application
Forest Service	United States Forest Service
HPMP	Historic Properties Management Plan
NAHC	Native American Heritage Commission
NHPA	National Historic Preservation Act
NRHP	National Register of Historic Places

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OHP	Office of Historic Preservation
PM&E	protection, mitigation, and enhancement
Project	Kern River No. 1 Hydroelectric Project (FERC Project No. 1930)
SCE	Southern California Edison
Section 106	Section 106 of the National Historic Preservation Act
SHPO	California State Historic Preservation Officer
TCP	Traditional Cultural Properties
Tribes	American Indian Tribes
TSP	Technical Study Plan
TSR	Technical Study Report

7.13 TRIBAL RESOURCES

This section describes Tribal resources and American Indian Tribes (Tribes) known to have cultural interest in the vicinity of Southern California Edison's (SCE) Kern River No. 1 Hydroelectric (Project). This section identifies Tribes that are known to have cultural ties or other Tribal interests in the vicinity of the Project, identifies Tribal lands in the vicinity of the Federal Energy Regulatory Commission (FERC) Project boundary, and identifies Tribal cultural or economic interests, including Traditional Cultural Properties (TCP) that may be affected by the Proposed Action and existing Project operations and maintenance activities. Section 7.13.1 describes the Area of Potential Effects (APE) and Study Area. Section 7.13.2 describes the affected environment, including information sources used for the Technical Study Plan (TSP) and this section, and Tribes and Tribal interests in the Project. Section 7.13.3 identifies proposed environmental measures, management, and monitoring plans (collectively referred to as protection, mitigation, and enhancement [PM&E] measures) to be implemented under the Proposed Action (see Appendix E.1 for a full description of proposed PM&E measures). Section 7.13.4 includes an analysis of the potential effects of the Proposed Action.

Preliminary information regarding implementation of the TRI 1 – Tribal Resources TSP is presented here. Preliminary information regarding implementation of the CUL 1 – Built Environment TSP and CUL 2 – Archaeology TSP can be found in Section 7.12, *Cultural Resources*. The TRI 1 – Tribal Resources Technical Study Report (TSR) (Tiley and West 2026) is being completed and will be submitted to the United States Forest Service (Forest Service) and Tribes before the Final License Application (FLA). Information provided in this section may be updated following review of the Draft TRI 1 – Tribal Resources TSR and will be provided in the FLA.

Section 106 of the National Historic Preservation Act of 1966 (Section 106) (NHPA) directs federal agencies to take into account the effects of their undertakings on historic properties within the APE and to afford the Advisory Council on Historic Preservation (ACHP). The regulations implementing Section 106 define "historic properties" as any pre-contact or historic period district, site, building, structure, or individual object included in or eligible for inclusion in the National Register of Historic Places (NRHP). This term includes artifacts, records, and remains that are related to and located within historic properties, as well as TCPs that meet the NRHP criteria.

7.13.1 Area of Potential Effects and Study Area

Under Code of Federal Regulations (CFR) Title 36 § 800.16(d), an APE is defined as "the geographic area or areas within which an undertaking may directly or indirectly cause changes in the character or use of historical properties, if any such properties exist." Additionally, the ACHP and California Office of Historic Preservation have provided guidance for federal agencies and their delegated licensees to consider potential effects that:

- May occur immediately and directly;
- Are reasonably foreseeable or may occur later in time;

- Are farther removed in distance and potentially affected indirectly; and
- Include cumulative effects that may result from the undertaking.

During Cultural Resources Working Group meetings including the Forest Service and Tribes, the proposed APE was discussed, and comments were incorporated into the revised TRI 1 – Tribal Resources TSP.

The initial APE for the purposes of study implementation is defined as the area within the FERC Project boundary, a 25-foot buffer from the centerline of the access trails located outside of the FERC Project boundary, and a 50-foot radius around FERC ancillary facilities such as gauges located outside of the FERC Project boundary. The Tribal resources study area is a 5-mile radius around the APE (Map 7.13-1). This study area was a guide for archival research, development of the historic context and background statements, and general Tribal informant interviews.

SCE, as the non-federal representative for NHPA Section 106 consultation for FERC, submitted the proposed APE and study area to the State Historic Preservation Officer (SHPO) on July 16, 2024. The SHPO agreed in letter dated August 30, 2024, with the delineation of the current APE and study area but reserved the right to consult on its expansion should planned studies or consultation identify cultural resources that extend beyond the FERC Project boundary or otherwise are found to be affected by the Project (Office of Historic Preservation [OHP] 2024).

7.13.2 Affected Environment

See Section 7.12, *Cultural Resources* for a description of the affected environment including environmental, precontact, ethnographic, and historic contexts for the Project APE and study area.

7.13.2.1 Information Sources

This section was developed using existing information available in the following primary sources. Additional references are cited in the text, as appropriate.

Archival Research

Archival research was conducted at repositories to obtain additional information specific to the prehistory, ethnography, and history associated with the study area. This information was used to create an American Indian ethnohistory including maps depicting Tribal territories and traditional use areas in the study area. Archival research was also used to develop the Tribal resources historic context for identification of Tribal resources within the APE and evaluation of these resources for the NRHP.

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ARCHIVAL REPOSITORIES VISITED

The following repositories were visited:

- Annie Mitchell Local History Research Room, Tulare County Library, Visalia
- Kern County Library's Beale Memorial Library, Bakersfield
- California State Library, California History Room
- Harrington (n.d.) field notes
- Kern Valley Historical Society and Museum, Kernville
- Sequoia National Forest archives
- SCE Archive (Huntington Library)
- University of California, Berkeley, Bancroft Library (many publications online); (Waterman n.d.)
- Yosemite National Park Research Center

ADDITIONAL INFORMATION SOURCES

- The Native American Heritage Commission Sacred Lands File search and Native American Consultation List (Native American Heritage Commission [NAHC] 2022) identified 14 Tribal groups with affiliation to the study area. An updated list received in June 2025 listed additional Tribal contacts (NAHC 2025).
- Nineteen cultural affiliations/heritage associations were identified by extracting data from mid- to late twentieth-century ethnographic work in the study area.
- Critical archival resources include work by Gehr and Conlan (1984); Harrington notes (n.d.)—Yokuts and Tubatulabal Reels; Stephen Powers (1976); Smith (1978); C. Voegelin (1935a, 1935b); E. Voegelin (1938); Kroeber (1907, 1925); Latta (2014); Gayton (1948); Wallace (1978); Spier (1978); Waterman (n.d.); and Garfinkel and Williams (2011).
- Local historian Bob Powers (1979, 1989, 1990, 1991) provided extensive summaries of historical and American Indian issues in the region.
- The Garcés Diary (Coues 1900) of pre-statehood exploration in the study area provided details about lifeways, trade patterns, and cultural affiliations.
- Research and information from Devlin Gandy, MPhil, RPA Independent Cultural Researcher; Consultant to the Tejon Indian Tribe; Research Collaborator with the Tübatulabal Tribe of Kern Valley provided named places in the study area including

villages, places in local traditional narratives, sacred areas, fishing locales, and hunting and gathering grounds (Gandy 2019, 2025).

These sources, together with interviews and field visits, provided the context for identification and evaluation of Tribal resources within the APE.

7.13.2.2 Meetings and Outreach with Tribal Governments

Meetings with Tribal governments/administrators provided Project information to Tribal groups, elicited areas of interest, identified appropriate Tribal contacts, and established protocols for conveying information-gathering activities. From Tribal outreach efforts and archival research, SCE identified 12 Tribes as having potential interests in the Project area. These are listed below (in alphabetical order) with a summary of outreach and participation activities with the Project and Tribal resources study to date (also see Appendix E.4.8):

- Big Pine Paiute Tribe of Owens Valley: no response.
- Chumash Indian Council of Bakersfield: no response.
- Fort Independence Indian Community of Paiute Indians/Fort Independence Reservation: no response.
- Kawaiisu Nation: David Laughing Horse Robinson, Tribal Chair, attended the initial study report meeting on March 19, 2025, and expressed interest in participating in the Tribal resources study and reviewing the draft report.
- Kern Valley Indian Community: Bob Robinson, Tribal Chair, attended the site visit and additional meetings to discuss preliminary results of the study and provided input.
- Kitanemuk & Yowlumne Tejon Indians: no response.
- Lone Pine Paiute-Shoshone Tribe: Kathy Bancroft, THPO, indicated interest in reviewing the draft TSR.
- Santa Rosa Indian Community of The Santa Rosa Rancheria of Tachi Yokut Tribe: no response.
- Tejon Indian Tribe: Curtis Alcantar provided information through emails and a phone call.
- Tübatulabals of Kern Valley: Robert Gomez, Tribal Chair, attended the site visit, additional meetings and provided input throughout the process.
- Tule River Indian Tribe of California: checking internally for information and interest; permitted use of internal study results on Harrington notes.

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- Wuksache Indian Tribe/Eshom Valley Band: no response.

The Tribal resource investigation/study has and will continue to make a good-faith effort at proper communication with Tribal leaders. The results of the study will be filed with the FLA.

Continued consultation and review of the TRI 1 – Tribal Resources TSR with participating Tribes, Forest Service, and SHPO are in progress.

7.13.2.3 Tribal Lands

Tribal lands are defined as all lands within the boundaries of an Indian reservation and all dependent Indian communities (36 CFR § 800.16[x]), and any lands held in trust for any tribe by the United States Bureau of Indian Affairs (BIA). Based on review of BIA data sources, archival research and interviews, there are no Tribal lands located within or adjacent to the FERC Project boundary.

7.13.2.4 Tribal Resources and Interests

Tribal resources and interests have been identified within the APE and study area. Continued consultation with participating Tribes, Forest Service, SHPO, and FERC is ongoing.

7.13.2.5 Traditional Cultural Properties

A TCP is a resource that is eligible for inclusion in the NRHP based on its associations with the cultural practices, traditions, beliefs, lifeways, arts, crafts, or social institutions of a living community. TCPs are rooted in a traditional community's history and are important in maintaining the continuing cultural identity of that community. A TCP must have integrity and meet at least one of the four NRHP eligibility criteria (36 CFR Part 63) to be considered a historic property.

A Native American Heritage Commission Sacred Lands File conducted for the FERC Project boundary and a 1-mile buffer did not identify any Sacred Lands (NAHC 2022). Any potential TCPs identified by the current study will be reviewed by Tribes associated with the TCP, Forest Service, SHPO, and FERC.

7.13.3 Proposed Environmental Measures

Under the Proposed Action, SCE proposes to implement PM&E measures associated with ongoing Project operations and maintenance activities. PM&E measures are designed to protect, maintain, or enhance environmental and cultural and Tribal resources over the term of the new license. SCE proposes implementing the following PM&E measures related to cultural and Tribal resources:

- Historic Properties Management Plan (HPMP)

An adverse effect is defined in the regulations implementing Section 106 (36 CFR § 800.5(a)(1)). Pursuant to that definition, an adverse effect is found when an undertaking

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may alter, directly or indirectly, any of the characteristics of a historic property that qualify the property for inclusion in the NRHP in a manner that would diminish the integrity of the property's location, design, setting, materials, workmanship, feeling, or association. A resource that has not yet been evaluated for the NRHP is assumed eligible for listing and treated as historic property until determined otherwise.

Section 106 requires that every federal agency "take into account" how each of its undertakings could affect historic properties. Historic properties are districts, sites, buildings, structures, TCPs, and objects significant in American history, architecture, engineering, and culture that are eligible for inclusion in the NRHP. SCE currently implements a Cultural Resources Management Plan (Taylor 1993) to manage potential effects to cultural resources from Project operations and maintenance activities. SCE will develop an HPMP as an update to the Cultural Resources Management Plan that will incorporate the results from the cultural and Tribal resource studies conducted for relicensing, concurrence on eligibility received from the SHPO and measures to avoid, minimize, or mitigate adverse effects to cultural resources from operations and maintenance activities. The Draft HPMP will be developed and reviewed in consultation with the Forest Service, Tribes, and SHPO and will outline implementation procedures such as management roles and responsibilities, Tribal and agency consultation, Project review requirements, annual meetings, and reporting, as well processes for revision of the HPMP and dispute resolution.

7.13.4 Potential Project Effects

This section describes the potential effects to Tribal resources that could occur because of continued operations and maintenance activities to be implemented under the Proposed Action. Potential effects are determined by analyzing the changes in Tribal resources that may result from activities implemented under the Proposed Action (Section 5.2) compared to the No-Action Alternative (existing condition) (Section 5.1). Final effects determinations consider PM&E measures to be included under the Proposed Action (refer to Appendix E.1).

Under the Proposed Action, SCE would continue to operate and maintain the Project as described in Section 5.1, *No-Action Alternative*, with minor adjustments to Project operations and maintenance activities in response to implementing proposed PM&E measures. No new or upgraded facilities, structural changes, or operational changes to the Project are proposed.

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Consistent with FERC's Scoping Document 2 (FERC 2023), this section evaluates potential effects of continued Project operations and maintenance activities on the following:

- Historic or archaeological resources, and TCPs that may be eligible for inclusion in the NRHP, or on other areas or places of religious, cultural, and traditional importance to Tribes.[1]

Refer to Section 7.12, *Cultural Resources* for a discussion of the effects to cultural resources.

7.13.4.1 Potential Effects to Tribal Resources from Continued Operation and Maintenance of Project Facilities

To ensure system operability and efficiency, Project facilities are subject to ongoing maintenance, including general repair, replacement of constituent components, electrical and mechanical upgrade, and structural or material reinforcement. Maintenance activities may affect Tribal resources if the activity involves ground disturbance or has the potential to cause indirect effects such as erosion, visual effects, or access issues to Tribal resources.

To protect Tribal resources during operations and maintenance activities, SCE will develop and implement an HPMP that includes Tribal consultation and measures to avoid, minimize, or mitigate adverse effects to Tribal resources from maintenance activities. The HPMP will be developed in consultation with Tribes, the Forest Service, and SHPO.

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[1] As discussed earlier in this section, the Draft TRI 1 – Tribal Resources TSR (Tiley and West 2026) is being reviewed by SCE and will be submitted to the Forest Service and Tribes for review and concurrence with findings. FERC, as the lead agency, makes the final effects determination in consultation with the Forest Service. The SHPO concurs on the effects determination.

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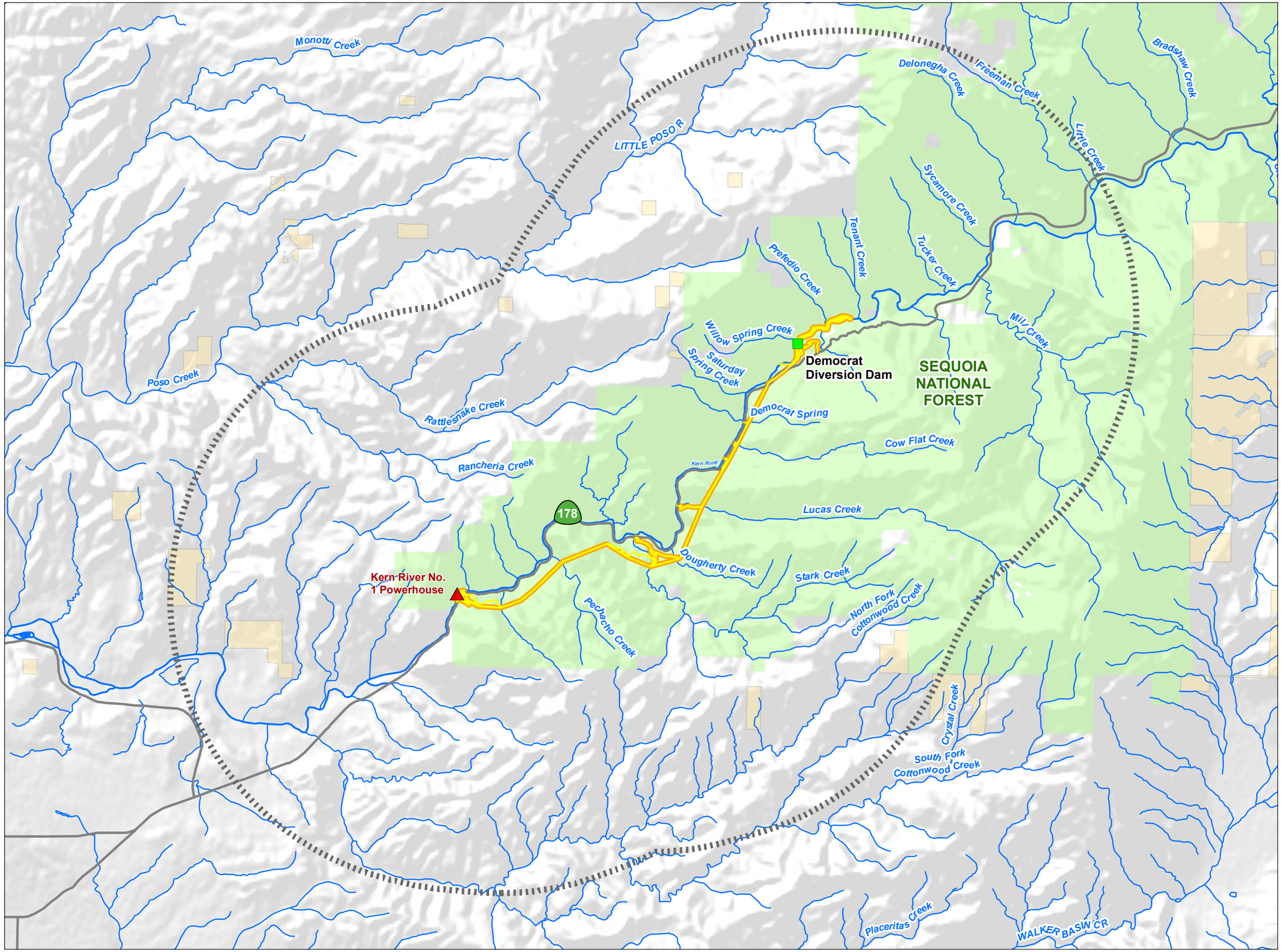
MAPS



Facilities

- Dam
- Powerhouse
- FERC Boundary

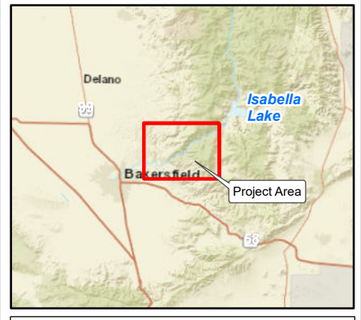
Other Features

- Watercourse
- Highway
- Project APE
- 5 Mile Study Area

Land Jurisdiction*

- U.S. Forest Service
- U.S. Bureau of Land Management
- Private (Blank)

*SOURCE: BLM 2021



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Kern River No. 1 Hydroelectric Project
FERC Project No. 1930

Map 7.13-1

Tribal Resources APE and Study Area

0 1 2 Miles

Projection: UTM Zone 11
Datum: NAD 83

Date: 1/4/2025

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LIST OF ACRONYMS

BLM	United States Bureau of Land Management
cfs	cubic feet per second
FERC	Federal Energy Regulatory Commission
Forest Service	United States Forest Service
Kern EDC	Kern Economic Development Corporation
PM&E	protection, mitigation, and enhancement
Project	Kern River No. 1 Hydroelectric Project
SCE	Southern California Edison
SQF	Sequoia National Forest
SR-178	State Route 178

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7.14 SOCIOECONOMICS

This section provides a general description of the socioeconomic conditions in the vicinity of Southern California Edison's (SCE) Kern River No. 1 Hydroelectric Project (Project), including social and economic conditions, general land use patterns, population patterns, and sources of employment. Refer to Section 7.9, *Land Use* for more information regarding land ownership and management in the Project vicinity and to Section 7.10, *Recreation Resources* for information regarding recreation in the Project vicinity.

Section 7.14.1 describes the affected environment and resource conditions under current Project operation and maintenance (i.e., baseline condition). Section 7.14.2 identifies proposed environmental measures, management, and monitoring plans (collectively referred to as protection, mitigation, and enhancement [PM&E] measures) to be implemented under the Proposed Action (see Appendix E.1 for a full description of proposed PM&E measures). Section 7.14.3 includes an analysis of the potential environmental effects of the Proposed Action, including potential beneficial effects of proposed PM&E measures. Section 7.14.4 describes unavoidable adverse effects of the Proposed Action on socioeconomic resources.

7.14.1 Affected Environment

7.14.1.1 Information Sources

This section was developed using existing, relevant, and reasonably available information in the following primary sources. Additional references are cited in the text, as appropriate.

- Kern Economic Development Corporation, 2024–2025 Kern County Market Overview and Member Directory (Kern Economic Development Corporation [EDC] 2024)
- SCE Pre-Application Document for the Kern River No. 1 Hydroelectric Project (SCE 2023)
- United States Census Bureau, 2020 Decennial Census (United States Census Bureau 2020)
- United States Census Bureau, 2023 American Community Survey 1-Year and 5-Year Estimates Data Profiles (United States Census Bureau 2023)

7.14.1.2 Area Overview

The Project is located along the Kern River in Kern County, California. The Project is situated in the foothills of the western slope of the Sierra Nevada and occupies federal lands within the Sequoia National Forest (SQF), administered by the United States Forest Service (Forest Service).

The nearest populated area to the Project is the City of Bakersfield, which is approximately 15 miles west. There are also several small towns and communities

upstream along the Kern River to the northeast, including the town of Lake Isabella, approximately 20 miles northeast; Bodfish, immediately south of the town of Lake Isabella; Mountain Mesa, along the southern edge of Lake Isabella (and the location of the region's hospital); and the City of Kernville, upstream of Lake Isabella.

State Route 178 (SR-178) is the main transportation route between the metropolitan Bakersfield area and Lake Isabella and provides access to the Project. Within the vicinity of the Project, SR-178 follows along the eastern edge of the Kern River through the canyon.

7.14.1.3 General Land Use Patterns in the Vicinity of the Project

Kern County is California's third largest county by area, encompassing approximately 8,100 square miles at the southern end of the Central Valley. The geography of the county is diverse, containing mountainous areas, agricultural lands, and desert areas. The eastern portion is largely managed by federal and state agencies, including the Bureau of Land Management (BLM), Department of Defense, Forest Service, and the State of California (California State Geoportal 2025). Kern County has 11 incorporated cities; Bakersfield is the largest and serves as the county seat.

7.14.1.4 Population Characteristics

The City of Bakersfield accounted for approximately 45% of the population of Kern County in 2023. The population density in Kern County is 112 people per square mile, which is lower than the California average of 250 people per square mile (United States Census Bureau 2023a).

Between 2020 and 2023, the population of Kern County grew by 0.5%, compared to the 1.5% statewide decline. By comparison, populations of the City of Bakersfield and Lake Isabella both increased between 2020 and 2023 by approximately 2%. Over the same period, the population of the small community of Kernville decreased by 125% (United States Census Bureau 2020, 2023a). In 2023, most of the Kern County population (57%) identified as Hispanic or Latino (of any race) (United States Census Bureau 2023a).

Table 7.14-1 summarizes population trends in the State of California, Kern County, the City of Bakersfield, and key communities located in the vicinity of the Project. Table 7.14-2 summarizes Hispanic or Latino and race demographics in the State of California and Kern County.

7.14.1.5 Housing

Housing ownership, occupancy, and rental vacancy data are used to assess housing needs and to provide an indicator of the economic "climate" within an area. In 2023, the share of owner-occupied units (as compared to renter-occupied units) was approximately 60%. This is higher than the share of owner-occupied units statewide, which was approximately 56% in 2023.

Kern County accounts for approximately 2% of the state's overall housing stock. Table 7.14-3 summarizes housing information for the State of California and Kern County.

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7.14.1.6 Economic Indicators

Economic data including per capita personal income, median household income, unemployment rates, and poverty rates are widely used as indicators of economic and social wellbeing. In 2023, the per capita income in Kern County was $29,201, substantially lower than the statewide average of $48,013. Median household income was also substantially lower in Kern County ($68,893) as compared to the state ($95,521) (United States Census Bureau 2023a).

In 2023, Kern County's average unemployment rate was 8%, higher than the California average of 6%. A higher percentage of Kern County individuals were below the federal poverty level (19%) than in the state overall (12%) (United States Census Bureau 2023a).

Table 7.14-4 presents economic indicators for Kern County and the State of California, including per capita and median household income, unemployment rates, and poverty rates.

7.14.1.7 Employment

Kern County's economy is strongly tied to resource-based industries, particularly agriculture (including farming, forestry, fishing, and hunting) and extractive activities (including mining, quarrying, and oil and gas extraction). Kern County is one of the top agricultural production counties in the United States. In 2022, the gross value of all agricultural commodities produced in Kern County was over $7.72 billion (Kern EDC 2024). Other industries, such as manufacturing, are tied to these primary activities. Kern County's economic output fluctuates in association with changes in oil and gas prices, water supply (droughts) and other factors affecting agriculture.

Table 7.14-5 summarizes the estimated number of full-time employees 16 years of age and over by industry in Kern County (seasonal workers, such as agricultural workers, are not included in these data) and the State of California. The health care, agriculture, and retail industries account for the largest number full-time employees in Kern County (United States Census 2023a).

7.14.2 Proposed Environmental Measures

Under the Proposed Action, SCE proposes to implement PM&E measures associated with ongoing Project operation and maintenance activities that are designed to protect, maintain, or enhance environmental and cultural resources over the term of the new license. No PM&E measures related to socioeconomics are proposed as part of the Project. Appendix E.1 provides complete descriptions of measures SCE is proposing as part of the license application and to include in any new license issued for the Project.

7.14.3 Potential Project Effects

This section describes the potential effects to socioeconomics that could occur because of continued operation and maintenance activities to be implemented under the Proposed Action. Potential effects are determined by analyzing the changes in socioeconomics that may result from activities implemented under the Proposed Action (Section 5.2) compared to the No-Action Alternative (existing condition) (Section 5.1). Final effects

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determinations consider PM&E measures to be included under the Proposed Action (refer to Appendix E.1).

Under the Proposed Action, SCE would continue to operate and maintain the Project as described in Section 5.1, *No-Action Alternative*, with minor adjustments to Project operation and maintenance activities in response to implementing proposed PM&E measures. No new or upgraded facilities, structural changes, or operational changes to the Project are proposed.

Consistent with the Federal Energy Regulatory Commission's (FERC) Scoping Document 2 (FERC 2023), this section evaluates potential effects of continued Project operation and maintenance on the following:

- Continued Project operations and flow diversions on agriculture and other consumptive uses in the Kern River watershed.
- Any reduction in the amount of water available for irrigation on agricultural production in Kern County.
- Any reduction in the amount of water available for future water supply deliveries to the City of Bakersfield.
- The tourism economy alongside other potential socioeconomic impacts and recreation economics.

7.14.3.1 Potential Effects of Continued Project Operations on Water Availability for Agriculture, Irrigation, and Consumptive Uses

As described in Section 5.1.4.1, *Water Management*, and Section 7.1, *General Description of the River Basin*, the Kern River Watershed consists of two principal forks, the North Fork and South Fork, and a lower portion referred to as the lower Kern River. Both forks flow south and west, respectively, where they converge at Lake Isabella. The Kern River exits Lake Isabella and flows southwest toward the San Joaquin Valley and terminates in Buena Vista Lake about 20 miles southwest of Bakersfield.

There are six FERC-licensed hydroelectric projects located on the Kern River. Above Lake Isabella, SCE owns and operates the 40.2-MW Kern River No. 3 Project (FERC Project No. 2290) located on the North Fork of the Kern River.

At or below Lake Isabella, there are five more FERC-licensed hydroelectric projects on the Kern River: the Project; the Isabella Hydroelectric Project (FERC No. 8377) and the Borel Hydroelectric Project (FERC No. 382) upstream of the Project; and the Kern Canyon Hydroelectric Project (FERC No. 178) and Rio Bravo Hydroelectric Project (FERC No. 4129) downstream of the Project. All of the hydroelectric projects are non-consumptive users of water (refer to Map 5-4).

The Project is operated in a run-of-river mode. Water captured at the Democrat Dam diversion structure is transported through a connecting flowline and penstock to the

powerhouse and then returned to the river through the powerhouse tailrace 10.2 miles downstream. The Project has diversion rights of 412 cubic feet per second (cfs), which is the maximum capacity of the diversion. The Project license requires a minimum instream flow of 50 cfs to be released to the bypass reach from June 1 to September 30 and 15 cfs released between October 1 and May 31, or inflow if lower than the seasonal flow requirement. Project inflow is almost entirely regulated by upstream operations at Isabella Dam, save for accretion flow from a few small tributaries between Isabella and Democrat dams. The amount and timing of flow diverted is a function of releases from Lake Isabella, flowline and powerhouse capacities, and minimum instream flow requirements.

Water exiting the Kern River No. 1 Tailrace is immediately impounded behind the diversion for the Kern Canyon Project. Diverted water from the Kern Canyon Project is released back into the Kern River 1.6 miles downstream at the Kern Canyon Powerhouse and then diverted again approximately 500 feet downstream by the Rio Bravo Project. The Rio Bravo Project returns diverted water back to the Kern River 2 miles downstream at the Rio Bravo Powerhouse. From this point, the Kern River continues downstream into the City of Bakersfield and the California Central Valley where it is almost entirely utilized by consumptive uses. The Kern River terminates at Buena Vista Lake, a landlocked topographical depression located approximately 20 miles southwest of Bakersfield.

Under the Proposed Action, SCE would continue to operate the Project without any major operational changes or new construction. Water availability under existing conditions for downstream agriculture, irrigation, and consumptive uses would not change under the Proposed Action. SCE's operation of the Project would continue to be regulated by upstream operations of Isabella Dam, minimum instream flow requirements would continue, and water would be returned to the river as it is under existing condition. The two downstream Projects would continue to operate under the terms and conditions of their existing FERC licenses. Therefore, the Proposed Action would not result in adverse effects on socioeconomics as it relates to downstream water availability.

7.14.3.2 Potential Effects on Tourism and Recreation Economies

SCE does not own or operate developed recreation facilities in the vicinity of the Project. Recreation facilities and improvements are relatively limited along the lower Kern River due to the steep and rugged topography and the proximity of the highway. Developed recreation facilities along the bypass reach include four Forest Service day use areas and one privately owned recreation site at Democrat Hot Springs. Day use SQF areas are administered by the Forest Service or a concessionaire to the Forest Service. There are also non-Project undeveloped river access points along SR-178, Project access trails, and non-Project Forest Service trails in the vicinity of the Project. Refer to Section 7.10, *Recreation Resources* for additional details and maps.

Under the Proposed Action, SCE would continue to operate the Project without any major operational changes or new construction. Operation and maintenance activities would continue under the existing conditions. Under the Proposed Action, there would be no change in river flows that would affect water-based recreation opportunities, nor would there be any changes that affect recreation at non-Project day use areas and trails. Because the Proposed Action would not change any conditions associated with

recreation or tourism compared to the No-Action Alternative, the Proposed Action would not result in effects to tourism and recreation economies.

7.14.4 Unavoidable Adverse Effects

There are no unavoidable adverse effects to socioeconomics from continued operation and maintenance of the Project under the Proposed Action.

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TABLES

Table 7.14-1. Population Trends (2020–2023)

Geography	Population (2020)	Population (2023)	Population Percent Change (2020–2023)	Land Area (square miles)	Population Density (2023) (population per square mile)
California	39,538,223	38,965,193	-1.5	155,859.20	250.0
Kern County	909,235	913,820	0.5	8,134.70	112.3
• Bakersfield	405,455	413,376	1.9	149.8	2,759.5
• Kernville	1,549	688	-125	12.6	54.6
• Lake Isabella	3,573	3,654	2.2	21.7	168.4
• Remainder of Kern County	498,658	496,102	-0.5	7,951	62.4

Source: 2020 Decennial Census and 2023 American Community Survey 1-Year Estimates, DP05 Demographic and Housing Estimates (United States Census Bureau 2020, 2023a)

Table 7.14-2. Hispanic or Latino and Race (2023)

Demographic Information	California		Kern County	
	Persons	%	Persons	%
Total Population	38,965,193		913,820	
Hispanic or Latino (of any race)	15,760,437	40	522,138	57
Not Hispanic or Latino	23,204,756	60	391,682	43
White alone	12,962,645	33	260,041	29
Black or African American alone	2,004,832	5	43,594	5
American Indian and Alaska Native alone	102,548	0.3	2,500	0.3
Asian alone	6,042,726	16	44,539	5
Native Hawaiian and Other Pacific Islander alone	133,436	0.3	1,312	0.1
Some Other Race alone	259,508	0.7	8,023	0.9
Two or More Races	1,699,061	4	31,673	4

Source: 2023 American Community Survey 1-Year Estimates, DP05 Demographic and Housing Estimates (United States Census Bureau 2023a).

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Table 7.14-3. Housing Occupancy Information (2023)

Geography	Housing Units				Total Housing Units
	Occupied			Vacant	
	Owner-Occupied	Renter-Occupied	Total Occupied		
California	56%	43%	13,699,816	1,062,711	14,762,527
Kern County	60%	40%	289,845	19,787	309,632
• Bakersfield	52%	48%	135,734	8,000	143,734
• Kernville	100%	0%	425	342	767
• Lake Isabella	74%	26%	7,063	2,842	9,905
• Remainder of Kern County	66%	34%	146,623	8,603	155,226

Source: 2023 American Community Survey 5-Year Estimates, DP04 Selected Housing Characteristics (United States Census Bureau 2023b)

Table 7.14-4. Economic Indicators (2023)

Geography	Per Capita Mean Income	Median Household Income	Unemployment Rate of Population 16 Years and Over	Share of Individuals Below Poverty Level
California	48,013	95,521	6%	12%
Kern County	29,201	68,893	8%	19%

Source: 2023 American Community Survey 1-Year Estimates, S1902 Mean Income in the Past 12 Month; S1901 Income in the Past 12 Months; S1701 Poverty Status in the Past 12 Months; DP03 Selected Economic Characteristics (United States Census Bureau 2023a).

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Table 7.14-5. Kern County and California Employment by Industry (2023)

Industry	Estimated Employed Population, 16 Years of Age and Over			
	Kern County		California	
	Persons	%	Persons	%
Agriculture, forestry, fishing and hunting, and mining	45,747	12	379,601	2
Construction	26,922	7	1,258,660	7
Manufacturing	22,836	6	1,684,528	9
Wholesale trade	7,005	2	406,848	2
Retail trade	41,388	11	1,888,499	10
Transportation, warehousing, and utilities	33,788	9	1,186,824	6
Information	4,531	1	553,090	3
Finance, insurance, real estate, and rental and leasing	11,522	3	1,013,177	5
Professional, scientific, management, administrative and waste management services	31,256	8	2,780,335	15
Educational services, health care, and social assistance	81,499	21	4,238,380	22
Arts, entertainment, recreation, accommodation, and food services	35,834	9	1,838,902	10
Other services (except public administration)	16,034	4	914,766	5
Public administration	21,531	6	882,956	5
Total	**379,893**	**100**	**19,026,566**	**100**

Source: 2023 American Community Survey 1-Year Estimates, S2405 Industry by Occupation for the Civilian Employed Population 16 Years and Over (United States Census Bureau 2023a).

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Map 8-1. FERC-Licensed Projects in the Kern River Basin 8-13

LIST OF ACRONYMS

cfs	cubic feet per second
CRWQCB	California Regional Water Quality Control Board
DO	dissolved oxygen
FERC	Federal Energy Regulatory Commission
Forest Service	United States Forest Service
Project	Kern River No. 1 Hydroelectric Project
MW	megawatt
NMFS	National Marine Fisheries Service
SCE	Southern California Edison
SD2	Scoping Document 2
SQF	Sequoia National Forest

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SWRCB	State Water Resources Control Board
TMDL	Total Maximum Daily Load
USACE	United States Army Corps of Engineers

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8.0 INTRODUCTION

A cumulative effect is the effect on the environment that results from the incremental effect of the action when added to other past, present, and reasonably foreseeable future actions, regardless of what agency (federal or non-federal) or person undertakes such other actions. Cumulative effects can result from individually minor but collectively significant actions taking place over a period of time, including hydropower and other land and water development activities.

The Proposed Action is continued operation and maintenance of the Kern River No. 1 Hydroelectric Project (Project), Federal Energy Regulatory Commission (FERC) Project No. 1930, with implementation of proposed new environmental measures, management, and monitoring plans (refer to Appendix E.1).

As shown on Map 8-1, other projects/actions considered in the cumulative effects analysis include:

- Southern California Edison's (SCE) 40.2-megawatt (MW) Kern River No. 3 Project (FERC Project No. 2290) located on the North Fork of the Kern River upstream of Lake Isabella.

- United States Army Corps of Engineer's (USACE) operation and management of Lake Isabella, an upstream reservoir managed primarily for flood control, irrigation water storage, and delivery.

- Isabella Partners' 11.95-MW Isabella Hydroelectric Project (FERC No. 8377), which is located on the downstream toe of the main USACE-owned dam at Lake Isabella and diverts its water at the dam outlet works.

- SCE's 12.0-MW Borel Hydroelectric Project (FERC No. 382). This upstream project is currently non-operational and is in the process of being decommissioned by SCE.[1]

- Kern and Tule Hydro LLC's 11.475-MW Kern Canyon Hydroelectric Project (FERC No. 178), which is immediately downstream of the Kern River No. 1 Powerhouse.

- Olcese Water District's 14.0-MW Rio Bravo Hydroelectric Project (FERC No. 4129), a downstream project, which includes 5,100 acres of land and supplies irrigation water to agricultural lands and a golf course.

- Sequoia National Forest (SQF) maintains recreation facilities and provides for recreational opportunities on United States Forest Service (Forest Service) lands in the vicinity of the Project in accordance with its *Land Management Plan for the Sequoia National Forest* (Forest Service 2023).

[1] SCE filed a Surrender Application with FERC on May 1, 2023 for the Borel Project; FERC's approval of license surrender and decommissioning is pending.

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- Other land and water development activities in the Kern River Basin (e.g., upstream diversions, municipal wastewater discharges, and nonpoint source runoff).

8.1 RESOURCES THAT COULD BE CUMULATIVELY AFFECTED

Resources considered for inclusion in the cumulative effects analysis were identified based on the FERC's Scoping Document 2 (SD2) (FERC 2023) and a review of the technical information developed in support of this Application for New License. For this analysis, water quantity, water quality, fish and aquatic resources, and recreation were identified as resources that may be cumulatively affected by the proposed continued operation and maintenance of the Project in combination with other hydroelectric projects and other activities in the Kern River Basin.

8.1.1 Geographic Scope

The geographic scope for the cumulative effects analysis defines the physical limits or boundaries of the effects on resources from implementation of the Proposed Action when considering effects from other projects/actions. The geographic scope of analysis for cumulatively affected resources is defined by the physical limits or boundaries of: (1) the Proposed Action's effect on the resources, and (2) contributing effects from other hydropower and non-hydropower activities within the Kern River Basin.

The geographic scope for the cumulative effects analysis includes the Kern River Basin from its headwaters to the City of Bakersfield where all flow is diverted for consumptive uses. We chose this geographic scope because the operation and maintenance of the Project, in combination with other hydroelectric projects in the Kern River Basin may affect water quality, water quantity, fish and aquatic resources, and recreational resources in the Kern River.

8.1.2 Temporal Scope

The temporal scope for the cumulative impact analysis defines the length of time analyzed when evaluating resource effects of the Proposed Action in the context of past, present, and reasonably foreseeable future actions. Evaluations of past and future actions are limited by the amount of available information for each resource and by information defining future projects and actions. Based on the anticipated term of the new license for the Project, the temporal scope used for this analysis of reasonably foreseeable future actions is 50 years.

8.2 CUMULATIVE EFFECTS ANALYSIS

8.2.1 Water Quantity

FERC stated in SD2 that hydrology and water availability in the Project bypass reach and downstream of the Project powerhouse could be cumulatively affected by the proposed continued operation and maintenance of the Project in combination with other hydroelectric projects and water usage in the Kern River Basin.

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The Kern River is part of the Tulare Lake Basin, which occupies the southern end of the San Joaquin Valley, and historically included Tulare Lake, which was one of the largest freshwater lakes west of the Mississippi prior to the development of water resource management in California. In years of extreme rainfall, surface water from the basin drains north into the San Joaquin River; otherwise, there is no surface drainage to the San Joaquin River (FERC 2024). The Tulare Lake Basin covers approximately 10.5 million acres and includes the entire area drained by the Kern River. The Tulare Lake Basin is one of the most important agricultural centers in the world (FERC 2024). The Kings, Kaweah, and Tule rivers supply most of the surface water to the Tulare Lake Basin (California Regional Water Quality Control Board [CRWQCB] 2018). Water from the Kern River is principally diverted for agriculture, with minor quantities being diverted to urban areas around Bakersfield and Oildale. At the southern end of the Kern River, water is almost entirely diverted for irrigation and aquifer recharge, with any excess water directed into the California Aqueduct (part of the California State Water Project) or Buena Vista Lake. In addition to agriculture and domestic uses, large areas of land downstream from the Project have also been developed (i.e., water banks) for the purposes of conserving the Kern River and other water supplies not needed for crop irrigation, which has allowed for underground storage of this water for future use (City of Bakersfield 2003).

Hydrology and water availability in the Kern River are primarily influenced by the USACE's operation of Lake Isabella, which is managed primarily for flood control and irrigation water storage and delivery. The USACE will continue to operate Lake Isabella to provide seasonal flows from Lake Isabella that is used to irrigate approximately 1 million acres of agricultural land near the City of Bakersfield. On a smaller scale, reach-specific hydrology in the Kern River is influenced by hydropower operations at four other operational hydropower projects in the lower Kern River (i.e., Kern River No. 3 Project, Isabella Project, Kern Canyon Project, and the Rio Bravo Project). However, these facilities are all non-consumptive and operated as run-of-river projects, which maintains stable river flows and diversion impoundment elevations. Water diverted for generation at these hydropower projects is discharged back into the river system without storing water. Each project has its own operational requirements (e.g., minimum flow requirements, sediment management protocols) set forth by FERC to maintain minimum flows and to pass water downstream.

As described in the Proposed Action and the Minimum Instream Flow Measure, SCE is proposing to provide and maintain the same minimum flows as currently licensed and to continue to operate the Project as a run-of-river facility. SCE's proposed Stream Gaging Plan would allow for minimum instream flows to be monitored and for short-term planned or unplanned deviations to be identified and documented. SCE proposes to continue to divert up to 412 cubic feet per second (cfs) for generation at the Project and to discharge water into the Project tailrace. All water used for generation[2] would be returned to the river at the Project powerhouse, where it would be available to downstream water users for hydropower production, recreation, and agriculture. As such, the Proposed Action would have no cumulative effect on hydrology, water quantity, water availability, or water

[2] Except for incidental, consumptive use at the powerhouse.

use in the bypass reach or in downstream reaches as compared to existing conditions (i.e., the No-Action Alternative).

8.2.2 Water Quality

FERC stated in SD2 that water quality in the Project bypass reach and downstream of the Project powerhouse could be cumulatively affected by the proposed continued operation and maintenance of the Project in combination with other hydroelectric projects and activities in the Kern River Basin.

Most of the Kern River is of high quality and is therefore not classified as impaired under Section 303(d) of the Clean Water Act (State Water Resources Control Board [SWRCB] 2024). According to the Basin Plan (CRWQCB 2018), the Kern River is one of many rivers in the region that is of excellent quality: "*The Kings, Kaweah, Tule, and Kern rivers, which drain the west face of the Sierra Nevada Mountains, are of excellent quality and provide the bulk of the surface water supply native to the Basin."* Lake Isabella, the only section of the Kern River that is listed as impaired under Section 303(d) of the Clean Water Act (SWRCB 2024), is classified as impaired for mercury, dissolved oxygen (DO), and pH. The USACE developed a total maximum daily load (TMDL)[3] for pH in 2021 and expects to complete TMDLs for mercury and DO by 2027 (SWRCB 2024). These TMDLs are expected to reduce daily loading of mercury, minimize low DO conditions, and maintain pH. Isabella Partners, licensee of the Isabella Hydroelectric Project (FERC No. 8377), which is located at Isabella Dam, is required to aerate flows passed through the turbines by venting the draft tube or by injecting oxygen or compressed air to maintain required DO levels in downstream reaches of the Kern River (FERC 2025).

SCE's historical water quality and water temperature studies and the study completed in 2024 as part of the current relicensing for the Project demonstrated that water quality in the Project area met applicable Basin Plan objectives for all parameters, including water temperature, pH, DO, turbidity, suspended sediment, nutrients, dissolved metals, and total metal concentrations (SCE 2025a, SCE 2025b).[4] These data demonstrate that water entering and leaving the Project is of good quality and that Basin Plan objectives are met by existing operation and maintenance of the Project. Data collected by SCE in 2024 showed that levels of methylmercury in fish tissue were consistently equal to or above the state of California's reference criteria for potential effects to women of childbearing age, children, and the general public due to consumption of fish. This, however, is not a Project related effect and is consistent with the mercury impairment in Isabella Lake.

Hydropower dams upstream and downstream of the Project are also required by state and federal regulations to maintain high quality water in the Kern River. SCE has operated the Project in conjunction with other federal and non-federal hydroelectric projects in the Kern River system for nearly a century. Water quality studies completed from 2022 through 2024 as part of the relicensing of the Kern River No. 3 Project on the North Fork

[3] A calculation of the maximum amount of a pollutant allowed to enter a waterbody so that the waterbody will meet and continue to meet water quality standards for a particular pollutant.

[4] Pursuant to FERC's Study Plan Determination, SCE also monitored water quality and water temperature in 2025; the results of 2025 monitoring will be provided in the Updated Study Report, which is due to FERC in March 2026.

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Kern River demonstrated that Basin Plan water quality objectives and surface water quality standards were also met. Some inconsistencies were observed at the Kern River No. 3 Project for two Basin Plan objectives—chemical constituents and DO—that were not attributed to the Project (SCE 2024).

Isabella Partners submitted an amendment application to FERC in 2024 to add a 5 MW minimum flow turbine at Lake Isabella Dam (FERC 2025). FERC recommended in its environmental assessment that the new turbine includes a draft tube vent or oxygen or compressed air injection. With this recommendation, FERC concluded that the proposed amendment would have no effect on water quality following construction. Therefore, water discharging downstream from the Isabella Hydroelectric Project to the lower Kern River is expected to meet Basin Plan DO objectives of 8 milligrams/liter.

Decommissioning of the Borel Project by SCE is not expected to adversely affect water quality because the Borel Project is no longer operational and therefore does not divert flow or affect water quality (FERC 2024). Some increases in turbidity and sediment loading may occur during decommissioning activities, but many of the Borel Project facilities are being left in place and construction will implement best management practices to protect water quality. As such, minimal effects on Kern River water quality are expected from dam surrender and decommissioning of the Borel Project (FERC 2024).

The SQF operates recreational facilities in the Project area (i.e., the Upper Richbar Day Use Area, Lower Richbar Day Use Area, Democrat Dam Raft Take-Out Boating Site, and the Live Oak Day Use Area) and throughout the Kern River Basin. The SQF maintains recreation facilities and provides recreational opportunities on Forest Service lands in the vicinity of the Project in accordance with its *Land Management Plan for the Sequoia National Forest* (Forest Service 2023). A primary forest-wide component of the SQF Land Management Plan is to ensure that:

> *Water quality supports State-designated beneficial uses of water. Water quality is sustained at a level that retains the biological, physical, and chemical integrity of aquatic systems and benefits the survival, growth, reproduction, and migration of native aquatic and riparian species*.

Forest Service objectives identified in the plan related to water quality include, but are not limited to:

- Maintaining or restoring watershed conditions in at least three Hydrologic Unit Code-12 watersheds within 15 years of plan approval based on the watershed condition framework conserving riparian areas,

- Restoring the structure and composition of at least 400 acres in riparian areas within 15 years following plan approval, emphasizing riparian areas that face the most risk from large-scale high-intensity fire, past fire exclusion, or accelerated flooding events associated with climate change.

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- Enhancing or improving conditions on at least five meadows of any size, within 15 years following plan approval.

- Enhancing or restoring the structure, composition, or function of habitat for fisheries and other aquatic species along at least 5 stream miles over a 15-year period.

Implementation of these Forest Service activities is expected to have a positive, cumulative effect on water quality in the Kern River Basin.

While other land and water development activities in the Kern River Basin (e.g., upstream diversions, municipal wastewater discharges, and nonpoint source runoff) in combination with the Proposed Action have the potential to cumulatively affect water quality, the incremental effect of the Proposed Action is expected to be negligible. The Proposed Action (i.e., continued operation and maintenance of the Project, including environmental measures) is not expected to have an adverse, cumulative effect on water quality as it would not introduce new sources of chemical, biological, or thermal pollution, nor would it significantly alter sediment transport, turbidity, or water temperature regimes as compared to existing conditions (i.e., the No-Action Alternative). Ongoing project practices such as controlled forebay draining and sediment management have not resulted in observable degradation of water quality or beneficial uses (SCE 2025a), and future activities are expected to remain consistent with these historical patterns. Additionally, environmental measures proposed under the new license, such as the Sediment Management Plan, Stream Gaging Plan, and Minimum Instream Flow Measure, would support continued compliance with California's water quality objectives and help ensure that Project operations do not contribute to a cumulative degradation of water quality.

8.2.3 Fish and Aquatic Resources

In SD2, FERC identified fish habitat, fishery resources, western pearlshell mussels, fish entrainment, and fish passage as resources that could be cumulatively affected by the proposed continued operation and maintenance of the Project in combination with other hydroelectric projects and activities in the Kern River Basin.

8.2.3.1 Fish Habitat and Fish Resources

SCE is proposing no changes to the operation or maintenance of the Project and would continue to provide suitable minimum instream flows to the bypass reach for target fish and maintain run-of-river operations. The provision of minimum instream flows and run-of-river operations would continue to protect fishery resources in the Democrat Dam Impoundment and bypass reach by maintaining suitable water quality and water temperature, stable water surface elevations, shoreline aquatic and riparian habitat, and suitable aquatic habitat for fish species of management interest such as smallmouth bass (*Micropterus dolomieu*) and hardhead (*Mylopharodon conocephalus*). Hydropower projects in the Kern River upstream and downstream of the Project (i.e., Kern River No. 3 Project, Isabella Project, Kern Canyon Project, and the Rio Bravo Project) are also

required to provide protective river flows and manage operations in a comprehensive manner to produce hydropower while protecting fish habitat and fishery resources. As such, protective river flows and operations as licensed now or as licensed in the future by FERC, including the Proposed Action, are expected to have a negligible cumulative effect on fish and aquatic resources in the Kern River Basin compared to the No-Action Alternative. Decommissioning of the Borel Project by SCE is not expected to affect fish or aquatic habitat because the Borel Project is no longer operational and therefore does not divert flow or affect fish habitat or fishery resources (FERC 2024).

As discussed in Section 7.4, *Fish and Aquatic Resources*, the USACE operates Isabella Dam to provide irrigation water in and around the City of Bakersfield throughout the spring, summer, and fall. Water released from Lake Isabella is used to irrigate approximately 1 million acres of land in Kern County in the San Joaquin Valley. SCE has no control over releases made from Isabella Dam and therefore spills water at Democrat Dam into the bypass reach when inflow exceeds 412 cfs (hydraulic capacity of the turbines) and the minimum instream flow release. As a result, increased flows from Isabella Dam pass into the Project bypass reach and can reduce aquatic habitat suitability for smallmouth bass and hardhead on a seasonal basis (e.g., summer/fall irrigation season). Excess water passed downstream from Isabella Dam may reduce habitat suitability for fish and other aquatic organisms at other hydropower projects in the lower Kern River (e.g., Kern Canyon and Rio Bravo). Fluctuations in river flows due to releases from Lake Isabella may affect spawning or rearing behavior or affect nursery habitats in the lower Kern River Basin. These effects, however, are not related to the Proposed Action.

Aquatic conservation activities planned by the Forest Service pursuant to the SQF Land Management Plan include, but are not limited to:

- Enhancing or restoring the structure, composition, or function of habitat for fisheries and other aquatic species along at least 5 stream miles over a 15-year period.

- Eliminating or mitigating at least one priority barrier to aquatic organism passage or ecological connectivity within 15 years following plan approval.

- Restoring the structure and composition of at least 400 acres in riparian areas within 15 years following plan approval, emphasizing riparian areas that face the most risk from large-scale high-intensity fire, past fire exclusion, or accelerated flooding events associated with climate change.

Implementation of these activities would have a positive, cumulative effect on fish habitat and fishery resources in the Kern River Basin.

8.2.3.2 Western Pearlshell Mussel

Western pearlshell mussel (*Margaritifera falcata*) is a Forest Service watch list species. According to the Xerces Society (2025), western pearlshell mussels were documented in

the upper Kern River above Lake Isabella in 1948 and most recently in 2016 near the Kern River No. 3 Project. Western pearlshell mussels were documented historically (1948) in the lower Kern River (i.e., downstream of Lake Isabella) but were not found in recent surveys (2008–2009) at historical locations (Howard et al. 2015). Operations of hydropower facilities in the Kern River, USACE operations of Lake Isabella, the decommissioning of the Borel Project, conservation actions implemented by the Forest Service, other land and water development activities in the Kern River, and the Proposed Action are not expected to cumulatively affect western pearlshell mussels, given their existing distribution.

8.2.3.3 Fish Entrainment

As described in Section 7.4, *Fish and Aquatic Resources*, the large size of the diversion intakes at the Project are designed to produce low-approach velocities that allow fish to avoid involuntary entrainment by swimming away from the intake. Under the Proposed Action, continued operations and maintenance of the existing Project is expected to have no effect on fish entrainment at the Project as compared to the No-Action Alternative. Entrainment of juvenile largemouth bass could occur at the Project due to their slow swim speeds; however, there is a limited amount of suitable aquatic habitat near the intakes and largemouth bass are not an obligatory migratory species. As such the overall risk of entrainment is low. Based on the high relative density of juvenile and adult largemouth bass captured in Democrat Dam in 2024, there is no evidence of population-level effects from entrainment under existing conditions. Entrainment of juvenile largemouth bass or other fish species may occur at other hydropower projects in the Kern River, thereby exerting a cumulative effect on fishery resources; however, the Proposed Action would not change entrainment in the Kern River compared to the No-Action Alternative. Therefore, there would be no cumulative effect to fish entrainment.

8.2.3.4 Upstream and Downstream Fish Passage

As described in Section 7.4, *Fish and Aquatic Resources*, there are no anadromous fish (i.e., steelhead, coho salmon, Chinook salmon) in the Project area. The southern limit of the Central Valley steelhead range is the Kings River, which is north of the Kern River (National Marine Fisheries Service [NMFS] 2014). All hydropower diversion dams and Lake Isabella Dam create barriers to instream movements of resident fish in the Kern River; however, resident and stocked fish maintain the ability to move volitionally within long, riverine reaches in the lower Kern River, the North Fork Kern River, the South Fork Kern River, and within lakes and impoundments in the watershed. Existing conditions throughout the lower watershed, where the Project is located, provide suitable aquatic habitat for a foothill transitional zone fish assemblage (e.g., native Sacramento sucker, hardhead, and Sacramento pikeminnow, non-native smallmouth bass, hatchery-origin rainbow trout, other centrarchids (bass and sunfish), ictalurids (catfish), and non-native cyprinids (minnows). As such, the Proposed Action in combination with other hydropower operations, USACE operations of Lake Isabella, the decommissioning of the Borel Project, conservation actions implemented by the Forest Service, and other land and water management activities in the Kern River in combination with the Proposed Action are expected to have no cumulative adverse effects on upstream or downstream passage of

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resident fish species or anadromous fish species (given their absence) in the Kern River compared to existing conditions (i.e., the No-Action Alternative).

8.2.4 Recreation

FERC stated in SD2 that recreation could be cumulatively affected by the proposed continued operation and maintenance of the Project in combination with other hydroelectric projects and activities in the Kern River Basin. FERC requested that recreation effects of the Project operation and maintenance be evaluated in relation to:

- Effects of continued Project operation and maintenance on recreation resources.
- Adequacy of existing recreation facilities to meet current and future recreation demand.
- Adequacy of existing Project access to project waters and trails to meet current and future recreation demand.
- Effects of Project operation and maintenance on recreational white water boating use in the Project bypass reach.

Section 7.10, *Recreation Resources*, evaluates the Project's effects on recreation and concludes that continued operation and maintenance of the Project would have no effect on recreation resources compared to the No-Action Alternative. Accordingly, continued operation and maintenance of the Project would not cumulatively contribute to recreation-related effects in combination with other hydroelectric projects and activities in the Kern River Basin. Specifically, continued operation and maintenance of the Project would not result in any substantive change to the existing recreation environment or recreation opportunities compared to existing conditions; would not alter developed facilities or informal river access points along the bypass reach—neither of which are within the FERC Project boundary and both of which adequately meet current and foreseeable recreation needs; and would have no effect on the adequacy of the impoundment above Democrat Dam (the only Project water), which adequately meets current and future recreation demand.

Results from the recreation facility use assessment completed for the relicensing show light recreation use of Project trails, averaging only two to three users per trail per day, indicating that current capacity is adequate and overuse is not an issue (SCE 2025c). Continued operation and maintenance of the Project would have no effect on the adequacy of Project trails to meet either present or foreseeable future recreation demand (e.g., associated with a 12 percent increase in Kern County's population by 2050). Project trails generally function as recreational amenities within the Kern River Basin that may not exist absent the Project, and from this perspective, they contribute positively to the cumulative quantity of recreation resources in the area.

Results from the whitewater boating study completed for the relicensing suggest the bypass reach is not frequently boated, and when it is boated that boaters are mostly

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expert or expedition-level paddlers (SCE 2025d). Whitewater opportunities are naturally constrained both by the difficulty of the whitewater and also by the limited periods when flows are within a boatable range. Project inflow is almost entirely regulated by upstream operations at Isabella Dam, save for accretion flows from a few small tributaries between Isabella and Democrat dams, and suitable flows occur only part of the year—and in some years not at all—depending on individual boaters' minimum and preferred flow levels. As such, boating conditions are largely independent of Project operations. The Project has diversion rights of up to 412 cfs, with the current license requiring minimum instream flows of 50 cfs from June 1 through September 30 and 15 cfs released from October 1 through May 31, or inflow if lower than the seasonal flow requirement. Diversion volumes depend on Lake Isabella releases, flowline and powerhouse capacities, and minimum instream flow requirements. The Proposed Action would maintain existing minimum instream flow requirements and does not propose any other changes that would affect whitewater opportunities. As such, continued Project operation and maintenance is not expected to have any effect on whitewater boating opportunities in the bypass reach, nor would it cumulatively contribute to boating-related impacts in combination with other hydroelectric projects and activities in the Kern River Basin.

8.3 UNAVOIDABLE ADVERSE EFFECTS

No unavoidable cumulative adverse effects are expected as a result of implementation of the Proposed Action.

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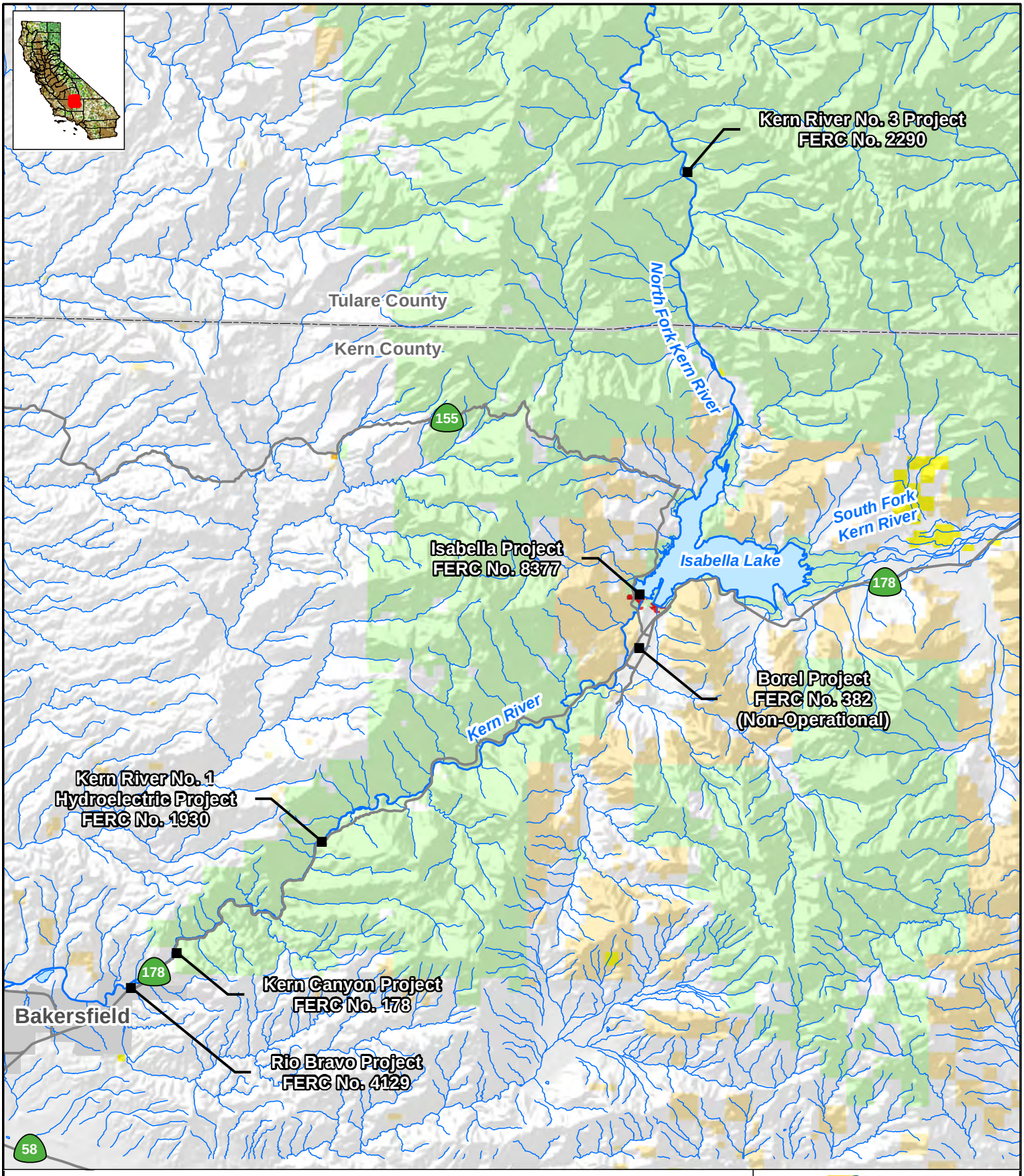
MAPS



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LIST OF ACRONYMS

CFR	Code of Federal Regulations
FERC	Federal Energy Regulatory Commission
FLA	Final License Application
PM&E	protection, mitigation, and enhancement
SCE	Southern California Edison

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9.0 DEVELOPMENTAL ANALYSIS

As specified in the Federal Energy Regulatory Commission's (FERC) content requirements in the Code of Federal Regulations (CFR), Title 18, Section 5.18(b)(5)(ii)(E) (18 CFR § 5.18(b)(5)(ii)(E)), this section compares costs associated with the No-Action Alternative (existing condition) with costs associated with the Proposed Action for the Project. This analysis includes a comparison of economic benefits; costs of new protection, mitigation, and enhancement (PM&E) measures; and power generation between the alternatives.

The power and economic benefits of the Project will be refined as part of the Final License Application (FLA). In addition, the analysis in the FLA will include an estimate of the costs of PM&E measures and a comparison of costs under the Proposed Action with those associated with the No-Action Alternative. In keeping with FERC policy as described in 72 FERC 61,027 (July 13, 1995), this economic analysis is based on current electric power cost conditions and does not consider future escalation of fuel prices in valuing the Project's power benefits.

9.1 NO-ACTION ALTERNATIVE

The No-Action Alternative represents the existing condition as described in Section 5.1, *No-Action Alternative*, of this Exhibit E. Under the No-Action Alternative, Southern California Edison (SCE) would continue to operate and maintain the Project as it currently does under the existing license. SCE would not provide any additional PM&E measures above those provided in the existing license. The annualized operating costs associated with the No-Action Alternative are approximately $4,673,490 (Table 9-1).

9.2 PROPOSED ACTION ALTERNATIVE

Under the Proposed Action, SCE would implement new PM&E measures that are designed to protect or enhance environmental and cultural resources over the term of the new license. *The annualized costs associated with implementation of new PM&E measures will be provided as part of the FLA.*

9.3 COMPARISON OF ANNUAL PROJECT BENEFITS AND COSTS

A summary of the annual cost, power benefits, and annual net benefits for the No-Action Alternative and the Proposed Action will be provided as part of the FLA.

9.4 AIR QUALITY

SCE does not propose substantial new construction for the Project. Therefore, an air quality effects analysis is not required.

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TABLES

Table 9-1. Summary of Annual Costs for the No-Action Alternative

Cost Component	Annual Amount
Capital Cost[1]	$0
New Environmental Measures[2]	$0
Operation and Maintenance[3]	$2,423,037
Depreciation[4]	$1,531,634
Property Tax[5]	$336,997
Administrative and General	$381,822
Total Expense	**$4,673,490**

Notes: [1] Capital costs associated with existing Project facilities are included under operation and maintenance.
[2] Costs associated with existing environmental measures are included under operation and maintenance.
[3] Annual average operation and maintenance costs over the past 5-year period (2020–2024).
[4] Actual depreciation for 2024.
[5] Actual property tax for 2024.

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LIST OF ACRONYMS

cfs	cubic feet per second
FERC	Federal Energy Regulatory Commission
FPA	Federal Power Act
PM&E	protection, mitigation, and enhancement
Project	Kern River No. 1 Hydroelectric Project
SCE	Southern California Edison

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10.0 CONCLUSIONS AND RECOMMENDATIONS

This section (1) compares the developmental and non-developmental effects of the Proposed Action and the No-Action Alternative for Southern California Edison's (SCE) Kern River No. 1 Hydroelectric Project (Project), (2) identifies the recommended alternative, (3) summarizes unavoidable adverse effects, (4) discusses the recommendations of fish and wildlife agencies, (5) describes the Project's consistency with comprehensive plans, and (6) presents a summary of findings and level of significance.

10.1 COMPARISON OF ALTERNATIVES

This section includes a comparison of the developmental and non-developmental effects (resource conditions) resulting from Project operation and maintenance under the Proposed Action and the No-Action Alternative.

10.1.1 Proposed Action Alternative

Overall, the Proposed Action would protect and maintain resource conditions in the vicinity of the Project. The key consideration in developing the Proposed Action was to ensure that future Project operation and maintenance would protect power generation and system capability and reliability, while protecting and maintaining environmental and cultural resources potentially affected by the Project. Resource effects under the Proposed Action are described in detail in Section 7.0, *Environmental Analysis*.

Under the Proposed Action, ongoing Project operation and maintenance activities would continue, and SCE would implement proposed protection, mitigation, and enhancement (PM&E) measures that are designed to protect and maintain environmental and cultural resources over the term of the new license (Appendix E.1). The measures also include new resource protection measures; new monitoring requirements; new resource agency consultation and reporting requirements; and improved compliance mechanisms compared to the No-Action Alternative.

Annual net generation for the Project since issuance of the current license (1999 to 2024) is 132,068 megawatt hours. Under the Proposed Action, Project operations would continue as they currently do under the No-Action Alternative (existing conditions), namely, the Project would continue to be operated in a run-of-river mode with a minimum instream flow requirement of 50 cubic feet per second (cfs) to be released to the bypass reach from June 1 through September 30 and 15 cfs released from October 1 through May 31, or inflow if lower than the seasonal flow requirement. Since there would be no changes to Project operation that would affect energy generation, the average annual net generation under the Proposed Action would be similar to the No-Action Alternative.

Benefits associated with the Proposed Action include:

- Water Use and Hydrology
  - Maintains minimum instream flows below Democrat Dam.

  - Protects existing water uses and water rights.
  - Establishes protocols for stream gaging, compliance, and reporting.
  - Provides a mechanism for the dissemination of real-time flow information to the public.

- Water Quality
  - Maintains beneficial uses, as defined by the State Water Resources Control Board.
  - Maintains water quality and water temperature.

- Fish and Aquatic Resources
  - Protects listed special-status aquatic and amphibian species and their habitat during Project operation and maintenance (e.g., hardhead [*Mylopharodon conocephalus],* northwestern pond turtle *[Actinemys marmorata])*.
  - Maintains minimum instream flows below Democrat Dam that provide fish and aquatic habitat.
  - Establishes methods for monitoring the fish assemblage within the Project area.

- Botanical and Wildlife Resources
  - Protects listed special-status wildlife species and their habitat during Project operation and maintenance (e.g., Kern Canyon slender salamander *[Batrachoseps simatus],* relictual slender salamander *[Batrachoseps relictus]).*
  - Protects special-status plant species and their habitat during Project operation and maintenance (e.g., rose-flowered larkspur [*Delphinium purpusii]).*
  - Maintains SCE's Environmental Screening Process for operation and maintenance activities to determine the level of environmental review required.
  - Maintains SCE's Avian Protection Program that integrates United States Fish and Wildlife Service's guidelines for sensitive raptors, as well as Avian Power Line Interaction Committee guidelines for raptor-safe transmission and power line configurations.
  - Maintains SCE's Environmental Training Program (e.g., Annual Federal Energy Regulatory Commission (FERC) Environmental Training Program and Worker Environmental Awareness Program) to educate workers on the ecological resources in the Project area.

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  - Maintains and protects upland wildlife habitats.
  - Minimizes the potential spread or introduction of non-native invasive plants.

- Geology and Soils
  - Protects soil resources and minimizes erosion.
  - Reduces the potential for soil contamination.
- Geomorphology
  - Maintains sediment transport in the bypass reach.
- Wetland, Riparian, and Littoral Habitats
  - Protects wetland, riparian, and littoral habitats during maintenance activities.
  - Reduces the potential spread or introduction of non-native invasive plant species to wetland, riparian, and littoral habitats.
- Land Use
  - Ensures that only land that is necessary for Project operation and maintenance is encompassed by the Federal Energy Regulatory Commission (FERC) Project boundary.
  - Maintains consistency with established land management plans and policies, as well as land use designations.
- Recreation Resources
  - Maintains recreation access and opportunities.
- Aesthetics
  - Ensures consistency with established visual quality objectives, including visual screening and use of neutral paint colors.
  - Maintains aesthetic opportunities along the Democrat Dam Bypass Reach.
- Cultural and Tribal Resources
  - Protects cultural and Tribal resource during Project operation and maintenance activities.

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  - Establishes clear protocols for protection and management of cultural and Tribal resources, including identification, protection, and evaluation for inclusion in the National Register of Historic Places.

  - Establishes protocols for environmental review of Project operation and maintenance activities to ensure protection of cultural and Tribal resources.

  - Includes periodic resource condition monitoring and reporting.

- Socioeconomics

  - Contributes to low-cost, renewable power availability for the local and regional population.

10.1.2 No-Action Alternative

The No-Action Alternative would maintain the existing baseline conditions with no improved or updated protections to resources (status quo). The Project would continue to operate under the current license conditions. No new environmental or cultural measures would be implemented.

10.2 COMPREHENSIVE DEVELOPMENT AND RECOMMENDED ALTERNATIVE

Section 4(e) of the Federal Power Act (FPA) requires FERC to—in addition to the power and development purposes for which licenses are issued—give equal consideration to the purposes of energy conservation; the protection, mitigation of damage to, and enhancement, of fish and wildlife (including related spawning grounds and habitat); the protection of recreational opportunities; and the preservation of other aspects of environmental quality. Further, Section 10(a) of the FPA requires that a project, as licensed, be in the judgment of FERC, best adapted to a comprehensive plan for improving or developing a waterway for beneficial public purposes. The following describes the basis for selecting the Proposed Action as the preferred alternative.

While in the No-Action Alternative, the status quo would be maintained the Proposed Action is better adapted to a comprehensive plan for improving or developing a waterway for beneficial public purposes based on FERC's mandate under the FPA. The Proposed Action would also result in a better balance between developmental and non-developmental resources compared to the No-Action Alternative.

The Proposed Action is recommended as the preferred alternative because (1) issuance of a new hydropower license by FERC would allow SCE to continue operating the Project as a beneficial and dependable source of clean renewable electric energy; and (2) it includes recommended PM&E measures that would protect and maintain environmental and cultural resources in the vicinity of the Project.

10.3 UNAVOIDABLE ADVERSE EFFECTS

Unavoidable adverse effects on environmental resources under the Proposed Action were evaluated for each resource area (refer to individual resource areas in Section 7.0,

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Environmental Analysis). The Proposed Action would result in no unavoidable adverse effects on environmental resources.

10.4 SUMMARY OF RECOMMENDATIONS OF FISH AND WILDLIFE AGENCIES

The Proposed Action considers input from federal and state resource agencies, Tribes, non-governmental organizations, and members of the public acquired during consultation activities completed for relicensing of the Project. No formal recommendations from fish and wildlife agencies have been submitted to date. Therefore, the Proposed Action represents only SCE's recommended PM&E measures.

10.5 CONSISTENCY WITH COMPREHENSIVE PLANS

Section 10(a)(2)(A) of the FPA requires FERC to consider the extent to which a project is consistent with federal or state comprehensive plans for improving, developing, or conserving a waterway or waterways affected by the project. In addition, 18 Code of Federal Regulations Section 5.6(b)(2) requires that a potential applicant exercise due diligence in determining what information exists that is relevant to describing a project's existing environment, including a review of federal and state comprehensive plans filed with FERC and listed on FERC's website.

The comprehensive plans listed in Section 10.5.1 below are relevant to the relicensing of the Project based on a review of FERC's most recent *List of Comprehensive Plans* (FERC 2025) and a review of other relevant planning documents. The potential effects of the Proposed Action will be evaluated with respect to each of these comprehensive plans as the relicensing process proceeds. The purpose of the evaluation will be to ensure that operation and maintenance of the Project is consistent with the goals and objectives outlined in these comprehensive plans.

On April 27, 1988, FERC issued Order No. 481, establishing that FERC will accord FPA Section 10(a)(2)(A) comprehensive plan status to any federal or state plan that:

- Is a comprehensive study of one or more of the beneficial uses of a waterway or waterways;
- Specifies the standards, the data, and the methodology used; and
- Is filed with the Secretary of FERC.

10.5.1 Relevant Plans from FERC's List of Comprehensive Plans

FERC currently lists 115 federal or state and Tribal Comprehensive Management Plans for the State of California (FERC 2025). Of these listed plans, nine pertain to the Project, three of which have been updated since the FERC (2025) list was published. These updated plans are marked with an asterisk (*).

1. California Department of Fish and Game. 2003. Strategic Plan for Trout Management: A Plan for 2004 and Beyond. Sacramento, California. November 2003.

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2. *California Department of Fish and Wildlife. 2015. California Wildlife: Conservation Challenges, California State Wildlife Action Plan. Sacramento, California.[1]

3. California Department of Fish and Wildlife. 2008. California Aquatic Invasive Species Management Plan. Sacramento, California. January 18, 2008.

4. *California Department of Parks and Recreation. 2012. Survey on Public Opinions and Attitudes on outdoor Recreation in California. Sacramento, California. January 2014.[2]

5. *California State Water Resources Control Board. 2018. Water Quality Control Plan for the Tulare Lake Basin. Sacramento, California.[3]

6. California State Water Resources Control Board. 2015. ISWEBE Plan: Water Quality Control Plan for Inland Surface Waters, Enclosed Bays, and Estuaries of California. Sacramento, California. April 2015. [Amended May 2017 and August 2018.]

7. Forest Service. 2023. Land Management Plan for the Sequoia National Forest. Pacific Southwest Region. May.

8. National Park Service. 1993. The Nationwide Rivers Inventory. Department of the Interior, Washington, D.C.

9. United States Fish and Wildlife Service. No Date. Fisheries USA: The Recreational Fisheries Policy of the United States Fish and Wildlife Service. Washington, D.C.

The relevant plan goals and objectives, applicability to the Project, and Project compatibility are summarized in Table 10-1. No inconsistencies between these plans and the proposed operation and maintenance of the Project were found.

10.6 REFERENCES

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[2] https://www.parks.ca.gov/pages/1008/files/spoa_2012_january_2014.pdf
[3] https://www.waterboards.ca.gov/rwqcb5/water_issues/basin_plans/tularelakebp_201805.pdf

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TABLES

Table 10-1. Relevant Comprehensive Management Plans

Comprehensive Plan Name	Relevant Plan Goals and Objectives	Applicability to Project	Project Compatibility
California Department of Fish and Game.[1] 2003. Strategic Plan for Trout Management: A Plan for 2004 and Beyond. Sacramento, California. November 2003.	This plan provides diverse angling and recreational opportunities.	CDFW currently stocks rainbow trout twice annually at three locations within the Kern River Canyon, including in the bypass reach near the Richbar picnic areas. Most of the lower Kern consists of stocked rainbow trout with wild populations of bass and brown trout. The primary recreational activity in the Project area is fishing, and angling access is scattered throughout the bypass reach.	The lower Kern River supports stocked rainbow trout and some populations of wild brown trout. The rainbow trout population is essentially a put-and-take fishery, with no known natural recruitment (see Sections 7.4, *Fish and Aquatic Resources*; 7.7, *Recreation Resources*; and 7.8, *Land Use Management and Resources*).
California Department of Fish and Game[1]. 2015. California Wildlife: Conservation Challenges, California's Wildlife Action Plan. Sacramento, California.*	This plan is meant to maintain and increase ecosystem and native species distributions in California, while sustaining and enhancing species abundance and richness and enhancing ecosystem conditions, functions, and processes.	The Project releases streamflow into the Democrat Dam Bypass Reach on the Kern River that affect stream conditions.	The Proposed Action includes streamflow releases into the Kern River that reflect the natural stream conditions to protect and enhance native species, their habitats, and environmental processes. The Project has a negligible effect on terrestrial habitat outside of road/trail prisms (see Sections 7.2, *Water Use and Hydrology*; 7.3, *Water Quality*; 7.4, *Fish and Aquatic Resources*; and 7.5, *Botanical and Wildlife Resources*).

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Comprehensive Plan Name	Relevant Plan Goals and Objectives	Applicability to Project	Project Compatibility
California Department of Fish and Wildlife. 2008. California Aquatic Invasive Species Management Plan. Sacramento, California. January 18, 2008.	This plan is meant to minimize and prevent the introduction and spread of aquatic invasive species into and throughout the waters of California.	While the Project does not include recreation facilities, the public access points and Forest Service recreation facilities in Democrat Impoundment and along the bypass reach present a risk of the introduction of aquatic invasive species.	Few observations of aquatic invasive species have been recorded within the Project bypass reaches. Section 7.4, *Fish and Aquatic Resources*, provides additional information regarding the presence and habitat suitability of aquatic invasive species in the vicinity of the Project.
California Department of Parks and Recreation. 2012. Public Opinions and Attitudes on outdoor Recreation in California. Sacramento, California. March.*	An understanding of outdoor recreation demands, patterns, preferences, and behaviors of California residents is essential to develop policies, programs, services, access, and projections of future use.	Land ownership within the Project is predominantly composed of federal land administered by SQF.	The Project does not include any developed recreation facilities. The Forest Service owns and operates recreation facilities in the vicinity of the Project and along the bypass reach. Section 7.9, *Land Use*, and Section 7.10, *Recreation Resources*, provide additional information regarding the land use and recreation in the vicinity of the Project.

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Comprehensive Plan Name	Relevant Plan Goals and Objectives	Applicability to Project	Project Compatibility
California State Water Resources Control Board. 2018. Water Quality Control Plan for the Tulare Lake Basin. Sacramento, California. Revised May 2018 (with Approved Amendments).	Beneficial uses are critical to water quality management in California. State law defines beneficial uses of California's waters that may be protected against quality degradation to include (and not be limited to) "...domestic; municipal; agricultural and industrial supply; power generation; recreation; aesthetic enjoyment; navigation; and preservation and enhancement of fish, wildlife, and other aquatic resources or preserves" (Water Code Section 13050(f)). Protection and enhancement of existing and potential beneficial uses are primary goals of water quality planning.	Waterbodies within the Project fall under the jurisdiction of the Central Valley Regional Water Quality Control Board.	Streams and impoundments associated with the Project conform to regulatory water quality objectives and standards. No persistent, widespread water quality issues are present (see Section 7.3, *Water Quality*).
California State Water Resources Control Board. 2015. ISWEBE Plan: Water Quality Control Plan for Inland Surface Waters, Enclosed Bays, and Estuaries of California. Sacramento, California. April 2015. [Amended May 2017 and August 2018.]	• Trash shall not be present in inland surface waters, enclosed bays, estuaries, and along shorelines or adjacent areas in amounts that adversely affect beneficial uses or cause nuisance. • Sport fish water quality objectives for mercury apply to waters with the beneficial uses of COMM, CUL, WILD, or MAR. • Bacteria water quality objectives apply to waters with a REC-1 beneficial use.	• Trash and waste may be generated from recreationists, at non-Project recreation facilities, including the Democrat Raft Take-Out and locations along the Democrat Dam bypass reach. • Waterbodies within the FERC Project boundary and affected reaches have beneficial use designations as POW, REC-1, REC-2, WARM, COLD, WILD, RARE.	• Forest Service recreation sites in the vicinity of the Project provide receptacles for trash. Waste removal is coordinated with the SQF. • As part of the relicensing process, a water quality study was undertaken to assess Project waters. The Project does not contribute to mercury or bacteria levels in the waterways. Draft results of the study are provided in Section 7.3, *Water Quality*.

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Comprehensive Plan Name	Relevant Plan Goals and Objectives	Applicability to Project	Project Compatibility
Forest Service. 2023. Land Management Plan for the Sequoia National Forest. Pacific Southwest Region. May.	SQF land and management themes include management of a full spectrum of resources (biological, cultural, and land use and management).	Land ownership within the Project is predominantly composed of federal land administered by SQF.	Within the national forest, SCE's land management is directed by the FERC license order and Project resource management plans. National Forest System lands within and adjacent to the FERC Project boundary are managed by SQF, in accordance with the current Land Management Plan for the Sequoia National Forest.
National Park Service. 1993. The Nationwide Rivers Inventory. Department of the Interior, Washington, D.C.	The Nationwide Rivers Inventory is a listing of more the 4,500 free-flowing river segments in the United States that have been identified as eligible or potentially eligible for inclusion in the National Wild and Scenic Rivers System. Nationwide Rivers Inventory river segments possess one or more regionally or nationally significant "outstandingly remarkable" natural or cultural values.	The Forest Service has identified the lower Kern River from Lake Isabella 31 miles downstream to the canyon mouth above Bakersfield (inclusive of the Project area) as a river that meets Wild and Scenic eligibility requirements. The Democrat Dam bypass reach was identified in 2024 as having outstandingly remarkable values of recreational, scenic, and wildlife.	The segment of the Kern River within the FERC Project boundary is not Congressionally designated as a Wild and Scenic River. Implementation of the Proposed Action would have no impact on the eligibility status of the lower Kern River.

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USFWS. No Date. Fisheries USA: The Recreational Fisheries Policy of the USFWS. Washington, D.C.	This policy is meant to conserve, restore, and enhance aquatic systems to provide for increased recreational fishing opportunities nationwide.	Democrat Impoundment and the bypass reach provide recreational fishing opportunities.	Democrat Impoundment and the bypass reach are utilized by angling recreationists throughout the year (see Sections 7.4, *Fish and Aquatic Resources*; 7.9, *Land Use*; and 7.10, *Recreation Resources*). CDFW currently stocks rainbow trout at three locations within the Kern River Canyon (Democrat to Live Oak; Sandy Flat to Democrat Beach; and Keyesville below Isabella).

Notes: [1] CDFG is the predecessor name to CDFW; state legislature changed the name to CDFW in January 2013.

Key: CDFW = California Department of Fish and Wildlife
COLD = Cold Freshwater Habitat
COMM = Commercial and Sport Fishing
CUL = Tribal Tradition and Cultural
FERC = Federal Energy Regulatory Commission
Forest Service = United States Forest Service
POW = Hydropower Generation
MAR = Marine Habitat
RARE = Rare, Threatened, or Endangered Species
REC-1 = Water Contact Recreation
REC-2 = Non-Contact Water Recreation
SCE = Southern California Edison
SQF= Sequoia National Forest
USFWS = United States Fish and Wildlife Service
WARM = Warm Freshwater Habitat
WILD = Wildlife Habitat

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