SOUTHERN CALIFORNIA EDISON

Kern River No. 3 Hydroelectric Project (FERC Project No. 2290)

DRAFT LICENSE APPLICATION VOLUME II

Energy for What's Ahead℠

July 2024

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SOUTHERN CALIFORNIA EDISON

Kern River No. 3 Hydroelectric Project
(FERC Project No. 2290)

Draft License Application
Volume II

Southern California Edison
2244 Walnut Grove Avenue
Rosemead, CA 91770

July 2024

Support from:

ERM

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LIST OF EXHIBITS

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SOUTHERN CALIFORNIA EDISON

Kern River No. 3 Hydroelectric Project (FERC Project No. 2290)

EXHIBIT E: ENVIRONMENTAL REPORT DRAFT LICENSE APPLICATION

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TABLE OF CONTENTS

Page

LIST OF TABLES

LIST OF FIGURES

LIST OF APPENDICES

LIST OF ACRONYMS AND ABBREVIATIONS

°C	degree Celsius
°F	degree Fahrenheit
µg/L	microgram per liter
ACS	American Community Survey
ADI	Area of Direct Impact
AF	acre-foot
amsl	above mean sea level
AoR	Area of Review
APE	Area of Potential Effects
BD	below laboratory detection
BLM	Bureau of Land Management
BMI	benthic macroinvertebrate
BMP	best management practice
cal BP	calibrated years before present
CAL FIRE	California Department of Forestry and Fire Protection
CalEPA	California Environmental Protection Agency
Cal-IPC	California Invasive Plant Council
CALVEG	Classification and Assessment with Landsat of Visible Ecological Groupings
CBG	Census Block Group
CC	chemical constituent
CDC	Centers for Disease Control and Prevention
CDFW	California Department of Fish and Wildlife
CEFF	California Environmental Flows Framework
CEII	Critical Electric/Energy Infrastructure Information
CFR	Code of Federal Regulations
cfs	cubic feet per second
CFU	colony forming units
CMP	Comprehensive Management Plan
CNDDB	California Natural Diversity Database
CRMP	Cultural Resources Management Plan
CSCI	California Stream Condition Index

CT	Census Tract
CUI	Controlled Unclassified Information
CWA	Clean Water Act
CZMA	Coastal Zone Management Act
DAC	Disadvantaged Communities
DCG	developed campground
DKA	Davis-King & Associates
DLA	Draft License Application
DO	dissolved oxygen
DPR	Department of Parks and Recreation
DPS	Distinct Population Segment
EAP	Emergency Action Plan
EFH	essential fish habitat
EJ	environmental justice
EJScreen	Environmental Justice Screening and Mapping Tool
ESA	Endangered Species Act
FERC	Federal Energy Regulatory Commission
FGV	fine-grained volcanic
FLA	Final License Application
Forest Service	U.S. Forest Service
FPA	Federal Power Act
FW	Far Western Anthropological Research Group, Inc.
GHG	greenhouse gas
GPS	Global Positioning System
HAER	Historic American Engineering Records
HPMP	Historic Properties Management Plan
HRA	Historical Research Associates, Inc.
HUC	Hydraulic Unit Code
ID	identification
IFIM	instream flow incremental methodology
ILP	Integrated Licensing Process
IPaC	Information for Planning and Consultation
KOP	key observation point

KR&LAEP	Kern River and Los Angeles Electric Power Company
KR3	Kern River No. 3
KR3HD	Kern River No. 3 Historic District
kV	kilovolt
LMP	Land Management Plan
MCL	maximum contaminant levels
mg/L	milligrams per liter
MIF	minimum instream flow
mL	milliliters
mm	millimeter
MOU	Memorandum of Understanding
MPN	most probable number
MW	megawatt
MWh	megawatt-hour
NAHC	Native American Heritage Commission
NEPA	National Environmental Policy Act
NERC	North American Electric Reliability Corporation
NFKR	North Fork Kern River
NHPA	National Historic Preservation Act
NMFS	National Marine Fisheries Service
NNIP	non-native invasive plant
NPS	National Park Service
NRHP	National Register of Historic Places
NVUM	National Visitor Use Monitoring Program
O&M	operations and maintenance
ORV	outstanding remarkable value
PA	Programmatic Agreement
PAD	Preliminary Application Document
PCT	Pacific Crest Trail
PHD	Palegewan Heartland District
PL&P	Pacific Light & Power Company
PQS	Professional Qualification Standards
PRIV	Privileged

Project	Kern River No. 3 Hydroelectric Project (FERC Project No. 2290)
RD	Recreation Day
RM	River Mile
SB	Senate Bill
SCE	Southern California Edison
SCORP	Statewide Comprehensive Outdoor Recreation Plan
SD1	Scoping Document 1
SD2	Scoping Document 2
SFKR	South Fork Kern River
SHPO	State Historic Preservation Office
SOI	Secretary of the Interior
SQF	Sequoia National Forest
State Water Board	State Water Resources Control Board
SUP	Special Use Permit
TCP	Traditional Cultural Property
TR	Tiley Research
TSR	Technical Study Report
TWG	Technical Working Group
USACE	U.S. Army Corps of Engineers
USC	United States Code
USEPA	U.S. Environmental Protection Agency
USFWS	U.S. Fish and Wildlife Service
USGS	U.S. Geological Survey
USR	Updated Study Report
WECC	Western Electricity Coordinating Council
WQC	Water Quality Certificate
WY	water year
YBP	years before present
YOY	young-of-year

1.0 INTRODUCTION

Southern California Edison (SCE or Licensee) 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. 3 (KR3) Hydroelectric Project (Project), FERC Project No. 2290. Pursuant to FERC regulations in the Code of Federal Regulations, 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 July 3, 2024. The deadline to file the USR is October 11, 2024. 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 October 9, 2023, 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 impacts of Project operation and maintenance (O&M) 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, recreational, and cultural resources.

This Exhibit E was developed from information summarized in SCE's Preliminary Application Document (PAD) along with additional information collected during implementation of the FERC-approved Revised Study Plan, which consisted of 20 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 type of license the Licensee 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.
- 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 (also referred to the proposed Project), including any changes to Project

facilities, how SCE would operate the Project, and introduces environmental measures, management plans, and programs associated with the proposed Project.

- 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 Project—including proposed environmental measures—on environmental, recreation, 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 O&M. 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.

- Section 11.0, *References*, presents a comprehensive list of all the sources cited in Exhibit E.

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

- Appendix E.1, *Proposed Environmental Measures, Management Plans, and Programs*, includes measures proposed by the Licensee to protect and in some cases enhance environmental and cultural resources affected by the proposed Project and to mitigate any potential adverse effects on those resources. Collectively, these are referred to as environmental measures.

- Appendix E.2, *Resource Technical Memorandum*, include data and information collected during the Integrated Licensing Process (ILP) associated with the 20 FERC-approved Study Plans.[1] Technical memorandum filed with FERC are included as part

[1] Study Plan Determination, Project No. 2290-122, Accession No. 20221012-3024 (issued Oct. 12, 2022) and Determination on Requests for Study Modifications and New Studies, Project No. 2290-122, Accession No. 20240530-3030 (issued May 30, 2024)

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,[2] only the most recent version of the technical memorandum is included. Additionally, for some studies, multiple technical memoranda were developed and filed with FERC to address different study components. Certain appendices to the technical memorandum contain Controlled Unclassified Information (CUI) and Critical Electric/Energy Infrastructure Information (CEII) and are included in Volume III of this filing. Draft technical memoranda for cultural and Tribal resources contain information regarding sensitive cultural resources and are therefore filed as Confidential and Privileged Information (CUI//CEII//PRIV) in Volume IV of this filing.

- Appendix E.3, *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.

As set forth under 18 CFR § 4.51 and § 5.18(a), as applicable, the remaining exhibits for this filing are organized as follows:

- Volume I (Public)
  - Description of the Project (Exhibit A);
  - Description of Project operations and resource utilization (Exhibit B);
  - Summary of construction history and schedule for any proposed new facilities (Exhibit C);
  - Summary of Project costs and financing, including SCE's estimate of cost for implementing proposed environmental measures (Exhibit D);
  - Project maps depicting the FERC Project Boundary (Exhibit G);
  - Description of the need for the electricity provided by the Project, availability of electrical energy alternatives, and other miscellaneous information (Exhibit H).
- Volume IV (CUI//CEII)
  - Design drawings (Exhibit F)

[2] Initial Study Report, Project No. 2290-122, Accession No. 20231010-5229 (filed October 10, 2023)

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2.0 APPLICATION

SCE is applying to FERC for a new license for the existing Project using the ILP. This Application for New License was prepared pursuant to FERC regulations at 18 CFR § 5.16 and § 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 will file an FLA for the Project with FERC on or prior to November 30, 2024, to continue Project O&M under a new license (16 USC § 808(c)(1)).

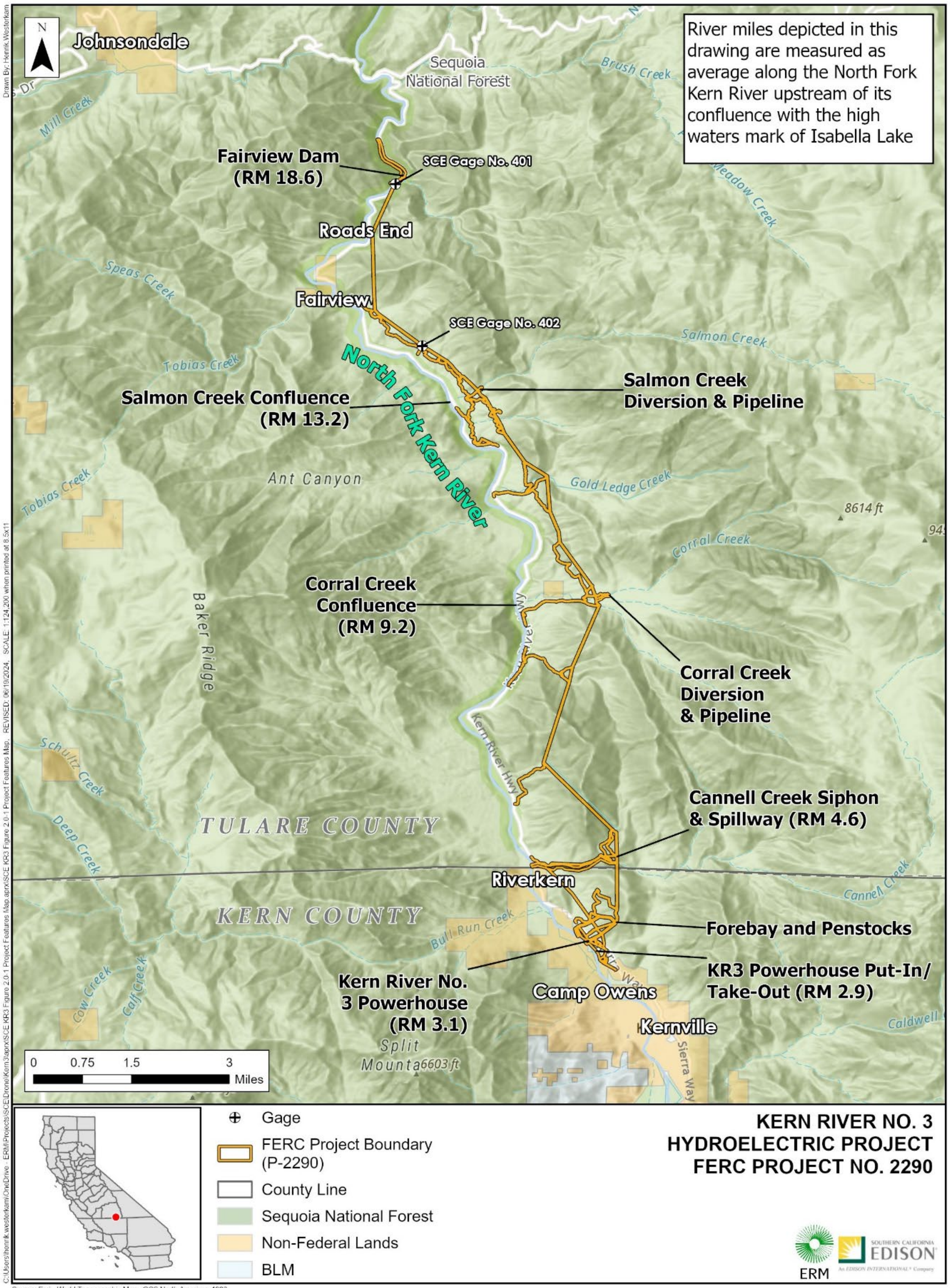
The Project is designated as FERC Project No. 2290 pursuant to the license issued on December 24, 1996, which was subsequently amended in 1997 (81 FERC ¶ 61,162), 2004 (107 FERC ¶ 62,136), and 2019 (166 FERC ¶ 62,049), for a period of 30 years, terminating on November 30, 2026. Because the current license will expire on November 30, 2026, SCE is seeking a license renewal for the continued O&M 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 North Fork Kern River (NFKR) and on Salmon and Corral Creeks near the town of Kernville in Kern and Tulare Counties, California (Figure 2-1). Project facilities are primarily located on federal lands administered by the U.S. Department of Agriculture, U.S. Forest Service (Forest Service), Sequoia National Forest (SQF), and on SCE-owned lands around the KR3 Powerhouse. The installed capacity 40.2-megawatt (MW) run-of-river Project includes the following:

- An intake diversion dam (Fairview Diversion Dam) on the NFKR;
- Two smaller diversion dams and conduits on Salmon and Corral Creeks;
- A water conveyance system consisting of the sandbox, flowline (which includes concrete-lined arched tunnels, covered and open concrete box flumes, and a metal siphon), a forebay, and two penstocks;
- A powerhouse; and
- Ancillary features.

The Project's annual average generation over the term of the current license (1997 to 2023) taking into account wet, dry, and average water years is 118,497 megawatt-hours (MWh); the 5-year average annual production taking into account wet, dry, and average water years is 123,505 MWh. Under the existing Project license, the FERC Project Boundary encompasses 234.57 acres, including 225.2 acres of federal lands administered by the SQF and 9.37 acres of SCE-owned lands. SCE does not propose any Project enhancements to increase Project capacity, nor does it propose any new construction.



BLM = Bureau of Land Management; FERC = Federal Energy Regulatory Commission; RM = River Mile

Figure 2-1. Project Location, FERC Project Boundary, and Project Facilities.

3.0 PURPOSE OF ACTION AND NEED FOR POWER

3.1. PURPOSE OF ACTION

SCE proposes to continue the Project O&M under a new license issued by FERC pursuant to the FPA. If FERC issues a new license, a key component will be the conditions placed in the Project license to ensure compliance with the FPA and other applicable laws. 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 to the power and development purposes for which licenses are issued (e.g., flood control, irrigation, and water supply), FERC must 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); protection of recreational opportunities; and preservation of other aspects of environmental quality.

Issuing a new license for the Project would allow SCE to continue to generate electricity at the Project for the term of a new license, making electric power from a renewable resource available to its customers.

This Environmental Exhibit (this Exhibit E) assesses the effects associated with the Project, 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 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 would provide hydroelectric generation to meet part of SCE's power requirements, resource diversity, and capacity needs. The Project would have an installed capacity of 40.2 MW (36.8 MW estimated dependable capacity) and generate approximately 118,497 MWh (annual average from 1997 to 2023) per year.

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, 2019).

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 in 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 7 percent from 2020 to 2029. The summer peak demand is expected to increase by 9 percent during that same period (WECC, 2021). 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.

3.2.2. CALIFORNIA LEGISLATION

Greenhouse gas (GHG) emissions are regulated in California, and California continues to pursue extensive climate change policies. On September 8, 2016, former Governor Jerry Brown signed Senate Bill (SB) 32, *California Global Warming Solutions Act of 2006: emissions limit*, which extends the state's target to reduce GHG emissions. SB 32 mandates a 40 percent reduction in GHG emissions below 1990 levels by 2030 and built upon the Assembly Bill 32 GHG reduction target to reduce GHG to 1990 levels by 2020. To achieve the SB 32 reductions, the plan is to increase renewable energy use, improve energy efficiency, get more zero-emission vehicles on California's roadways, and curb emissions from key industries.

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 2030 Renewables Portfolio Standard (RPS) requirement to 60 percent with the goal of becoming carbon neutral by 2045 (CARB, 2019). 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 will detail how each utility will meet their customers resource needs, reduce GHG emissions, and ramp up the deployment of clean energy resources (CEC, 2019). SCE has developed a plan called *Pathway 2045* that outlines how SCE will meet carbon neutrality by 2045, which includes the continued operation of SCE's existing hydroelectric fleet (SCE, 2019).

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., can 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*).

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; and (3) provide a source of energy with low-GHG emissions.

In conclusion, power from the Project would help meet a need for power in the WECC in both the short and long-term. The Project provides low-cost power that displaces nonrenewable, fossil-fired generation, and contributes to a diversified generation mix. Displacing the operation of fossil-fueled facilities may avoid some power plant emissions and creates an environmental benefit.

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4.0 STATUTORY AND REGULATORY REQUIREMENTS AND APPLICABLE LAWS

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)

Section 4(e) of the FPA 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 225.2 acres of federal lands within the SQF, which are administered by the Forest Service. FERC will solicit FPA section 4(e) conditions from the Forest Service after the FLA is filed.

4.1.2. Section 10(j) Recommendations

Under Section 10(j) of the FPA, 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 states that FERC is to require the construction, operation, and maintenance by a licensee of such fishways as may be prescribed by the Secretaries of Commerce or the Interior.

FERC will solicit FPA Section 18 prescriptions after the FLA is filed.

4.2. Clean Water Act

Section 401 of the Clean Water Act (CWA) states that any applicant for a federal license or permit to conduct any activities that may result in any discharge into navigable waters requires the applicant to request certification from the state in which the discharge will originate. No federal license or permit shall be granted until the Water Quality Certificate (WQC) required by the CWA Section 401 is obtained from the state agency authorized to administer the CWA, unless the state agency waives the requirement for certification. If a certification is issued, the conditions set forth in a WQC become conditions of the FERC license and FERC must include them in its final Order.

As required by 18 CFR § 5.23(b), SCE will request a water quality certification, 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) requires federal agencies to ensure that their actions are not likely to jeopardize the continued existence of endangered or threatened 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 November 21, 2021, and on that same date designated SCE as the non-federal representative for informal consultation under Section 7. Since this designation, SCE has held conference calls with USFWS to better evaluate possible impacts to those species potentially impacted under the Proposed Action (refer to the summary of consultation included in Appendix E.3, *Consultation Documentation*). SCE's review of readily available information as FERC's non-federal representation, as well as early consultation with interested parties and agencies has identified that the northwestern pond turtle (*Actinemys marmorata*)—a species proposed for listing—is located within potentially affected stream reaches.

4.4. MAGNUSON STEVENS FISHERY CONSERVATION AND MANAGEMENT ACT

The Magnuson-Stevens Fishery Conservation and Management Act 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. NMFS has not identified any EFH within the vicinity of the Project. Therefore, the requirements for potential impacts to EFH as dictated by the Magnuson-Stevens Fishery Conservation and Management Act do not apply to the Project.

4.5. Coastal Zone Management Act

Under Section 307 (c)(3)(A) of the Coastal Zone Management Act (CZMA), 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.

The Project is not included within and does not affect California's coastal zone or resources. A letter of concurrence from the Coastal Zone Program Officer will be filed with the FLA.

4.6. National Historic Preservation Act

Section 106 of the National Historic Preservation Act (NHPA; United States Code, Title 16, Section 470f [16 USC § 470f]) and its implementing regulations in 36 CFR Part 800 requires that federal agencies consider the effects of their undertakings on historic properties. The NHPA (54 USC § 300308) defines a historic property or historic resource is any prehistoric [pre-contact] or historic district, site, building, structure, or object included in, or eligible for inclusion on, the National Register of Historic Places (NRHP), including artifacts, records, and material remains related to such a property or resource.

FERC initiated informal consultation with the California State Historic Preservation Office (SHPO) under Section 106 on November 21, 2021, and on that same date designated SCE as FERC's non-federal representative for informal consultation under Section 106. In a letter dated January 11, 2022, SCE on behalf of FERC initiated consultation with the SHPO and requested concurrence on the Area of Potential Effects (APE). By letter dated March 23, 2022, the SHPO pursuant to 36 CFR § 800.4(a)(1) found the APE as defined to be sufficient for the undertaking.

Discussion of potential Project effects on historic properties is provided in Section 7.10, *Cultural Resources,* of this Exhibit E. SCE anticipates that to meet the requirements of Section 106, FERC will execute a Programmatic Agreement (PA) for the protection of historic properties from the effects of the ongoing O&M of the Project under a new license issued by FERC. The terms of the PA are likely to require that SCE address and treat all historic properties identified within the APE that are affected by ongoing Project O&M through the finalization of a Historic Properties Management Plan (HPMP). SCE intends to file a HPMP concurrent with its filing of the FLA.

4.7. Wild and Scenic River Act

Section 7(a) of the Wild and Scenic Rivers Act requires federal agencies to determine 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.

In 1987, Congress designated 78.5 continuous miles of the NFKR from the Kern/Tulare County Line up to the headwaters in Sequoia National Park as “Wild and Scenic River” (Pub. L. No. 100-174, 101 Stat. 924 [1987]). Some portions of the water conveyance system and Project access roads fall within the Wild and Scenic River corridor quarter-mile buffer. However, the construction, original licensing, and initiation of operations (1921) pre-dates the enactment of the Wild and Scenic Rivers Act in 1968, as well as this designation of the NFKR in 1987. Moreover, Congress’ wild and scenic designation of the NFKR provides:

> “Nothing in this chapter shall affect the continued operation and maintenance of the existing diversion project, owned by Southern California Edison on the North Fork of the Kern River, including reconstruction or replacement of facilities to the same extent as existed on November 24, 1987.” 16 USC § 1274(a)(64)(C)

Project amenities south of the Cannell Creek–NFKR confluence, such as the pressure flume, forebay, penstocks, and KR3 Powerhouse are not located within the Congressionally designated wild and scenic river corridor.

As part of the updated Land Management Plan for the SQF, two additional tributaries to the NFKR near the Project (Salmon Creek and Bull Run Creek) were recommended as eligible for inclusion as Wild and Scenic Rivers (Forest Service, 2023a). While not yet designated as Wild and Scenic Rivers, interim protection measures are outlined in Forest Service Handbook 1909.12, Section 84.3 for recommended river segments: “Eligible, suitable, or recommended rivers’ free flow is not adversely modified, outstandingly remarkable values are protected, and water quality and preliminary classification are maintained until a decision is made on the future use of the river and adjacent lands through an Act of Congress or a change in eligibility or suitability status from a future study” (Desired Condition MA-EWSR-STD) (Forest Service, 2023b).

An existing small diversion dam, which is licensed by FERC as part of the Project and also predates Congress’ enactment of the Wild and Scenic Rivers Act in 1968, is located on Salmon Creek approximately 1 mile upstream from its confluence with the NFKR. The Forest Service has classified this segment of Salmon Creek as “scenic,” citing outstanding remarkable values (ORVs) of scenery, recreation, wildlife, and prehistory (Forest Service, 2023a). There are no Project features on Bull Run Creek.

The NFKR is managed by the Forest Service to protect and enhance the free-flowing condition, water quality, and ORVs for which the river was designated while providing for public recreation and resource uses that do not adversely affect or degrade those values.

4.8. WILDERNESS ACT OF 1964

Section 4(c) of the Wilderness Act of 1964, 16 USC § 1133(c) prohibits any commercial enterprise, structure, or installation within designated wilderness areas, except for existing private rights or activities authorized by the President. There are no areas designated under the Wilderness Act within the FERC Project Boundary.

The Domeland Wilderness includes about 133,720 acres and at its nearest point is about 6 miles east of the Corral Creek Diversion.

The Golden Trout Wilderness is about 12 miles north of the northernmost boundary of the Kern River impoundment area upstream of Fairview Dam.

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5.0 PROPOSED ACTION AND ALTERNATIVES

5.1. No-Action Alternative

Under the No-Action Alternative, the 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 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*

The Project is located on the NFKR in Kern and Tulare Counties, California. The earliest official action on the development of the Project occurred in October 1894, when the Kern River Company and the California Power Company filed with Kern County to appropriate water to generate hydroelectric power. The Edison Electric Company (later recapitalized as SCE) acquired water rights and permits for power plants on the Kern River in its 1902 purchase of the California Power Company. Construction-related activities occurred as early as 1910 on road construction and the establishment of a company work camp. Between 1910 and 1921, supporting infrastructure and Project features were constructed. The Project was placed into service by SCE in the spring of 1921 and operated under a permit from the Department of Agriculture until 1964. On August 7, 1964, FERC issued a 25-year operating license to SCE under FERC Project No. 2290. In 1989, the Project was nominated as a historic district for the NRHP, and was determined eligible (Mikesell, 1989). The Project currently operates under a 30-year FERC license issued on December 24, 1996, which expires on November 30, 2026 (77 FERC ¶ 61,313 [1996], *Order Issuing New License*).

5.1.1. Project Overview

The Project is run-of-river and has no water storage. Water from the NFKR is diverted into the water conveyance system at Fairview Dam and directed through a concrete structure, or sandbox, where sediment is allowed to settle out of the water before entering the Project's flowline. The flowline comprises tunnels, concrete flumes, and a siphon that runs along the eastern hillside above the NFKR. The Project also captures flows from two intermediate tributaries—Salmon Creek and Corral Creek—via two diversion dams. Diverted water within the flowline is directed to a small concrete forebay, two penstocks, and then through two Francis reaction-type turbines located in the KR3 Powerhouse (Figure 5.1-2).

The flowline bypasses an approximately 16-mile reach of the NFKR between Fairview Dam and the KR3 Powerhouse tailrace (herein referred to as the Fairview Dam Bypass Reach). The Project also bypasses the lower 0.4 mile of Salmon Creek and 1.1 miles of Corral Creek between their diversions and confluences with the NFKR. At the southern end of the Project, the KR3 Powerhouse is located approximately 2 miles north of Kernville in Kern County.

5.1.2. Existing Project Facilities

A summary of the existing Project facilities—including the dam, diversions, water conveyance system, pressure flume, forebay, penstocks, powerhouse, stream gages, access roads, ancillary support structures, and the Project recreation facility—under FERC's jurisdiction are presented below and depicted in Figure 5.1-1. Refer to Exhibit A (*Description of Project*) of this License Application for a detailed description of Project facilities; Exhibit F (*General Design Drawings and Supporting Information*) for detailed facility drawings and descriptions (filed as CUI//CEII in Volume III of this filing [placeholder for FLA]); and Exhibit G (*Project Maps*) for overview maps delineating Project features and all of SCE's Project facilities, features, and roads within the FERC Project Boundary (placeholder for FLA).

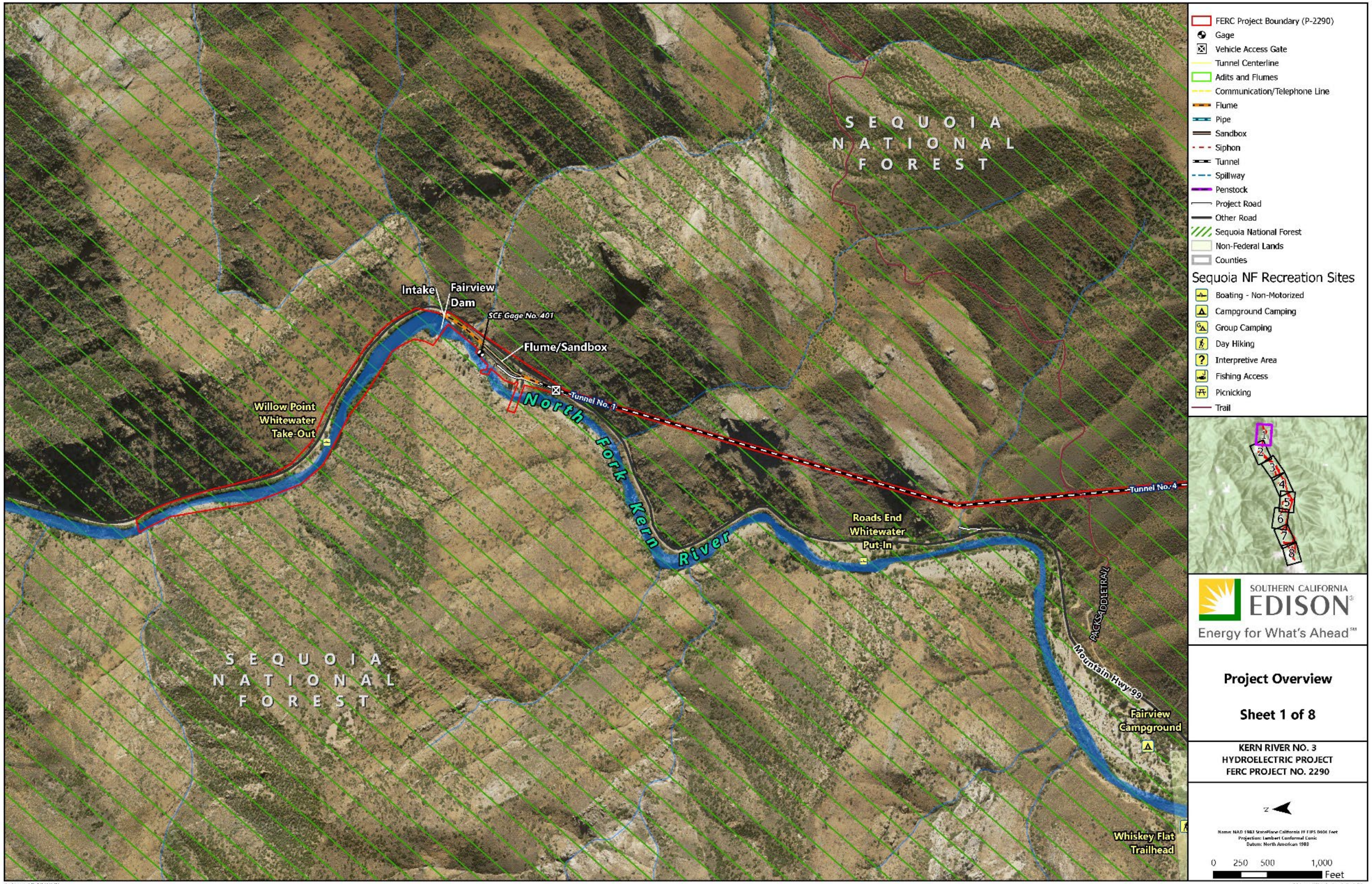

Figure 5.1-1a. Project Overview (Tile 1 of 8).

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Figure 5.1-1b. Project Overview (Tile 2 of 8).

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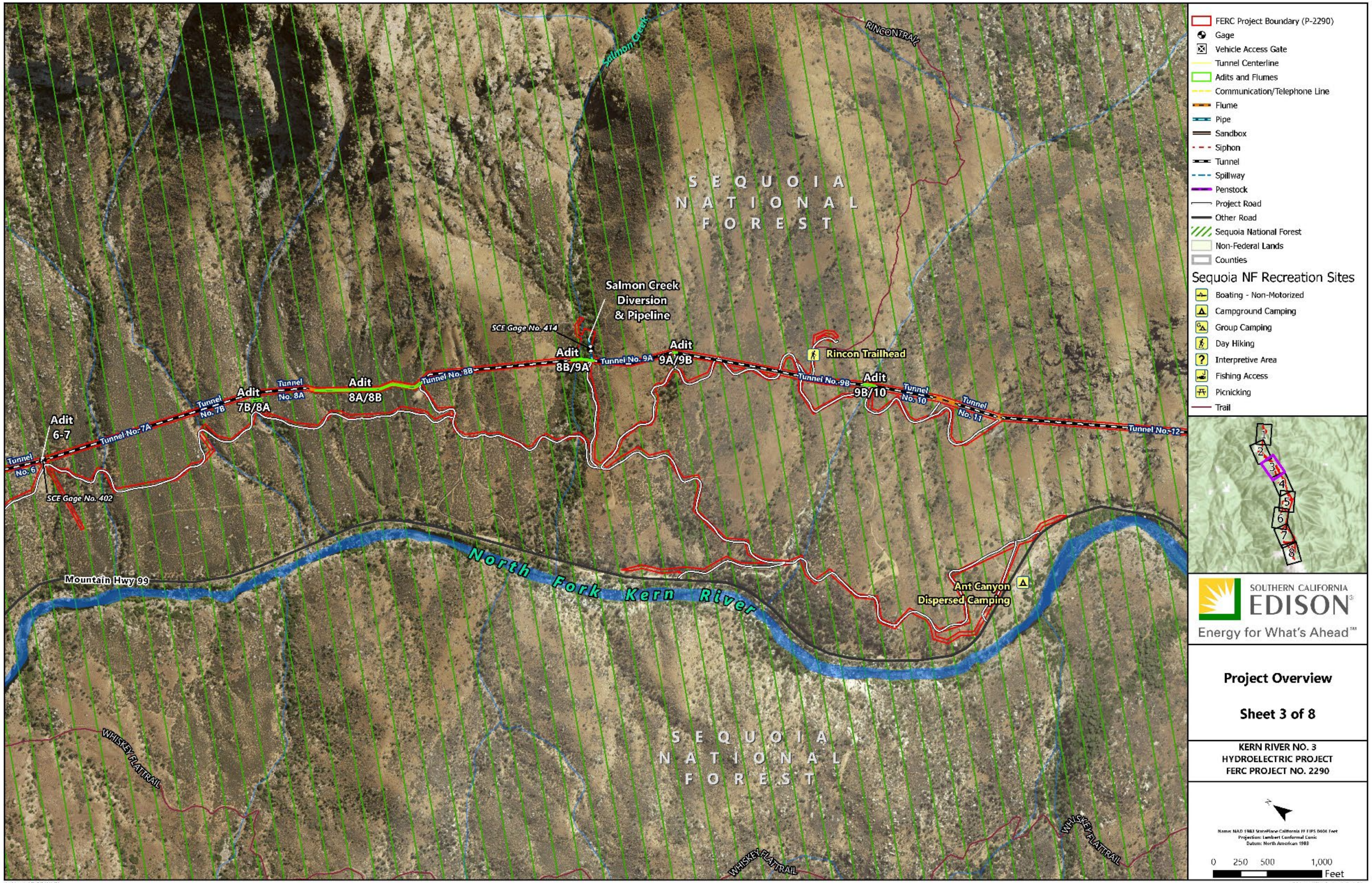

Figure 5.1-1c. Project Overview (Tile 3 of 8).

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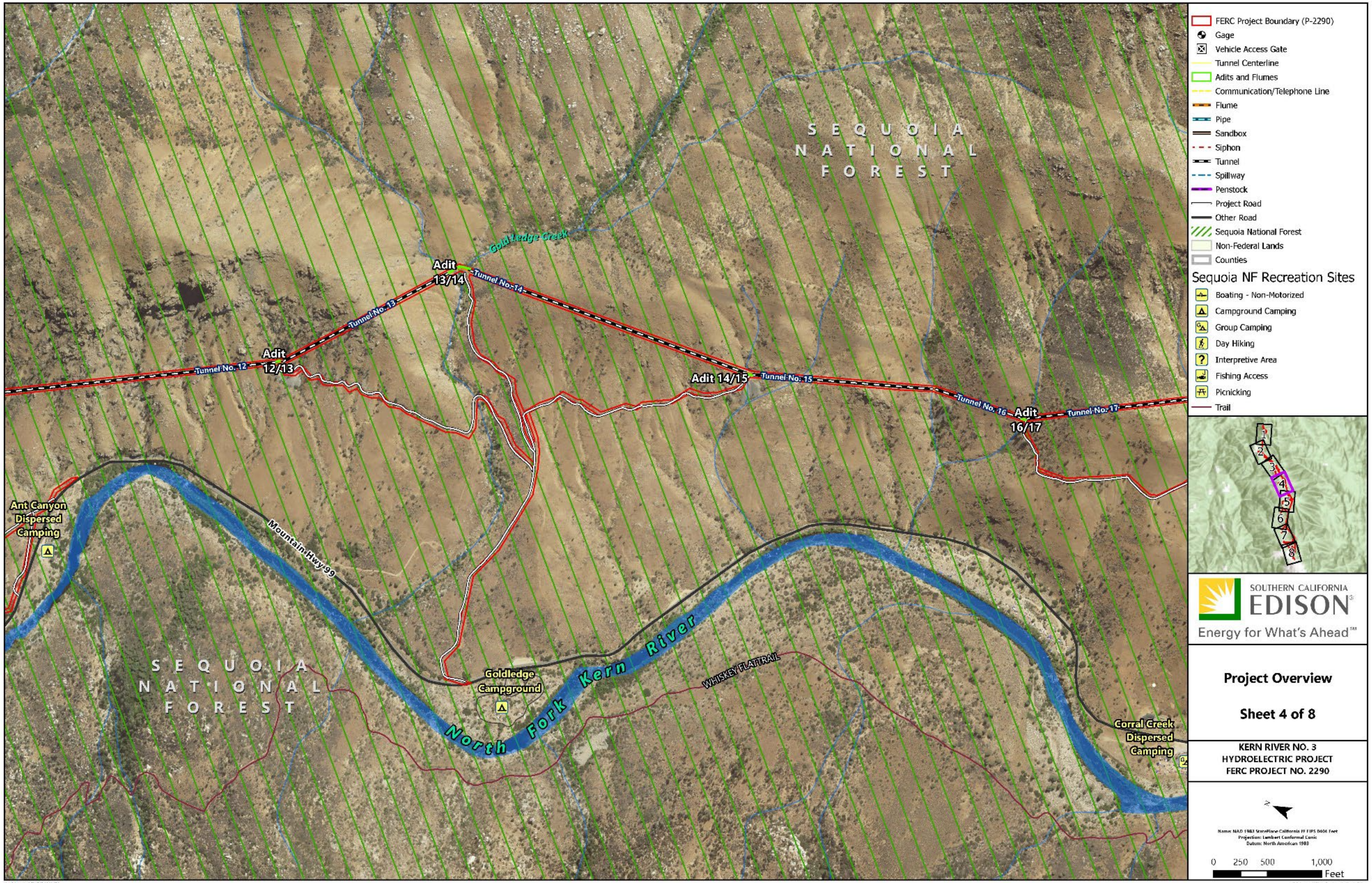

Figure 5.1-1d. Project Overview (Tile 4 of 8).

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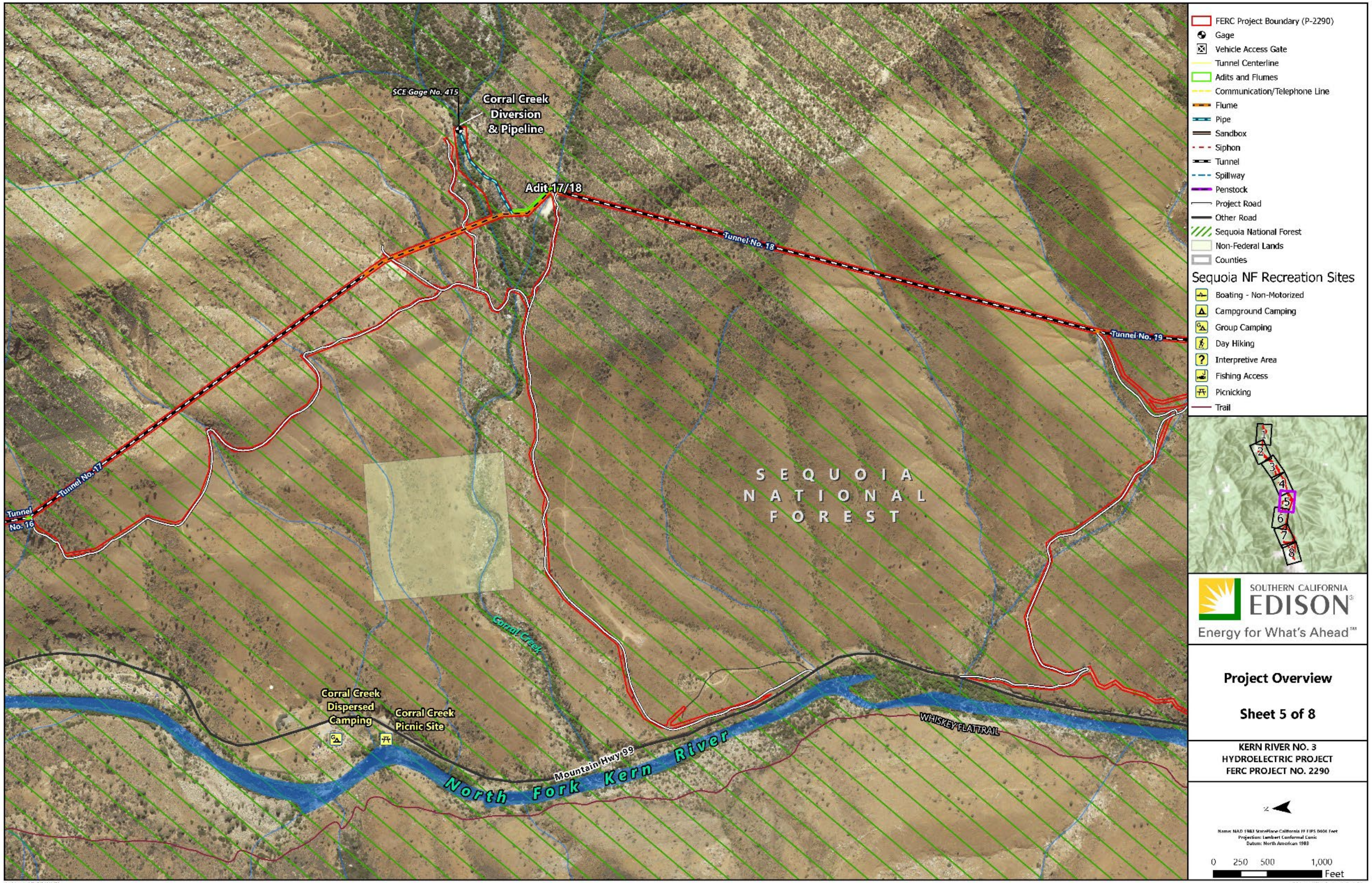

Figure 5.1-1e. Project Overview (Tile 5 of 8).

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Figure 5.1-1f. Project Overview (Tile 6 of 8).

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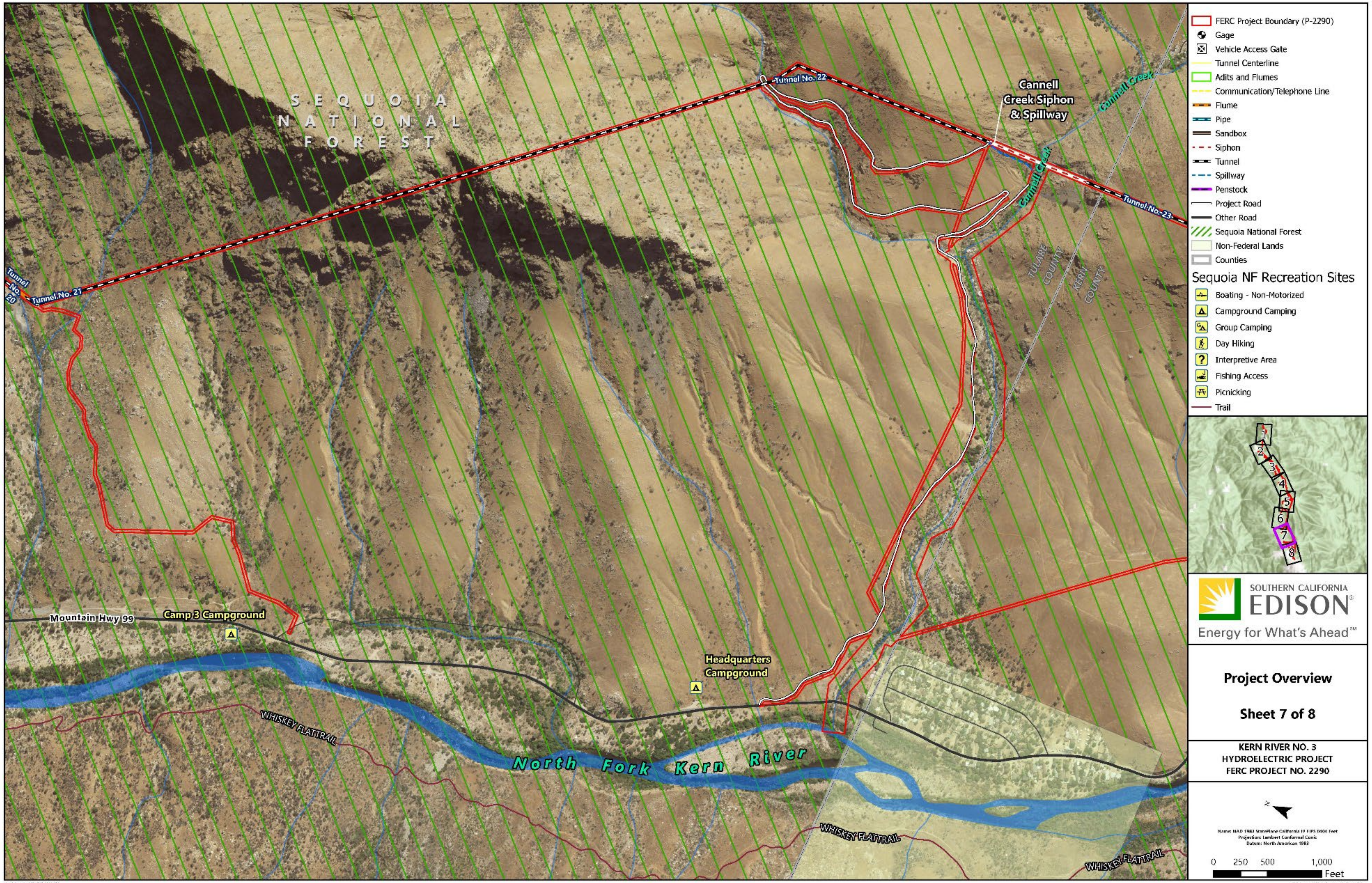

Figure 5.1-1g. Project Overview (Tile 7 of 8).

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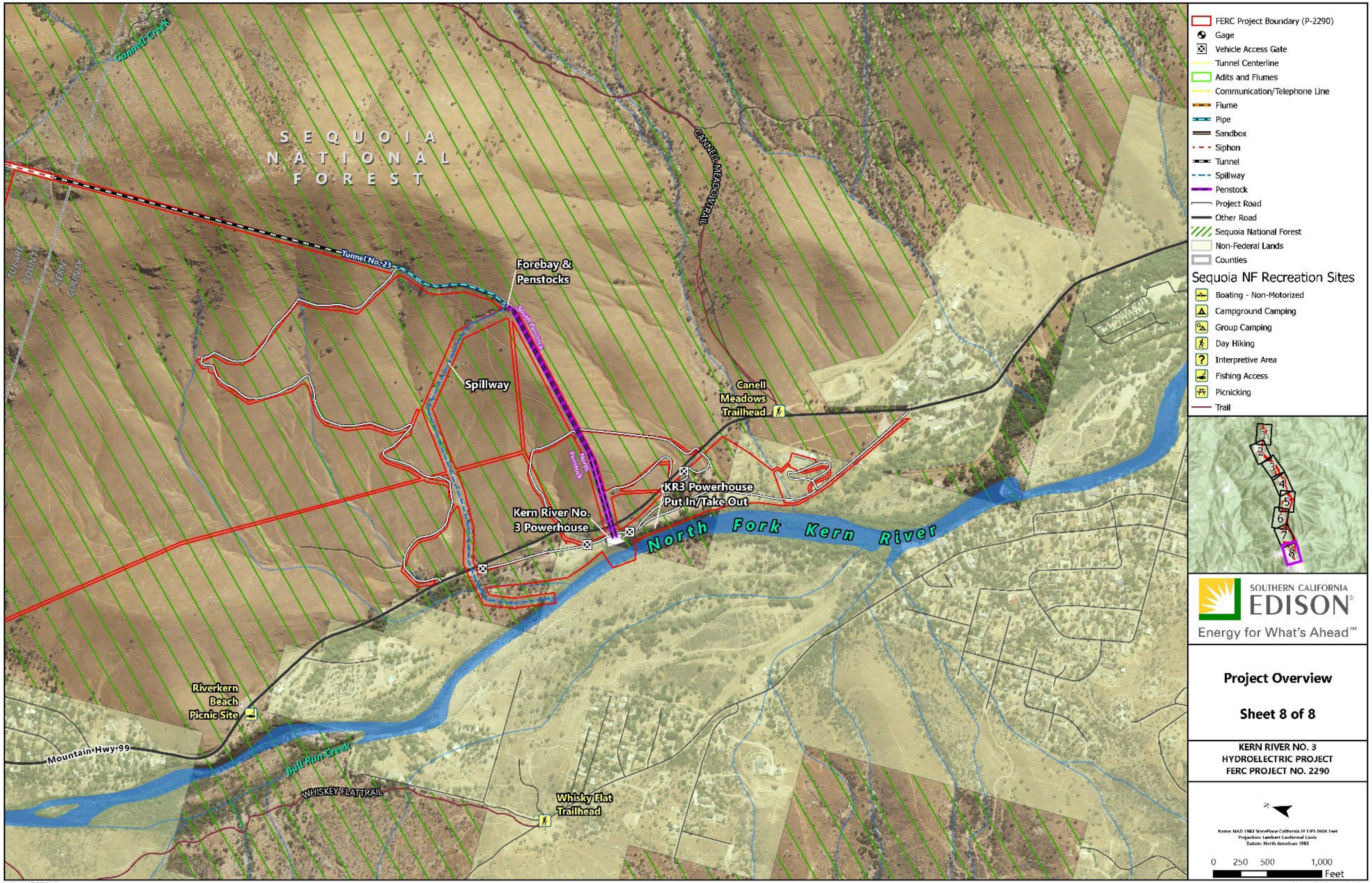

Figure 5.1-1h. Project Overview (Tile 8 of 8).

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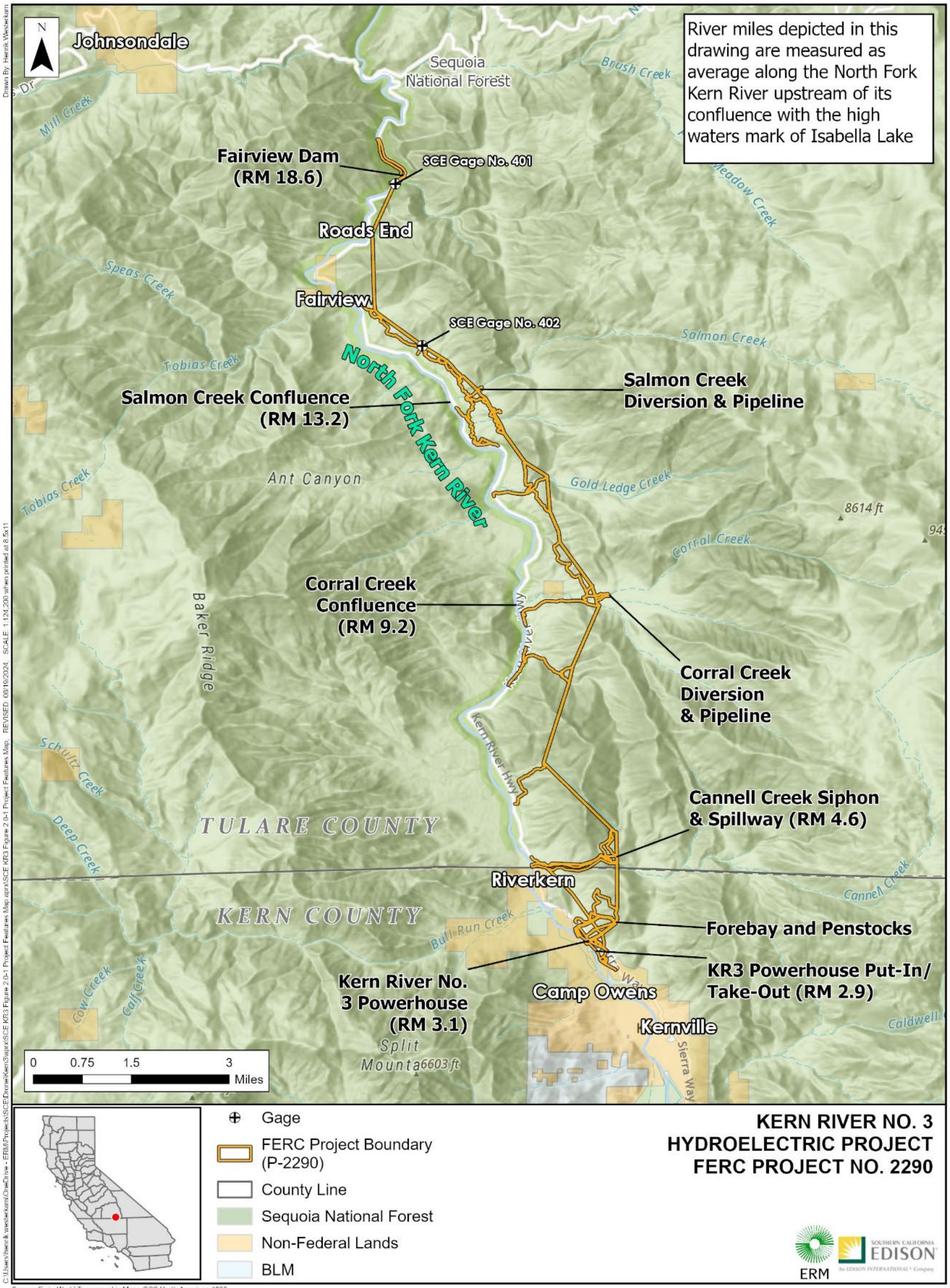
5.1.2.1. Project Dams and Diversions

Fairview Dam

Fairview Dam and its intake structure is a mass concrete overflow gravity structure located on the NFKR, approximately 18 miles north of the town of Kernville. The crest of the dam also serves as a spillway and is designed for a capacity of approximately 15,000 cubic feet per second (cfs) with 8 feet of head (the point on a watercourse up to which it has been artificially broadened and/or raised by an impoundment).

Water is diverted from the NFKR at the east dam abutment. The intake is a rectangular reinforced concrete structure and is equipped with a trash rack. There are two flowline intake gates located at the east end of the dam that divert water into a concrete-lined sediment trap (sandbox).

Two fish-release slide gates near the east dam abutment are designed to control lower flows along the NFKR. Each gate is capable of conveying flows up to 300 cfs, depending on head pressure behind the dam. The fish-release slide gates can be adjusted remotely from the KR3 Powerhouse or manually adjusted on-site during adverse conditions (e.g., power outage or communication loss).



BLM = Bureau of Land Management; FERC = Federal Energy Regulatory Commission; RM = River Mile

Figure 5.1-2. Kern River No. 3 Hydroelectric Project Location, FERC Project Boundary, and Project Facilities.

Two connected fish ladders are located adjacent to the west abutment of the dam that have remained non-operational (closed) since 1997 (79 FERC ¶ 62,113 [1997], *Order Approving Plan to Close Fish Ladders at Fairview Dam*).

The Project has essentially no storage capacity behind Fairview Dam; however, a small pool of water—well under 2 acre-feet in volume with an approximate surface area of half an acre-foot—backs up behind the dam.

Salmon Creek Diversion and Pipeline

Salmon Creek Diversion is located on Salmon Creek—approximately 5.4 miles downstream from Fairview Dam and approximately 0.4 mile upstream of the confluence with the NFKR. This diversion is a mass concrete overflow structure with a crest length of approximately 61 feet long and extends 5 feet above the streambed. An elevated wooden walkway provides access across the diversion. There are three hand-operated gates: two drain gates that direct water into Salmon Creek and a third gate that conveys water into the diversion pipe. The steel diversion pipe is 226 feet long with a 26-inch diameter. Flow from the diversion pipe can be returned to the creek approximately 180 feet downstream from the diversion through interchangeable fixed-orifice plates that provide the minimum instream flow (MIF) release, with any remaining flow directed into the main flowline. Seepage from beneath the two drain gates also provides flow into Salmon Creek.

Corral Creek Diversion and Pipeline

Corral Creek Diversion is located on Corral Creek—approximately 9.4 miles downstream from Fairview Dam and approximately 1.1 miles upstream of the confluence with the NFKR. The diversion is a steel-reinforced concrete gunite structure, similar in design to the Salmon Creek Diversion. The diversion crest length is approximately 43 feet, approximately 8 feet above the streambed. There are two hand-operated valves: an 8-inch slide gate that passes natural flows downstream when not diverting, and a pipe with interchangeable fixed-orifice plates that provides the MIF release first, with any additional flows diverted to the flowline. Flows exceeding the instream flow requirement are diverted via an approximately 900-foot-long steel pipe that varies in diameter between 11 and 14 inches to the main flowline.

Summary information regarding the Project dam and diversions are provided in Table 5.1-1 and the locations are depicted in Figure 5.1-1.

Table 5.1-1. Kern River No. 3 Hydroelectric Project Facility Specifications: Dam and Diversions

Fairview Dam	
Dam Location	NFKR
Constructed	1910–1921
Drainage Area	842 mi^2 (NFKR above Fairview Dam)

Dam Type	Mass concrete overflow gravity diversion
Elevation Datum	Kern River No. 3 Plant datum [a]
Hazard Classification	Low
Height of Dam above Streambed	26 feet
Dam Crest Length	206 feet
Dam Thickness	46 feet at base
Elevation of Dam Crest	3,632 feet mean sea level
Fish Release Slide Gate Capacity	• Two 19-foot by 8-foot fish water release gates • 300 cfs capacity, each
Spillway	• The crest of Fairview Dam also serves as a spillway • Capacity of 1,500 cfs with 8 feet of head
Salmon Creek Diversion	
Dam Location	Salmon Creek, approximately 0.4 mile upstream of the confluence with the NFKR (5.4 river miles downstream of Fairview Dam)
Constructed	1924
Drainage Area	26 mi^2
Dam Type	A mass concrete overflow gravity diversion
Elevation Datum	Kern River No. 3 Plant datum [a]
Hazard Classification	Low
Height of Dam above Streambed	5 feet
Dam Crest Length	61 feet
Elevation of Dam Crest	3,590 feet amsl
Intake Structure	Manually operated slide gate with a trash rack
Diversion Pipe (steel)	226 feet long, 26-inch-diameter pipe
Maximum Capacity	30 cfs
Corral Creek Diversion	
Dam Location	Corral Creek, approximately 1.1 miles upstream of the confluence with the NFKR (9.4 river miles downstream of Fairview Dam)
Constructed	1933
Drainage Area	9.1 mi^2
Dam Type	A mass concrete overflow gravity diversion
Elevation Datum	Kern River No. 3 Plant datum [a]
Hazard Classification	Low
Height of Dam above Streambed	8 feet

Dam Crest Length	43 feet
Elevation of Dam Crest	3,600 feet
Intake Structure	Manually operated slide gate with a trash rack
Diversion Pipe (steel)	904 feet long ranging from 11 to 19 inches in diameter
Maximum Capacity	12 cfs

amsl = above mean sea level; cfs = cubic feet per second; mi^2 = square mile; NFKR = North Fork Kern River; USACE = U.S. Army Corps of Engineers

Notes:

[a] To convert elevations from the Kern River No. 3 Plant datum to elevations on the USACE Isabella Reservoir datum, add 2.12 feet.

5.1.2.2. Water Conveyance System

The largest component of the Project is the approximately 13-mile-long water conveyance system along the eastern hillslope above the NFKR. Water from the intake at Fairview Dam is directed through the sandbox and then into the flowline, which comprises a series of buried, concrete-lined tunnels; open and covered above-ground flumes; and a steel siphon before connecting to a regulating pressure flume, forebay, and penstocks.

<u>Sandbox</u>

The sandbox is located downstream of Fairview Dam at the head of the water conveyance system along the east bank of the river. The sandbox is a settling basin where abrasive sediments settle out of the water column before flows are directed into the flowline. There is a short section of flume that connects the dam intakes and the sandbox. The sandbox is a reinforced concrete structure that is 449 feet long and 89 feet wide. At the downstream end of the sandbox, there are two fish screens to prevent fish from entering the flowline.

<u>Flowline</u>

Tunnels, Flumes, and Adits

There are 24 below-ground tunnel segments totaling 60,270 feet, numbered sequentially north to south. The tunnel segments vary in length from several hundred feet to over 1 mile. Tunnel portal access points, or adits, are situated at various tunnel or tunnel–flume junctions along the flowline.

The above-ground sections of the flowline, or flumes, are located between tunnel segments and constructed of reinforced concrete. The majority of the 4,600 feet of concrete flumes are enclosed; however, there are approximately 1,000 feet of uncovered, or open-topped, flume segments.

Cannell Creek Siphon and Spillway

The Cannell Creek Siphon and Spillway are located approximately 1 mile upstream from the KR3 Forebay. The siphon is 1,146 feet long, 8 to 9.5 feet in diameter, and made of riveted steel pipe. It is supported on concrete piers that are anchored to bedrock where it crosses above Cannell Creek.

The upstream section of the siphon is connected to a small concrete reservoir that serves to regulate flow into the siphon. If water elevations in the flowline exceed 3,498.6 feet above mean sea level (amsl), water from the flowline will naturally spill into a 45-foot-long concrete spillway and approximately 470-foot-long rock spillway channel down to Cannell Creek. The confluence of Cannell Creek and the NFKR is approximately 1 mile downstream from the spillway.

5.1.2.3. Pressure Flume, Forebay, Spillway, and Penstocks

Pressure Flume and Forebay

The pressure flume and forebay are the terminus of the flowline and are situated on the hill (northeast of the KR3 Powerhouse). The pressure flume is a 1,100-foot reinforced concrete pipe and the forebay is a 61-foot-long, 20-foot-wide, and 30-foot-high concrete box.

Forebay Spillway

Two 24-inch slide gates are located between the end of the pressure flume and the forebay and control flow into the penstocks. If the water surface elevation in the forebay exceeds the spillway crest (3,505.65 mean sea level), water is directed into the approximately 2,700-foot-long bedrock lined spillway channel. The spillway channel runs west, adjacent to the two penstocks along the hill slope until it rejoins with the NFKR approximately 700 feet upstream from the KR3 Powerhouse.

Penstocks and Release Valve

The KR3 Penstocks are composed of two metal pipes, each approximately 2,500 feet long, extending from the forebay to the KR3 Powerhouse. The last 160 feet of pipe (downhill nearest the powerhouse) is buried under earth fill.

Summary information regarding the Project's water conveyance system is provided in Table 5.1-2 and the locations are depicted in Figure 5.1-1.

Table 5.1-2. Kern River No. 3 Hydroelectric Project Facility Specifications: Water Conveyance

Intake Structure	• Reinforced concrete structure with 85 feet by 19 feet • Hydraulically operated fixed wheel gates and trash rack • Elevation invert: 3,623 feet
Sandbox (sediment trap)	449 feet long and 89 feet wide, double-chamber sediment settling basin

Flowline	Tunnels and Flumes: • 4,600 feet of covered and open concrete flumes, approximately 8.5 feet wide by 8.25 feet high • 60,270 feet of tunnels, ranging from approximately 8 feet high by 8.5 to 9.5 inches wide • Normal operating flow capacity-is approximately 600 cfs Cannell Creek Siphon and Spillway: • Siphon: 1,146-foot-long steel pipe • 45-foot-long, concrete-lined spillway to an approximately 470-foot-long rock-lined spillway to Cannell Creek
Concrete Pressure Flume	9.5-foot-diameter, 1,100-foot-long reinforced concrete pipe
Forebay and Spillway	• 61-feet-long, 20-feet-wide, and 30-feet-high concrete structure • 2,700-foot-long natural rock-lined spill channel adjacent to forebay and drains to the NFKR
Penstocks	Two metal pipes 2,500 feet long, ranging from 60- to 84-inches inside diameter
Tailrace	Concrete wing wall (90 feet long, approximately 20 feet high, and 18 inches thick) attached to the powerhouse and discharges directly to NFKR

cfs = cubic feet per second; NFKR = North Fork Kern River

5.1.2.4. Powerhouse

The Project includes one powerhouse located along the NFKR, approximately 2 miles north of the town of Kernville. The facility contains the power generation and distribution equipment for the Project. The Project does not include any transmission lines. Summary information regarding the KR3 Powerhouse is provided in Table 5.1-3 and depicted in Figure 5.1-1.

Electricity produced by the KR3 Powerhouse enters SCE’s bulk electric grid on the 66-kilovolt (kV) bus located inside the KR3 Powerhouse. The point of separation occurs at the Unit 1 and 2 66 kV upper and lower bus circuit breakers and the Nos. 1 and 2 local service bank 66 kV fused disconnects inside the KR3 Substation (non-Project).

Table 5.1-3. Kern River No. 3 Hydroelectric Project Facility Specifications: Powerhouse

Kern River No. 3 Powerhouse	
Location	North Fork Kern River
Date of Commission	Commenced construction in March 1919 and completed in March 1921
Approximate Size	88-foot-wide and 130-foot-long building
Turbine	
Number of Units	2

Manufacturer	Francis reaction-type
Rated Output	• 28,700 hp / 600 rpm, each • Total: 57,400 hp
License Nameplate Capacity	28,700 hp
Static Head	821 feet
Hydraulic Capacity (min/max)	40 cfs per unit / 605 cfs
Generator	
Number and Type	2, vertical shaft directly connected to the turbines
Manufacturer	General Electric
Installed Capacity	• Unit 1: 20,500 kVA (20.2 MW), 0.90 power factor, 60 Hz • Unit 2: 19,675 kVA (19.7 MW), 0.915 power factor, 60 Hz • Total: 40.2 MW
Normal Operating Capacity	• 18.4 MW, each • Total: 36.8 MW
Voltage	• Unit 1: 10.4 kV • Unit 2: 11 kV
Energy Production	
Average Annual Energy	118,497 MWh (1997–2023)
Estimate of Dependable Capacity	36.8 MW

cfs = cubic feet per second; hp = horsepower; Hz = hertz; kV = kilovolt; kVA = kilovolt-ampere; MW = megawatt; MWh = megawatt hours; rpm = revolutions per minute; USACE = U.S. Army Corps of Engineers

5.1.2.5. Gages

SCE maintains two recording gaging stations that monitor and record water flow for Project compliance. SCE gage 401 is located in the NFKR just below the Fairview Dam and SCE gage 402 is located within the flowline between tunnel sections 6 and 7 (Adit 6/7). SCE also maintains two non-recording gaging stations associated with Salmon and Corral Creek diversion low-flow release. The gages are described in Table 5.1-4 and shown in Figure 5.1-1.

Table 5.1-4. Kern River No. 3 Hydroelectric Project Facility Specifications: Gages

Gaging Stations	Gage Information
Kern River near Kernville, CA / Downstream of Fairview Dam	SCE gage 401 USGS gage 11186000 Flow Records: 2/1922–Present [a] Provisional real-time hourly flows [c]: https://www.sutronwin.com/scedison/tw/jsp/

Gaging Stations	Gage Information
KR3 Conduit near Kernville, CA / within the Flowline at Adit 6/7	SCE gage 402 USGS gage 11185500 Flow Records: 9/1960–Present [b] Provisional real-time hourly flows [c]: https://www.sutronwin.com/scedison/tw/jsp/
Salmon Creek Low-Flow Release below Diversion near Kernville, CA	SCE gage 414 USGS gage 11186550 Non-recording, instantaneous site inspection of rated flow from fixed geometry orifice in place
Corral Creek Low-Flow Release below Diversion near Kernville, CA	SCE gage 415 USGS gage 11186750 Non-recording, instantaneous site inspection of rated flow from fixed geometry orifice in place

CA = California; KR3 = Kern River No. 3; SCE = Southern California Edison; USGS = U.S. Geological Survey

Notes:

[a] January 1912, non-recording gage installed; February 1922, water-stage recorder installed; September 1967, manometer installed at sandbox drain canal; December 1988 to present, manometer system in "tunnel house" shelter built at Tunnel No. 1.

[b] March 1921 through October 1953 published record Water Supply Paper 1315-A. October 1953 through September 1960 combined flow only.

[c] Provisional real-time hourly flows for Kern River above Fairview Dam are calculated by combining flows from SCE gages 401 and 402.

5.1.2.6. Project Access Roads

The Project includes over 18 miles of roads/road segments, with the majority located on federal lands managed by the SQF, and only a short segment (approximately 0.5 mile) of road is located on SCE-owned lands. Most of the roads are publicly accessible (i.e., not gated), except for roads around Project facilities (Fairview Dam and Powerhouse) and Cannell Creek Road. Project roads are depicted in Figure 5.1-1 and the list of Project roads is presented in Exhibit E, Section 7.8, *Land Use Management and Resources*.

5.1.2.7. Ancillary Support Structures

Several detached ancillary buildings surround the KR3 Powerhouse and penstocks supporting the O&M of the Project. These buildings include a chlorinator house with two 5,000-gallon water tanks, a cottage, garages, a fire house box, machine shop, and warehouses. Three additional buildings located near Fairview Dam and the sandbox include a relief house, garage, and tunnel house. Buildings are depicted in Figure 5.1-1 with additional facility descriptions in Exhibit A, *Description of Project*.

5.1.2.8. Project Recreation Facility

The Project includes one recreation facility: KR3 Powerhouse Put-in/Take-out. This facility is located approximately 250 yards downstream of the KR3 Powerhouse and is situated on SCE-owned land. The facility consists of a dirt boat launch, graded parking area, and two signs designating the launch site. The facility is depicted in Figure 5.1-1 and additional details are discussed in Exhibit E, Section 7.7, *Recreation Resources*.

5.1.3. FERC Project Boundary

The FERC Project Boundary, as defined in the current FERC license, includes facilities and lands necessary for O&M of the Project and for other Project purposes, as described in Section 5.1.2, *Existing Project Facilities*, and summarized in Table 5.1-1. The boundary incorporates lands around the Project dam and diversions, the 13-mile-long flowline, KR3 Powerhouse, and other ancillary roads and buildings.

The current FERC Project Boundary was established in the December 24, 1996,

[3] License Order, and amended on December 20, 2001;[4] October 27, 2005;[5] June 22, 2006;[6] and April 28, 2014,[7] to remove non-jurisdictional transmission and distribution lines and update Project roads depicted on the Exhibit G, *Project Maps*, drawings. Maps depicting the Project features, FERC Project Boundary, and land ownership are depicted in Figure 5.1-1 and further detailed in Exhibit G, *Project Maps*.

The current FERC Project Boundary encompasses 234.57 acres of land, of which 225.2 acres are on federal land and the remaining 9.37 acres are on SCE-owned lands.

5.1.4. Project Operations

The Project is operated in compliance with existing regulatory requirements, agreements, and water rights to generate power. The following describes operational constraints (regulatory requirements and operating agreements) followed by a description of water rights and water management associated with the Project.

5.1.4.1. Regulatory Requirements

<u>FERC License</u>

FERC issued the current Project license to SCE on December 24, 1996 (77 FERC ¶ 61,313). FERC has issued various administrative Orders approving management plans and design drawings that were required as part of the current Project license. FERC has subsequently amended the license at various times with revisions to license articles and deletions of license articles. License conditions and management plans related to current Project O&M are summarized in Section 5.1.7, *Existing Environmental Measures*.

[3] 77 FERC ¶ 61,313 (1996), *Order Issuing New License*
[4] 97 FERC ¶ 62,255 (2001), *Order Amending License in Part, Approving Revised Exhibits, and Revising Annual Charges*
[5] 113 FERC ¶ 62,077 (2005), *Order Amending License, Approving Revised Exbibits and Revising Annual Charges*
[6] 115 FERC ¶ 62,302 (2006), *Order Approving Revised Exhibit G Drawings*
[7] 147 FERC ¶ 62,070 (2014), *Order Approving Revised Exhibit G Drawings and Revising Annual Charges*

The Project is also subject to Articles 1 through 23 of the FERC's standard terms and conditions set forth in Form L-1, updated October 1975, titled *Terms and Conditions of License for Constructed Major Project Affecting the Lands of the United States*, 54 Federal Power Commission 1792 and 1799.

Water Rights

The California State Water Resources Control Board (State Water Board) has authorized SCE to divert a combined total of 600 cfs of water from the NFKR at Fairview Dam and Salmon Creek for the purpose of generating power at the KR3 Powerhouse (License Identification [ID] 000148 / State ID A0000624). Additionally, SCE has a Supplemental Statement of Water Diversion and Use to divert water from Corral Creek (Application ID S001830). Pursuant to California Water Code Section 5100, SCE has filed annual reports with the State Water Board to document the amount of water diverted for hydropower generation associated with the Project.

5.1.4.2. Water Management

Water for power is diverted primarily from the NFKR at Fairview Dam, and the Project is operated as a run-of-river facility. Inflows can vary seasonally and annually, depending upon the winter snowpack and other storm events. Therefore, the amount and timing of flow diverted for power is a function of inflow from the NFKR upstream of the Project, FERC license requirements for MIF, and seasonal whitewater flow releases, flowline capacities, and other operational agreements. SCE controls the flowline so that a constant flow rate is maintained when operationally feasible. The KR3 Powerhouse operates when sufficient water is available at the primary intake at Fairview Dam and the two small diversions that supply additional water to the water conveyance system (Salmon Creek and Corral Creek Diversions).

The MIF is provided through the fish-release gates. The fish-release slide gates can be adjusted remotely from the KR3 Powerhouse or manually adjusted on-site during adverse conditions (i.e., power outage or communication loss). During periods of high flows (seasonal peak run-off or high water years [WYs]), flow diversion into the flowline is limited to approximately 600 cfs, which is the capacity of the flowline. Any additional inflows greater than the 1,200 cfs combined capacity of the intake to the flowline (approximately 600 cfs) and the two fish-release gates to the NFKR (300 cfs per gate) spill over the crest of the dam. During lower-flow periods, SCE may elect to operate only one generating unit and take the other off-line to conduct routine maintenance.

The current license requirements for MIF and recreational boating releases are discussed further in Section 5.1.7.1, *Project Operations and Maintenance*.

5.1.5. Project Maintenance

Routine inspection activities are conducted at Project facilities to verify the structural and/or functional integrity of the facilities and identify conditions that might disrupt operation or threaten public safety. Routine maintenance activities associated with

Project roads and lands, sediment management, vegetation management, and at Project facilities are summarized below in Tables 5.1-5 through 5.1-8.

5.1.5.1. Project Roads

Project roads are regularly inspected during normal Project activities. Minor repairs are typically conducted annually in the spring, following the winter rainy season, and as needed throughout the summer and fall. Major Project road work occurs as needed, or approximately every 2 to 3 years, depending on the type of activity. A description of each maintenance activity is provided in Table 5.1-5 and includes location, frequency, and a brief description of the activity.

Table 5.1-5. SCE Road Maintenance Activities for the Kern River No. 3 Hydroelectric Project

Maintenance Activity	Relevant Area	Frequency	Description
Maintenance of dirt/native roads and parking areas, including ditch and culvert maintenance	• All native Project roads • Parking area at boater put-in/take-out below KR3 Powerhouse	• Annually (spring), and as needed	Minor Project road maintenance: • Conduct grading within the road prism • Remove debris and complete basic repairs, including filing of potholes • Maintain erosion control features such as drains, ditches, and water bars • Repair, replace, or install access control structures such as posts and barrier rock • Clean and clear debris and sediment from culverts with a backhoe or hand shovel • Repair and replace signage • Manage vegetation concurrently with road maintenance on an as-needed basis Major Project road maintenance: • Repair or replace in-kind culverts and other drainage features
Maintenance of asphalt roads (repaving/patching)	• Paved Project roads: Forebay Access Road (adjacent to pressure flume) and around Project buildings near the powerhouse	• Minor: Annually • Major: As needed (approximately every 2–3 years)	Minor Project Road Maintenance: • Clean and clear debris and sediment from culverts and ditches with a backhoe or hand shovel • Use power equipment and hand tools to fill blacktop and potholes Major Project road maintenance: • Use pick-up truck, dump truck, loaders and backhoes, and graders for resurfacing larger/longer parking areas or roads

Maintenance Activity	Relevant Area	Frequency	Description
Slide debris removal	• All Project Roads, specifically along Cannell Creek Siphon Spillway Access Road segments	• As needed, typically following winter rains	• Remove slide debris with grader, loader, and dump truck • Spread material on road nearby as road base

KR3 = Kern River No. 3

5.1.5.2. Sediment Management

SCE conducts sediment management activities at Fairview Dam via the sandbox and at Salmon and Corral Creek Diversions either via flushing or physical removal with hand tools. Each maintenance activity, including location and frequency, is described in Table 5.1-6.

The sandbox is located downstream of Fairview Dam at the head of the water conveyance system along the east bank of the NFKR. When operating the sandbox, two additional sets of gates exist for each compartment, one upstream and one downstream, and are used to control flows into and out of the sandbox to isolate one or the other compartment to initiate the flushing activity. Accumulated sediment is returned to the river through two cast iron, hydraulically operated gates located at the end of each sandbox segment drain canal. SCE operates the sandbox flushing via control panels located adjacent to Mountain Highway 99.

Table 5.1-6. SCE Sediment Management Maintenance Activities for the Kern River No. 3 Hydroelectric Project

Maintenance Activity	Relevant Area	Frequency	Description
Sediment management (natural flushing)	• Sandbox (below Fairview Dam)	Bi-weekly when flows are above 350 cfs	License Article 402: Open the drain gate and flush sediment in accordance with Sandbox Flushing measure
Sediment management (natural flushing)	• Salmon Creek Diversion • Corral Creek Diversion	As needed	Open pond drain when diversion is turned-out and naturally flush sediment from behind diversion
Sediment management (physical removal)	• Salmon Creek Diversion • Corral Creek Diversion	As needed	Use hand shovels to remove sediment, if needed

cfs = cubic feet per second

5.1.5.3. Vegetation Management

Vegetation management includes both trimming by hand and using herbicides. In general, vegetation management activities occur during the spring and early summer to avoid work during periods of high fire danger. Vegetation management is implemented within the area necessary to provide access and protect Project facilities, for wildfire protection, and provide for worker/public health and safety. A description of each maintenance activity is provided in Table 5.1-7, and includes location, frequency, and a brief description of the activity.

Table 5.1-7. SCE Vegetation Management Maintenance Activities for the Kern River No. 3 Hydroelectric Project

Maintenance Activity	Relevant Area	Frequency	Description
Vegetation trimming and removal/clearing	• All Project roads • Project facilities, including the powerhouse, dam and small diversions, water conveyance system, penstocks, and stream gages	• Annually, or as needed	• Conduct brush mowing along roadway to maintain road as necessary for safe line of sight and passage • Trim vegetation both manually and with tools/equipment (i.e., weed whacker or chainsaw)
Hazard tree inspection and removal	• All Project Roads • Project facilities, including the powerhouse, dam and small diversions, water conveyance system, penstocks, and stream gages	• Quarterly and Biannual inspections • Removal as needed	• Remove hazard trees that are deemed a threat to roads or vehicles traveling over them and/or hazards threatening Project infrastructure • Maintaining vegetation-free buffers around assets • Trim vegetation both manually and with tools/equipment
Herbicide spraying	• Project facilities, including the sandbox, forebay, pressure tunnel, penstocks, and powerhouse	• Annually	• Conduct pre-emergent herbicide spraying followed by post-emergent, as necessary [a] • If necessary, conduct weed-whipping within flat areas prior to spraying
Material/slash burning	• Varies, depending upon source material location	• Annually, or as needed	• Burn brush, slash, or other vegetation accumulated from various Project operations with permit obtained from Sequoia National Forest when needed

Note:
[a] Herbicide spraying is conducted in accordance with Forest Service 4(e) Condition 27.

5.1.5.4. Project Facilities

Maintenance Outage

SCE conducts scheduled annual maintenance outages at the KR3 Powerhouse, typically during low-flow periods (fall/winter), which last approximately 2 to 4 weeks but may occur throughout the year depending on the type of maintenance needed. During an outage, SCE inspects mechanical and electrical components and conducts required maintenance of Project powerhouse appurtenances. In conjunction with the maintenance outage, SCE also makes repairs to the Project dam, diversions, and water conveyance system, as appropriate.

In the event of an unscheduled (forced) outage due to a mechanical malfunction (i.e., generator unit trips) or operational emergency, water in the flowline will either be spilled down the Cannell Creek Spillway and/or the Forebay Spillway and directed back into the NFKR. Other unscheduled Project outages may occur due to low inflows or turbid water in the NFKR, when SCE will reduce flows into the flowline and temporarily cease or reduce Project operations. Unscheduled (forced) outages from the past 5 years are summarized in Exhibit H, Table (ii)(D)-1.

A description of Project maintenance activities is provided in Table 5.1-8 and includes location, frequency, and a brief description of the activity.

Table 5.1-8. SCE Facility Maintenance Activities for the Kern River No. 3 Hydroelectric Project

Maintenance Activity	Relevant Area	Frequency	Description
Facility inspection and maintenance	• Powerhouse • Fairview Dam and associated structures (intake and sandbox) • Salmon Creek Diversion • Corral Creek Diversion • Forebay • Communication line	• Daily inspections of Powerhouse during spring and summer in peak run-off conditions • Weekly and monthly inspections of equipment and external facility observations (dam, flowline, forebay, and diversion) • As needed (Communication line repairs) • Maintenance work as needed	• “Turn-in/turn-out” small diversions as needed • Rake trash rack grids to ensure they are clean and free of debris • Fix minor concrete repairs/spalling • Flush tunnel rock drop located above Cannell Creek Siphon and Spillway to remove larger rocks collected within the flowline (approximately 25 cfs is flushed down the Cannell Creek Spillway to flush the rock drop)
Structural inspection and maintenance	• Water Conveyance System (flowline)	• Weekly and monthly inspections of equipment and external facility observations • Annual inspections of internal and above-ground external flowline segments • Maintenance work as needed	• Document locations of leaks along above-ground portions of tunnels • Walk segments of the underground tunnels to look for cracks or other signs of damage • Repair as needed

Maintenance Activity	Relevant Area	Frequency	Description
Access gates and security fencing	• Vicinity of powerhouse, including machine shop and warehouse • Vicinity of Fairview Dam • Cannell Creek Siphon Access Road • Open-topped flume locations along flowline	• Inspect weekly and monthly during other facility inspections	• Observation of conditions and repair as needed
Facility painting	• Powerhouse, handrails, and maintenance buildings • Penstocks • Parking lots • Salmon and Coral Creek Diversion pipelines	• Annual maintenance, as needed (full repainting/recoating of facilities on a rotation of every 10–20 years)	• License Article 424/Forest Service 4(e) Condition 11 (Visual Resources Protection Plan): Follow general aesthetic guidelines (e.g., painting in earth tones, landscaping with vegetation similar to surrounding areas)

cfs = cubic feet per second

5.1.6. Project Generation and Outflow Records

The powerhouse is operated as a baseload facility.[8] 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 MWh per month.

Average annual net generation for the Project under the current FERC license (1997 through 2023) is 118,497 MWh, with a 5-year average (2019 to 2023) of 123,505 MWh. During this period, the Project experienced periods (days, weeks, and months) of no or reduced generation, which may be the result of (1) planned routine maintenance and inspections or non-routine infrastructure repairs/upgrades; (2) unscheduled (forced) outages due to equipment malfunction; (3) periods of low inflow where SCE was required to meet MIF requirements in the Fairview Dam Bypass Reach and there was insufficient water remaining for generation; or (4) instances in which SCE elected to pause generation due to increased sediment loads in the NFKR upstream of the Project to reduce undue wear on the water conveyance system and generating units. Refer to Exhibit B, Section 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 O&M and environmental resources management included as part of current FERC Order, including amendments, are briefly described below.

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

5.1.7.1. Project Operations and Maintenance

Minimum Instream Flow Requirements

License Article 406 and Forest Service 4(e) Condition No. 4 (77 FERC ¶ 61,313) require SCE to maintain continuous minimum flows, or natural flows, whichever is less, as measured by SCE gage 401 below Fairview Dam in accordance with the following schedule:

- October: 80 cfs
- November through February: 40 cfs
- March: 70 cfs
- April through June: 100 cfs
- July through August: 130 cfs
- September: 100 cfs

Additionally, SCE provides 35 cfs year-round to California Department of Fish and Wildlife (CDFW's) Kern River Planting Base Hatchery via the Project water conveyance system and the KR3 Powerhouse tailrace.[9] In a run-of-river facility, diurnal flows fluctuate, and release and hatchery flows may vary; therefore, SCE includes an additional buffer of 5 to 10 cfs in the hatchery release. FERC confirmed the appropriateness of this practice in a letter issued to SCE on September 29, 2004, and SCE has continued this practice since that time (FERC Accession No. 20041005-0071). If the natural flow is not available to meet both the hatchery needs and the MIF, the hatchery flows take precedence over the instream flow releases at Fairview Dam (License Article 406 and Forest Service 4(e) Condition 4; 77 FERC ¶ 62,313).

SCE is also required, per Forest Service 4(e) Condition No. 4, to maintain MIFs below Salmon Creek Diversion and Corral Creek Diversion, as outlined in Table 5.1-9.

Table 5.1-9. Minimum Instream Flows for Salmon and Corral Creek Diversions

Diversion	Dates	Minimum Instream Flow (cfs)
Salmon Creek	February through June 30	4
Salmon Creek	July 1 through January 31	1
Corral Creek	February through June 30	1

[9] On July 27, 2023, FERC issued an Order granting SCE a temporary variance to the 35 cfs flow requirement to CDFW's Kern River Planting Base for a period of 2 years, or whenever the hatchery pipeline becomes operable, whichever occurs first (184 FERC ¶ 61,051 [2023], *Order Modifying and Approving Temporary Variance of Hatchery Flow Requirement Under Article 406*).

Diversion	Dates	Minimum Instream Flow (cfs)
Corral Creek	July 1 through January 31	0.5

Source: 107 FERC ¶ 62,136 (2004), *Order Amending License to Include U.S. Forest Service Revised Final Terms and Conditions Pursuant to Section 4(e) of the Federal Power Act*

cfs = cubic feet per second

The diversions are manually operated, and SCE may elect to “turn-out” the diversions in lower-flow months and let all natural flow continue downstream. However, if large rainfall is predicted, SCE will “turn-in” the diversion to capture and divert additional flow after the MIFs have been met; the diversions are configured so that the required instream flows are provided before any additional flow is diverted to the flowline.

Ramping Rates

License Article 407 and Forest Service 4(e) Condition No. 5 (amended November 17, 2006; 117 FERC ¶ 62,167 [2006], *Order Amending Article 407 and Revising Section 4(e) Condition 5*) clarified the ramping rate for the protection of aquatic resources in the NFKR downstream of Fairview Dam. The revised License Article states that when reducing flows in NFKR downstream of Fairview Dam (increasing flows in the flowline), the “Licensee shall operate the Project such that flow reductions [downstream of Fairview Dam] do not exceed 30 percent of the existing flow per half hour.”

Recreational Boating Releases

License Article 422 (amended January 30, 2019; 166 FERC ¶ 62,049 [2019], *Order Amending License Article 422 and to Include U.S. Forest Service Section 4(e) Condition 6(f)*) provides a flow schedule to enhance whitewater recreation opportunities in the Fairview Dam Bypass Reach during peak run-off in the spring and summer. The whitewater flow release schedule is shown in Table 5.1-10, and the Article states:

> Beginning no later than 10 a.m. and ending no earlier than 5 p.m. of each day that whitewater flows are scheduled, the Licensee must release the minimum whitewater flows described below into the Project bypass reach. The use of water under the regime below must be based on the previous day’s average inflow to the project, from April 1 through July 31, measured by adding the preliminary canal gauge 11185500 data below the diversion to the preliminary river gauge 11186000 data below Fairview Dam. In the event that actual inflows to the Project on a whitewater release day are insufficient to both allow the continuous 300-cfs diversion to the Project powerhouse and meet the minimum whitewater release, then the whitewater release may be reduced in order to allow the continuous 300-cfs diversion to the Project powerhouse.

Table 5.1-10. Whitewater Recreation Flow Releases Schedule

Dates	Boating Days	River Flow Fairview Dam (cfs)	Minimum Whitewater Release (cfs)
April 1 up to the weekend prior to Memorial Day Weekend	Fridays and Weekends	1,000 to 1,300 More than 1,700	700 1,400
Weekend prior to Memorial Day Weekend until July 4	Daily	1,000 to 1,300 More than 1,700	700 1,400
July 5 up to July 31	Weekends	1,000 to 1,300 More than 1,700	700 1,400

cfs = cubic feet per second

Sandbox Flushing/Sediment Management

The sandbox captures a portion of the naturally occurring river sediment, thereby reducing the amount of sediment entering the KR3 flowline, and ultimately the KR3 units in the powerhouse. By capturing and depositing sediments in the sandbox before diversion to the powerhouse, abrasive effects of sediments and associated maintenance on hydroelectric generating equipment is reduced. The sediment is then returned to the NFKR during regular flushing activities described below.

As stated in License Article 402 (amended January 7, 2010; 130 FERC ¶ 62,013 [2010], *Order Approving Sediment Flushing Regime Evaluation Study and Modifying Sediment Flushing Plan Under Article 402*), the Section 401 WQC Condition 4, and Forest Service 4(e) Condition No. 5, SCE implements sandbox flushing bi-weekly when river flows exceed 350 cfs. The sandbox consists of two sections, each of which is capable of transferring the flow needed for hydroelectric generation. When a flushing event takes place, one section is flushed while the other section conveys water, allowing the powerhouse to maintain continuous operation. Each section can be flushed and refilled in approximately 4 hours.

5.1.7.2. Aquatic Resources

Fish Monitoring

As required by License Article 411, SCE developed and FERC approved (on October 7, 1997) a Fish Population Monitoring Plan. The plan includes a monitoring program to track the abundance of fish and the age structure of the population over time. Fish populations were monitored at five locations (two sites upstream of and three sites downstream of Fairview Dam) every 5 years over the term of the license. SCE files monitoring reports with resource agencies and FERC following each 5-year sampling event to summarize findings and provide recommendations for future sampling efforts.

Funding Account

On September 27, 1995, SCE entered into the Upper Kern Basin Fishery Resource Enhancement Settlement Agreement (Settlement) with the California Department of Fish and Game (CDFW's previous agency name), Forest Service, and USFWS (together, the Parties) to require that SCE implement instream flows, provide funds in lieu of fish entrainment studies, and fish screens in furtherance of the objectives of the Upper Kern River Basin Fishery Management Plan (Upper Kern River Plan).[10] Under the Settlement, SCE agreed to establish the $2.5 million Fund to finance studies and enhancement efforts to further the objectives of the Upper Kern River Plan. On the same day they entered the Settlement, the Parties also entered into the 1995 Memorandum of Understanding (MOU) (which was amended in 2005 and approved by FERC on April 12, 2006 [115 FERC ¶ 62,059, *Order Approving Amended Trust Fund Agreement*]) regarding the distribution and use of the Fund.

Under Article 409 of the license, SCE was required to place $2.5 million in an interest-bearing account to establish the Fund. In addition, Article 409 expressly requires the Fund to be established "in accordance with the Settlement…and [MOU]." Under the general purposes for the Fund stated in Article 409, together with the specific criteria of the Article 412 Fisheries Plan (FERC Accession No. 20060928-5021), the Fund is to be used for the benefit of fishery resources in the Upper Kern River Basin. Representatives of the Parties to the MOU formed a Trust Committee that reviews and approves or disapproves each application for these funds, ensures proper expenditures, and verifies the effectiveness of each project, as applicable, to meeting fishery management objectives. Under Article 410, SCE is required to file an annual Project Expenditures Plan with FERC that shows the amount of money proposed to be spent pursuant to the funding provisions. SCE is also required to file an annual report with FERC to detail efforts to implement the FERC-approved projects paid for by the Fund. The Fund balance as of December 31, 2023, is $3,503,529.79, after grant disbursements of $21,262.53 as well as administrative and investment management fees of $43,206.19. The $21,262.53 is the balance from the $75,000 fund granted to Plumas Corporation Windy Fire Meadow Restoration Design Development, minus a $53,074 refund from the canceled Dry Meadow Restoration Project and $663.48 leftover funds from Johnsondale Bridge Staircase Project.

Both the Settlement and MOU provide that the Fund will continue beyond the current license term and even beyond the expiration of the Settlement and MOU themselves. Pursuant to section 1(B)(5) of the MOU, the Fund will continue following termination of the MOU: “upon termination of the MOU in accordance with Subsection I(B)(2)(i), (ii), or (iii), the Parties agree to continue the use of the Funding Account and the Interest Account for the purposes described in this MOU." The Settlement established a Restricted Fund Endowment (Fund Agreement), which, among other things, created the Kern County Community Foundation (Foundation) to manage the Fund established by the Settlement and required by Article 409 of the license. Notably, the Fund Agreement provides that "[t]he Fund is protected from obsolescence."[11]

[10] S. Cal. Edison, 77 FERC ¶61,313, at pp. 62.426 & 62,432 (1996). The Upper Kem River Plan is a public document that was developed by California Department of Fish and Game, the SQF, and the Sequoia National Park in April 1995.

[11] 2005 Fund Agreement at § 7(b)

5.1.7.3. Threatened and Endangered Species

As required by License Article 420, SCE shall notify USFWS, CDFW, Forest Service, and FERC if any federally listed threatened, endangered, or sensitive species other than those described in the final Environmental Assessment (FERC and Forest Service, 1996) are found within the FERC Project Boundary in the future.

5.1.7.4. Land Management

Visual Resources

In accordance with License Article 424, SCE filed a Plan for the Design and Construction of Project Facilities in Order to Preserve or Enhance Visual Quality. The plan was approved by FERC on June 10, 1998, and includes procedures for the preservation and/or enhancement of the aesthetic environment. The procedures include consultation and approval from the SQF prior to initiating any activities, painting facilities or structures in earth tones, using vegetation to screen and blend in structures with the surrounding areas, and requires that any new facilities or roads will be cited to minimize visual impacts, where feasible.

Oil and Hazardous Substances

SCE developed a Plan for Oil and Hazardous Waste Storage and Spill Prevention and Cleanup per License Article 404, which was approved by FERC on March 2, 1998 (82 FERC ¶ 62,142 [1998], *Order Approving Articles 401, 403, 404, and 405*). The plan includes a description of oil or hazardous materials associated with the Project and describes spill prevention procedures and, in the event of a spill, cleanup procedures and notification requirements. The plan also includes SCE's Spill Prevention Control and Countermeasures Plan for the Project, as required by 40 CFR Part 112, which is updated annually.

Erosion, Stream Sedimentation, Soil Mass Movement and Dust Control Plan

SCE developed a Plan for Control of Erosion, Stream Sedimentation, Soil Mass Movement, and Dust per License Article 401 and was approved by FERC on March 2, 1998 (82 FERC ¶ 62,142). The plan includes measures to reduce erosion and sedimentation and dust controls resulting from Project construction and operation. In addition, the plan includes measures for remediation in the event of a flowline rupture or failure of slopes along the water conveyance system or cut slopes for roadways and Project facilities.

Construction/Tunnel Spoils and Slide Material Storage/Disposal Plan

SCE developed a Plan for Storage and/or Disposal of Excess Construction/Tunnel Spoils and Slide Materials per License Article 405, which was approved by FERC on March 2, 1998 (82 FERC ¶ 62,142). The plan noted that if material is generated as a result of desiltation programs or from other earth movements, material from these activities will be used as fill material either on SCE-owned lands, or another agreed-upon location with the landowner. If needed, a separate plan will be developed and submitted to the SQF if major construction activities are planned.

5.1.7.5. Cultural Resources

As required by License Article 425, SCE implemented the PA, which includes the Cultural Resources Management Plan (CRMP). The CRMP identifies specific measures that SCE undertakes to avoid adverse impacts to NRHP-eligible properties located within the FERC Project Boundary.

The CRMP identifies various programmatic measures that SCE is required to implement, as well as resource monitoring and recordation. The CRMP states that if impacts to NRHP-eligible properties cannot be avoided with implementation of protective and avoidance measures, SCE, in consultation with the SHPO and FERC, shall develop a site-specific treatment plan in accordance with 36 CFR Part 800.4-800.6. Resource monitoring and recordation is required to occur in 5-year increments to determine the success of current measures and to evaluate the need for additional treatment.

5.1.7.6. Project Safety

Part 12 Dam Safety Inspections

The existing Project dam and diversions are classified as a “low hazard” since no reasonably foreseeable Project emergency would endanger life, health, or property. Accordingly, the Project is exempt from the FERC Part 12 Independent Consultants Dam Safety Inspection requirement. However, over the term of the existing license, SCE has participated in FERC dam safety and environmental inspections. Any subsequent FERC directives and items identified during these inspections as requiring attention were timely addressed by SCE and written documentation filed with FERC.

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. Since April 1981, SCE has been exempted from filing an EAP for the Project diversions because it demonstrated that no reasonably foreseeable Project emergency would endanger life, health, or property.

As required in 18 CFR § 12.21(c)(1), SCE continues to review the conditions that allow them the exemption by conducting field reconnaissance of areas downstream of all exempt diversions to confirm that no new downstream development has occurred. During the current license term, SCE has filed annual requests with FERC for a continuation of the exemption from EAP requirements for the Project since no downstream hazard exists should any of the diversions fail. To date, FERC has agreed with SCE’s annual requests and determined that an EAP is not required for the Project. Per 18 CFR § 12.21(c)(2), if there are any changes to the Project that might cause an emergency endangering life, health, or property, SCE would promptly notify FERC to determine the necessity to prepare an EAP.

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 Fairview Dam; and near the KR3 Powerhouse;
  - Signage is also posted along the river upstream of the Fairview Dam warning boaters about Fairview 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 Fairview Dam and intake structures;
  - Gates and fences limiting access into Project facilities.
- River safety measures: A horizontal safety cable is strung across the NFKR, just upstream of the Fairview 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 O&M in response to implementing new or modified environmental measures, which are described in detail below.

5.2.1. FERC PROJECT BOUNDARY MODIFICATIONS

Pursuant to 18 CFR § 4.41, the FERC Project Boundary must encompass all lands necessary for Project purposes, including the O&M of the Project over the term of the FERC license. The FERC Project Boundary would be modified (increased and/or decreased) under the Proposed Action to (1) include all lands necessary for Project O&M; (2) remove lands no longer necessary for Project O&M; 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 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 proposed Project to generate power for SCE customers consistent with regulatory requirements (i.e., FERC License Articles as modified by conditions included in the proposed Project 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 5.1.7.1, *Project Operations and Maintenance*, with the changes described below, including minor adjustments in response to the implementation of environmental measures.

5.2.3.1. Project Generation

Implementation of the new environmental measures may change Project generation at the KR3 Powerhouse under the Proposed Action compared with the No-Action Alternative. An estimate of the annual average generation under the Proposed Action, including implementation of the new measures will be provided in the FLA.

5.2.4. 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*).

5.2.5. Proposed Environmental Measures, Management Plans, and Programs

A description of the measures that SCE proposes to continue as part of a new license (ongoing); current measures that are mostly the same but have some minor changes or updates (modified); or new environmental management plans (new) are briefly described below in Table 5.2-1 with additional details provided in Appendix E.1. These environmental measures associated with ongoing Project O&M activities are designed to protect, maintain, or enhance environmental, recreation, and cultural resources over the term of the new license.

Table 5.2-1. Proposed Environmental Measures, Management Plans, and Programs

Proposed Measure No.	Environmental Measure/ Management Plan/Programs	Ongoing/ Modified/New	Summary of Proposed Measure
Water Resources & Project Operations			
WR-1	Minimum Instream Flows	Modified	Modified instream flow releases below Fairview Dam. Continue to provide 35 cfs via the Project's water conveyance system to support CDFW's Kern River Planting Base Hatchery (Current License Article 406). Provide minimum instream flows for Salmon and Corral Creeks (current Forest Service 4e Condition No. 4).
WR-2	Ramping Rates	Ongoing	Continue with same ramping rate when reducing flows in the NFKR (current License Article 407).
WR-3	Stream Gaging Plan	New	Develop a new management plan that describes ongoing maintenance and reporting of the Project stream gages used for compliance.
WR-4	Sediment Management Plan	Modified	Develop a management plan that outlines sediment management procedures at the sandbox (current License Article 402) and Salmon and Corral Creek Diversions.
WR-5	Recreational Boating Flows	New	New whitewater boating release schedule (replaces current License Article 422).
Recreation Resources			
RR-1	Recreation Plan	New	Develop a new management plan that outlines SCE's responsibility and long-term O&M for the Project recreation site (replaces current License Article 521).
Land Use			
LU-1	Project Roads and Facilities Management Plan	New / Ongoing	Develop new management plan that outlines SCE's responsibility and long-term O&M for Project roads and facilities on National Forest Service lands. The Plan will also include measures for soil stabilization and erosion control when performing minor road construction activities (current License Article 401), or storage or disposal of tunnel spoils (current License Article 405).

Proposed Measure No.	Environmental Measure/ Management Plan/Programs	Ongoing/ Modified/New	Summary of Proposed Measure
LU-2	Visual Resources Protection Plan	Ongoing	Continue to implement measures that outlines SCE's responsibility to maintain continued Project aesthetics (current License Article 424).
LU-3	Treatment and Disposal of Solid Waste and Wastewater Plan	Ongoing	Continue to implement measures for disposal of domestic solid waste, disposal of construction-related debris and management of domestic wastewater (current License Article 403).
LU-4	Oil and Hazardous Substances Management Plan	Ongoing	Continue to implement measures for oil and hazardous waste management (current License Article 404).
Cultural and Tribal Resources			
CR-1	Historic Properties Management Plan	New	Develop a new management plan that outlines measures for the management of historic properties (replaces current License Article 425 and existing CRMP).
Terrestrial and Botanical Resources			
TB-1	Vegetation Management Plan	New	Develop a new management plan that describes vegetation management activities and outlines measures for the protection of special status species and invasive species management. Incorporates notification of any new state or federally listed threatened, endangered, or sensitive species in the FERC Project Boundary (current License Article 420).
TB-2	Wildlife Resources Management Plan	New	Develop a new management plan that outlines measures for the protection of wildlife in the FERC Project Boundary, including special status species that may be present when conducting Project maintenance activities. Incorporates notification of any new federally listed threatened, endangered, or sensitive species in FERC Project Boundary (current License Article 420).

CDFW = California Department of Fish and Wildlife; cfs = cubic feet per second; CRMP = Cultural Resources Management Plan; FERC = Federal Energy Regulatory Commission; NFKR = North Fork Kern River; O&M = operations and maintenance; SCE = Southern California Edison

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 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 (SD1) and Scoping Document 2 (SD2), FERC concluded that federal takeover was not a reasonable alternative (FERC, 2021, 2022). 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 existing license with appropriate conditions. SCE 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.

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7.0 ENVIRONMENTAL ANALYSIS

7.1. GENERAL DESCRIPTION OF THE RIVER BASIN

The Project is located within the NFKR. This section provides an overview of the Kern River Basin, including information on the overall watershed area and sub-watershed areas, rivers and streams potentially affected by the proposed Project, major land and water uses, and other dams and diversions in the watershed. Additional information related to geology, hydrology, vegetation and wetlands, and population size and density is included in Section 7.2, *Geologic and Soils Resources;* Section 7.3, *Water Resources;* Section 7.6, *Botanical Resources;* and Section 7.8, *Land Use Management and Resources*, respectively.

7.1.1. KERN RIVER BASIN

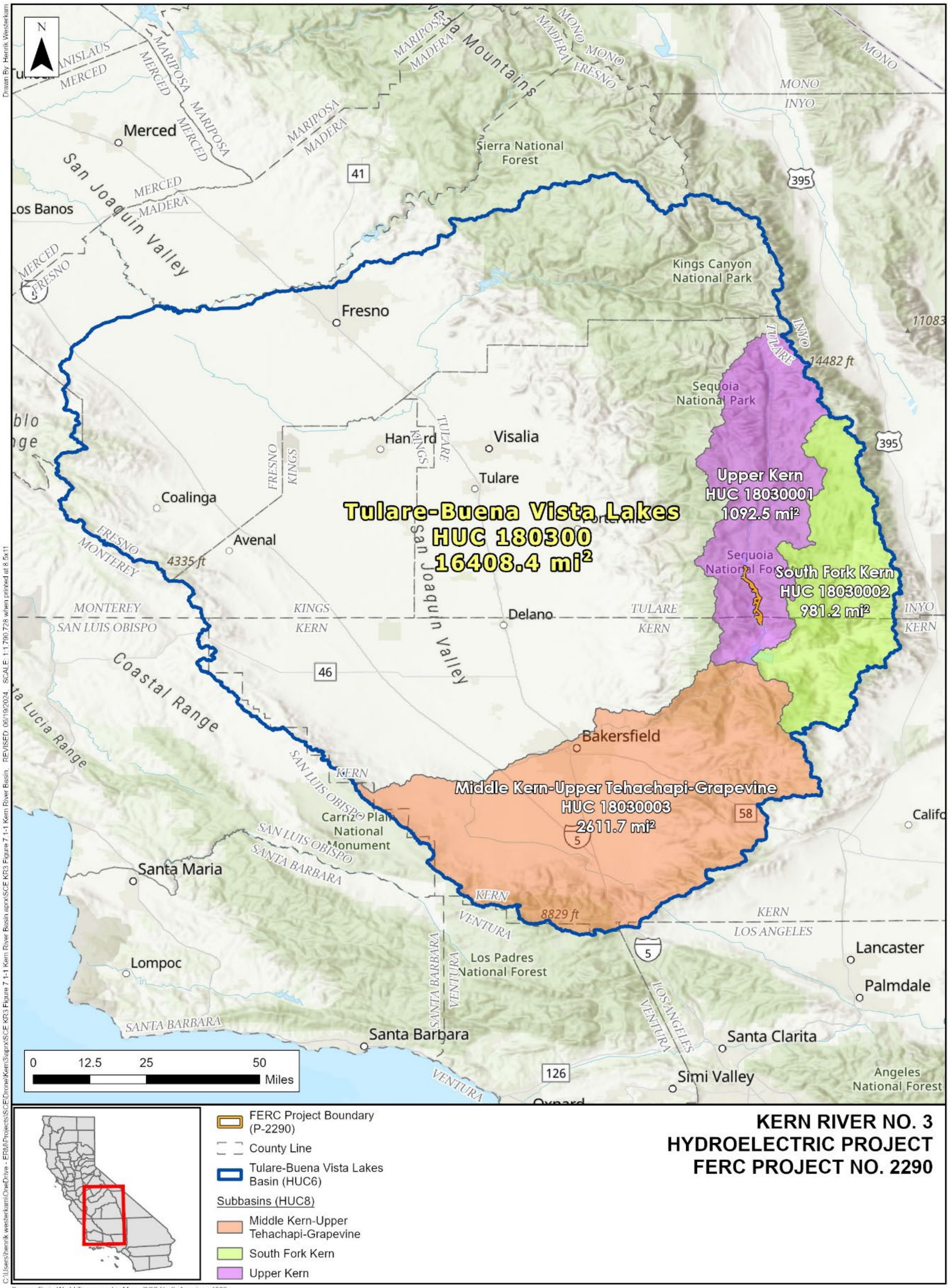
The Kern River Basin is the southernmost of four major river basins in the larger Tulare-Buena Vista Lakes Basin (Tulare Lake Basin) (Hydraulic Unit Code [HUC] 180300), draining to Tulare and Buena Vista Lakes, and the southernmost major river system in the Sierra Nevada (USGS, 1981). The Kern River Basin is divided into three subbasins: Upper Kern Subbasin (HUC 18030001), which also includes the NFKR and the FERC Project Boundary; South Fork Kern Subbasin (HUC 18030002) to the east; and the Middle Kern-Upper Tehachapi-Grapevine Subbasin (HUC 18030003) to the south (Figure 7.1-1).

The NFKR 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 amsl) on the west side of the Sierra Nevada, contained by the Great Western Divide to the west (a series of mountains in the Sierra Nevada 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 in elevation (USGS, 2012, 2015a, 2015b, 2015c, 2018). From its headwaters, the NFKR flows south through the Kern Canyon, a deep glacier-carved canyon, through both the Inyo National Forest and SQF and the Golden Trout Wilderness, receiving water from Rock Creek, Big Arroyo, Golden Trout Creek, and Rattlesnake Creek (USGS, 2012, 2015a, 2015b, 2018). At Hockett Peak, the NFKR is joined by the Little Kern River at Forks of the Kern (USGS, 2015c) and then continues south to Isabella Lake. The elevation of the Upper Kern Subbasin ranges from 14,495 feet amsl at Mount Whitney to 2,065 feet amsl at Isabella Lake (FERC and Forest Service, 1996). The NFKR is approximately 92 miles long and has a drainage area of approximately 1,093 square miles.

The headwaters of the South Fork Kern River (SFKR) begin in the Sierra Nevada Mountains of the Inyo National Forest in northeastern Tulare County, about 10 miles east of the NFKR in the South Fork Kern Subbasin. The headwaters begin in the Golden Trout Wilderness, flowing south into the SQF. The SFKR is 100 miles long and has a drainage area of approximately 981 square miles. Isabella Dam, owned and managed by U.S.

Army Corps of Engineers (USACE), is located downstream of the confluence of the NFKR and SFKR, creating Isabella Lake.

Downstream of Isabella Lake, the Kern River flows an additional 75 miles and drains an additional 2,612 square miles terminating near the city of Bakersfield. The Kern River historically emptied into the now dry Buena Vista Lake, which when overflowing, would back up into Kern Lake and then drain into Tulare Lake, which occasionally overflowed into the San Joaquin River during very high flows. Currently, water is almost entirely diverted for irrigation and aquifers, with any excess water directed into the California Aqueduct (part of the California State Water Project) or Lake Webb and Lake Evans, two small lakes in a portion of the former Buena Vista Lakebed. In addition to agriculture and domestic uses, large areas of land downstream from the Project have also been developed to conserve the Kern River and other water supplies not needed for crop irrigation.



FERC = Federal Energy Regulatory Commission; HUC = Hydraulic Unit Code; mi² = square mile

Figure 7.1-1. Kern River Basin.

7.1.1.1. Upper Kern Subbasin

The Upper Kern Subbasin is divided in to six watersheds, from upstream to downstream:

- Rock Creek-Kern River
- Golden Trout Creek-Kern River
- Little Kern River
- Rattlesnake Creek-Kern River
- Brush Creek-Kern River
- Bull Run Creek-Kern River

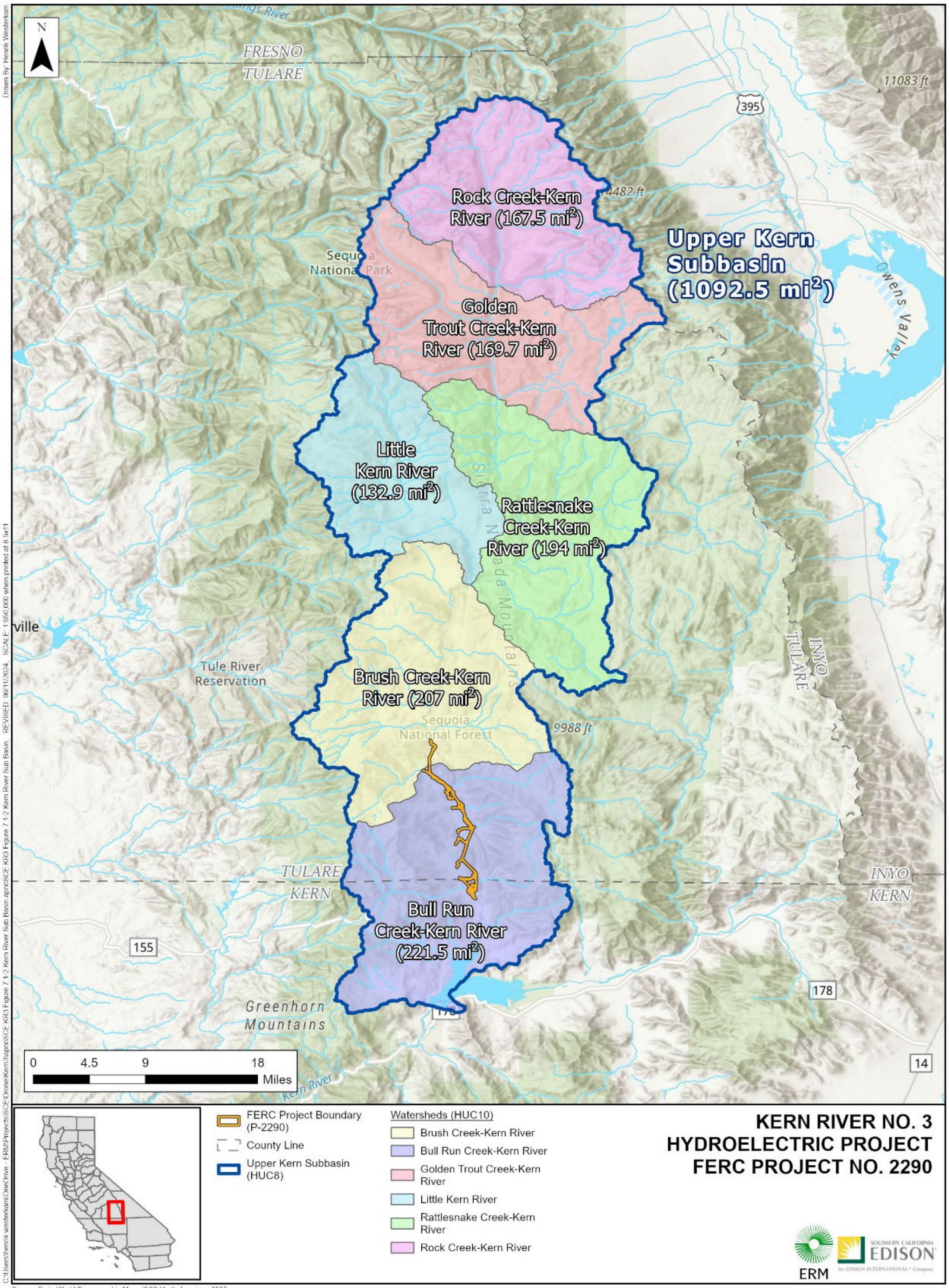
The Project is located on the downstream end of the Upper Kern Subbasin, in the Brush Creek-Kern River and Bull Run Creek-Kern River Watersheds (Figure 7.1-2). The highest elevations in the Brush Creek-Kern River and Bull Run Creek-Kern River Watersheds are around 8,000 to 9,000 feet amsl, while Project facilities range from about 3,632 feet amsl at Fairview Dam to approximately 2,700 feet amsl at the KR3 Powerhouse.

7.1.2. Tributaries and Affected Stream

The primary Project dam, Fairview Dam, and two smaller diversion dams direct water into the Project's water conveyance system, bypassing an approximately 16-mile-long reach of the NFKR and two smaller tributaries, Salmon and Corral Creeks. Fairview Dam diverts water from the NFKR into the Project water conveyance system at River Mile (RM) 18.6[12] and returns flows back in the river at the KR3 Powerhouse tailrace at RM 3.1 (Figure 7.1-3).

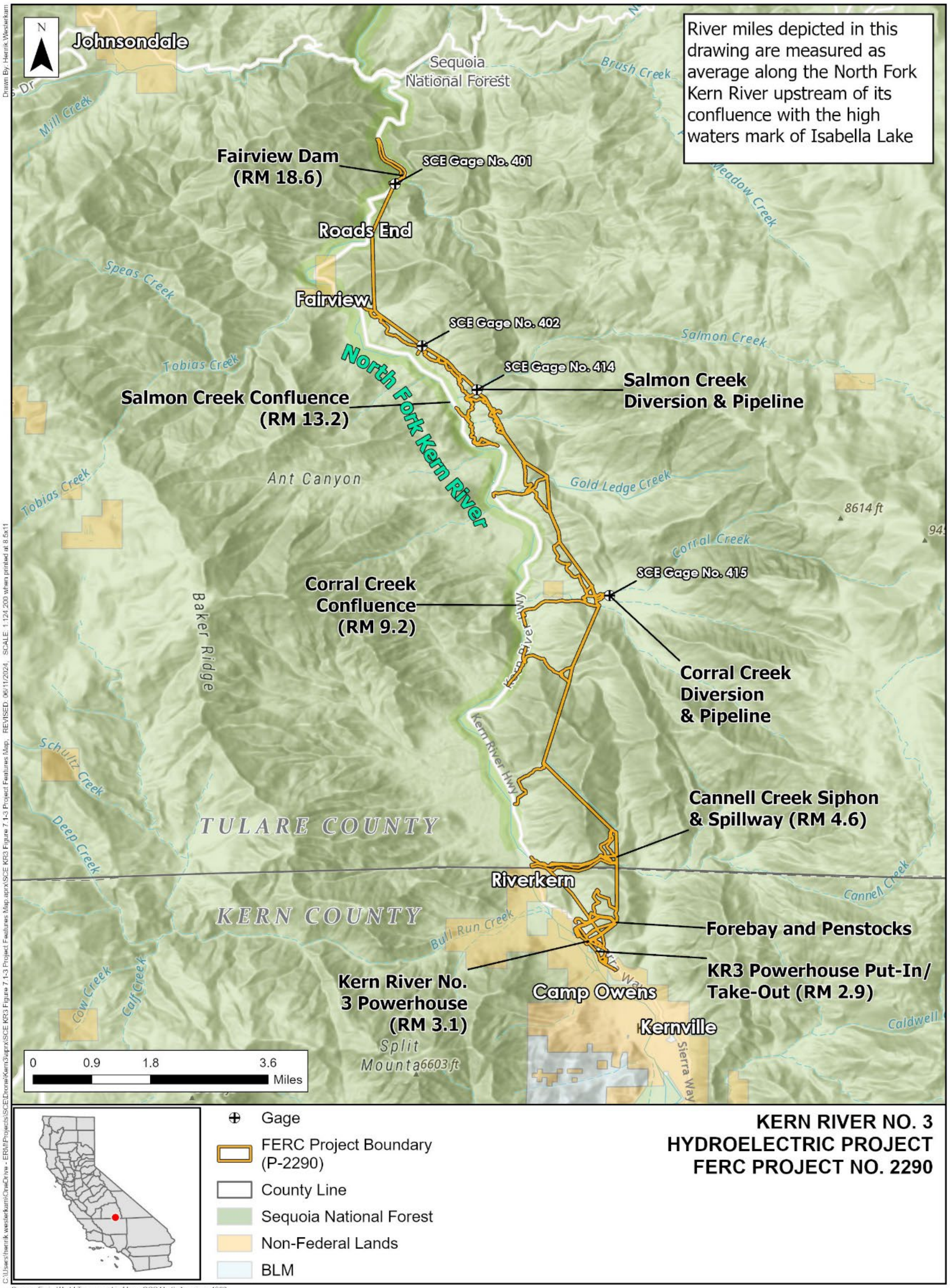
Along the Fairview Dam Bypass Reach, Salmon Creek joins the NFKR approximately 5.4 river miles downstream from Fairview Dam, and Corral Creek joins the NFKR another 4 river miles downstream. The Project diversions located on Salmon and Corral Creeks are situated approximately 0.4 mile and 1.1 miles upstream from their confluence with the NFKR, respectively. However, all bypassed flows are returned to the NFKR at the KR3 Powerhouse.

[12] RM 0.0 is defined as the NFKR confluence with the high-water line of Isabella Lake.



FERC = Federal Energy Regulatory Commission; HUC = Hydraulic Unit Code; mi^2 = square mile

Figure 7.1-2. Upper Kern Subbasin.



BLM = Bureau of Land Management; FERC = Federal Energy Regulatory Commission; KR3 = Kern River No. 3; RM = River Mile; SCE = Southern California Edison

Figure 7.1-3. Kern River No. 3 Hydroelectric Project Features.

Fairview Dam and the two diversion dams do not provide useful storage capacity, although a small pool of water may back up behind the diversion dams. The flowline traverses the eastern hillside between Fairview Dam and the KR3 Powerhouse and crosses a number of smaller tributaries; however, the Project infrastructure is situated above the stream channel and does not affect these streams. The Cannell Creek Siphon, a component of the flowline, is situated approximately 1 mile upstream from the forebay and conveys water across Cannell Creek. If excess pressure within the flowline needs to be reduced, the upstream section of the siphon is equipped to automatically release water from the flowline into the approximately 450-foot-long bedrock lined spillway (Cannell Creek Siphon spillway), to Cannell Creek. The confluence of Cannell Creek and the NFKR is approximately 1 river mile downstream from the siphon.

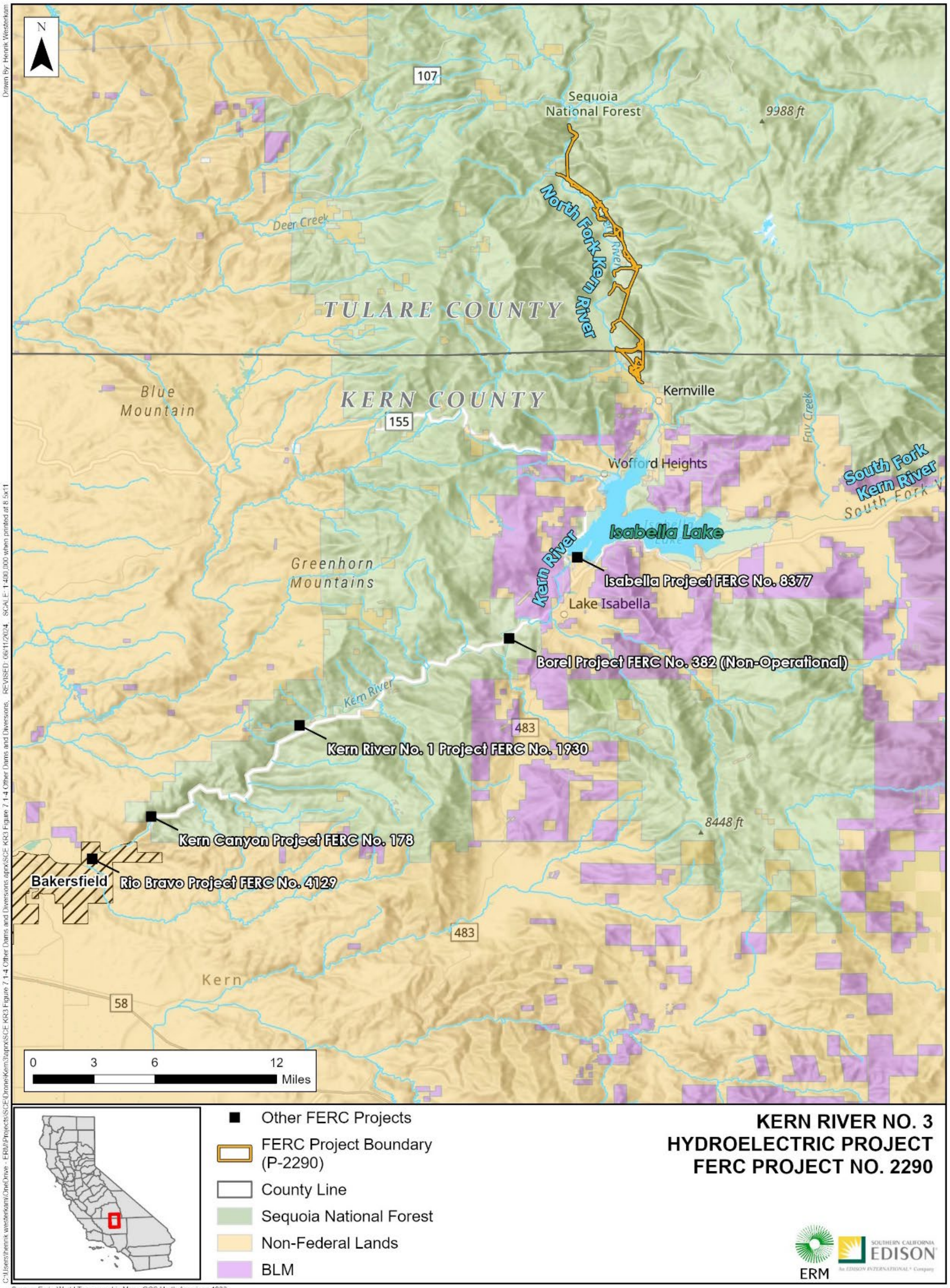
7.1.3. Other Dams and Diversions

No impoundments or diversions are located in the NFKR upstream of the Project. Two non-Project diversions (not owned or operated by SCE)—Kernville Ditch and Gilbert Ditch—are located immediately downstream of the KR3 Powerhouse on the NFKR and outside of the FERC Project Boundary. The Kernville Ditch is a pre-1914 water rights claim constructed of native streambed material with the diversion point located along the west side of the NFKR approximately 1 river mile downstream from the KR3 Powerhouse. The ditch can divert up to 3 cfs for domestic use to 62 residential property owners, and any excess flow is returned to the NFKR upstream of the Kernville Bridge. The Gilbert Ditch is a pre-1914 water right claim with the diversion point located along the east side of the NFKR approximately 1 river mile downstream from the KR3 Powerhouse and diverts up to 35 cfs from the NFKR for domestic use agricultural uses and excess flow, including the hatchery discharge, is returned to the NFKR downstream of Kernville. The Gilbert Ditch can receive water from two locations: (1) an enclosed pipe connected to the outflow from CDFW's Kern River Planting Base Hatchery, and (2) directly from the NFKR via a manual slide gate.

Approximately 10 miles downstream of the KR3 Powerhouse, the Kern River is impounded by USACE's Isabella Dam, which forms the Isabella Lake. Isabella Dam was constructed in the Kern River channel at the confluence of the NFKR and SFKR in 1953 for downstream flood control. Five other FERC-licensed hydroelectric projects are located on the Kern River at or below Isabella Lake, listed from upstream to downstream (Figure 7.1-4):

- Isabella Partners' 11.95-MW Isabella Hydroelectric Project (FERC No. 8377) is located on the downstream toe of the main USACE-owned dam at Isabella Lake and diverts its water within the dam outlet works. The total rate of diversion under existing permits is 1,632 cfs.
- SCE's 12.00-MW Borel Hydroelectric Project (FERC No. 382) is currently nonoperational.

- SCE's 26.3-MW Kern River No. 1 Hydroelectric Project (FERC No. 1930) is operated as a run-of-river power generation facility at Democrat Dam. The maximum diversion capacity for power generation is 412 cfs.
- Kern and Tule Hydro LLC's 11.475-MW Kern Canyon Hydroelectric Project (FERC No. 178) operates as a run-of-river project located approximately 15 miles east of Bakersfield, California.
- Olcese Water District's 14-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.



BLM = Bureau of Land Management; FERC = Federal Energy Regulatory Commission

Figure 7.1-4. Dams and Diversions Along the Lower Kern River.

7.1.4. Major Land Uses

The headwaters of the Kern River are in Sequoia National Park, and majority of the Upper Kern River Subbasin is under public ownership managed by the National Park Service (NPS) and SQF. In 1987, Congress designated 78.5 continuous miles of the NFKR from the Kern/Tulare County line up to the headwaters in Sequoia National Park as “Wild and Scenic River” (Pub. L. No. 100-174, 101 Stat. 924 [1987]). The Forest Service manages the SQF according to its Land Management Plan for a variety of land uses, including recreation (e.g., whitewater rafting, camping, destination recreation areas, trails), wilderness use, maintenance and improvement of habitat, rangeland, timber production, and the exploration and development of mineral resources, particularly energy resources (Forest Service, 2023). The area surrounding the Project is rural in nature and has minimal development, particularly upstream of the Project, because it is part of the SQF. Project features are all located on federal land within the SQF or on SCE-owned lands. Downstream of the Project, lands transition to primarily private ownership, with land use managed according to the Kern County General Plan (Kern County Planning Department, 2009).

Residential communities located closest to the Project are located along the NFKR downstream of Fairview Dam and include Fairview, Riverkern, Camp Owens, and Kernville (Figure 7.1-3). Farther downstream of the Project, several small towns are located around Isabella Lake, including Wofford Heights, Lake Isabella, Keyesville, and Bodfish. The closest city, Bakersfield, is about 40 miles southwest of the Project. The Kern River has historically been a focal point for the Bakersfield area because it provides the city’s municipal water supply and other beneficial uses, such as agricultural irrigation and recreation opportunities.

The segment of river between Fairview Dam and the KR3 Powerhouse is a popular recreation destination that offers a number of developed campgrounds (DCGs), day use areas, and hiking trails owned and operated by the Forest Service (Forest Service, 2024). Water-based recreation including angling and whitewater boating are also popular activities. Agriculture, including cultivated crops and hay, occurs in the adjacent Kern River Subbasins, particularly in the area around Bakersfield. Rangeland occurs in Kern County south of the Project around Isabella Lake on Bureau of Land Management (BLM) grazing allotments.

7.1.5. Major Water Uses

Existing and potential beneficial uses that apply to the surface waters in the NFKR, according to the *Water Quality Control Plan for the Tulare Lake Basin* (Basin Plan), include (1) municipal and domestic water supply; (2) hydropower generation; (3) water contact and non-contact water recreation; (4) warm freshwater fisheries; (5) cold freshwater fisheries; (6) wildlife habitat; (7) rare, threatened, and endangered species; (8) spawning, reproduction, and/or early development for fisheries; and (9) freshwater replenishment (CVRWQCB, 2018).

SCE operates the Project in a run-of-river mode for hydropower generation. MIF releases are set at levels to benefit resident trout and native fishes by improving adult habitat, juvenile habitat, and water temperatures during the summer (FERC and Forest Service, 1996). Additionally, 35 cfs is diverted via the water conveyance system to provide cooler water to the CDFW Kern River Planting Base Hatchery. No usable water storage is created by the dam or smaller diversions.

No significant water use occurs upstream of the Project, as the headwaters of the NFKR are located in Sequoia National Park and SQF, which are essentially undeveloped. The small town of Johnsondale, an old logging town, is located approximately 20 miles north of Kernville and is surrounded by the SQF and Giant Sequoia National Monument.

Downstream from the Project, water from the NFKR flows into Isabella Lake, an approximately 586,000-acre-foot (AF) reservoir managed by USACE for flood risk management, municipal and industrial water conservation, and recreation (USACE, 2012). From the reservoir, these waters then flow into the Kern River, which, along with the Kings, Kaweah, and Tule Rivers, supply most of the surface water supply to the Tulare Lake Basin (CVRWQCB, 2018). Water from the Kern River in this area is principally distributed for agriculture, with minor quantities diverted for the urban areas 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 aquifers, with any excess water directed into the California Aqueduct (part of the California State Water Project) or Lake Webb and Lake Evans, two small lakes in a portion of the former Buena Vista Lakebed. In addition to agriculture and domestic uses, large areas of land downstream from the Project have also been developed to conserve the Kern River and other water supplies not needed for crop irrigation.

Water rights diversions from the Kern River for these agricultural and domestic purposes date back to the 1860s (CalEPA, 2008). The distribution, use, and basis of water rights in the Kern River is complex and based on various other decrees and agreements developed over the last 100 years (CalEPA, 2008).

7.1.6. CLIMATE

The Kern River Valley is generally described as a Mediterranean subtropical climate with cold, wet winters, and hot, dry summers. Precipitation falls as snow in the higher elevations of the Upper Kern Subbasin, generally at elevations above 5,000 feet amsl.

In the vicinity of the Project, precipitation generally occurs in the form of rain. Mean annual precipitation in Kernville is approximately 13.1 inches. Temperatures vary with elevation; in Kernville, average annual high and low air temperatures are 97 and 31 degrees Fahrenheit (°F), respectively. The monthly average high and low temperatures are provided in Table 7.1-1.

Table 7.1-1. Average Monthly Temperature and Precipitation in Kernville, California

Month	Average High Temperature (°F)	Average Low Temperature (°F)	Average Precipitation (inches)
January	60	31	2.62
February	63	33	2.64
March	67	37	2.08
April	72	42	0.73
May	81	49	0.34
June	90	56	0.10
July	98	62	0.17
August	97	62	0.18
September	91	55	0.23
October	80	46	0.51
November	68	36	1.53
December	60	31	1.97

Source: U.S. Climate Data, n.d.

°F = Fahrenheit

Waterbodies in the Upper Kern Subbasin are heavily influenced by spring runoff from snowpack accumulated in the Sierra Nevada. Peak flows on the NFKR below Fairview Dam occur during the snowmelt period, typically between April and June. The lowest flows of the year generally occur in the fall, from September to November. Refer to Section 7.3, *Water Resources*, for additional information on Project-related hydrology in the NFKR. Precipitation and snowfall accumulation are recorded in the vicinity of the Project through a network of monitoring and recording stations operated by SCE, the U.S. Geological Survey (USGS), USACE, and the Forest Service's Kern River Ranger District. Real-time and historical rainfall and snowfall data in the watershed are available on the California Data Exchange Center website (http://cdec.water.ca.gov).

7.2. Geologic and Soils Resources

This section describes the geologic background and the applicable management direction regarding geologic and soils resources within the FERC Project Boundary and lands surrounding the Project, including Project bypass reaches. Section 7.2.1 describes the affected environment and resource conditions under current Project O&M (i.e., baseline condition). Section 7.2.2 identifies environmental measures, management plans, and programs that are included in the proposed Project. Section 7.2.3 includes an analysis of ongoing or new environmental effects of O&M activities from the proposed Project, including potential effects from proposed measures. The full description of proposed measures is provided in Appendix E.1.

The descriptions within this section were developed using existing, relevant, and reasonably available information and include results from the following relicensing studies where additional information was collected to further describe the resources:

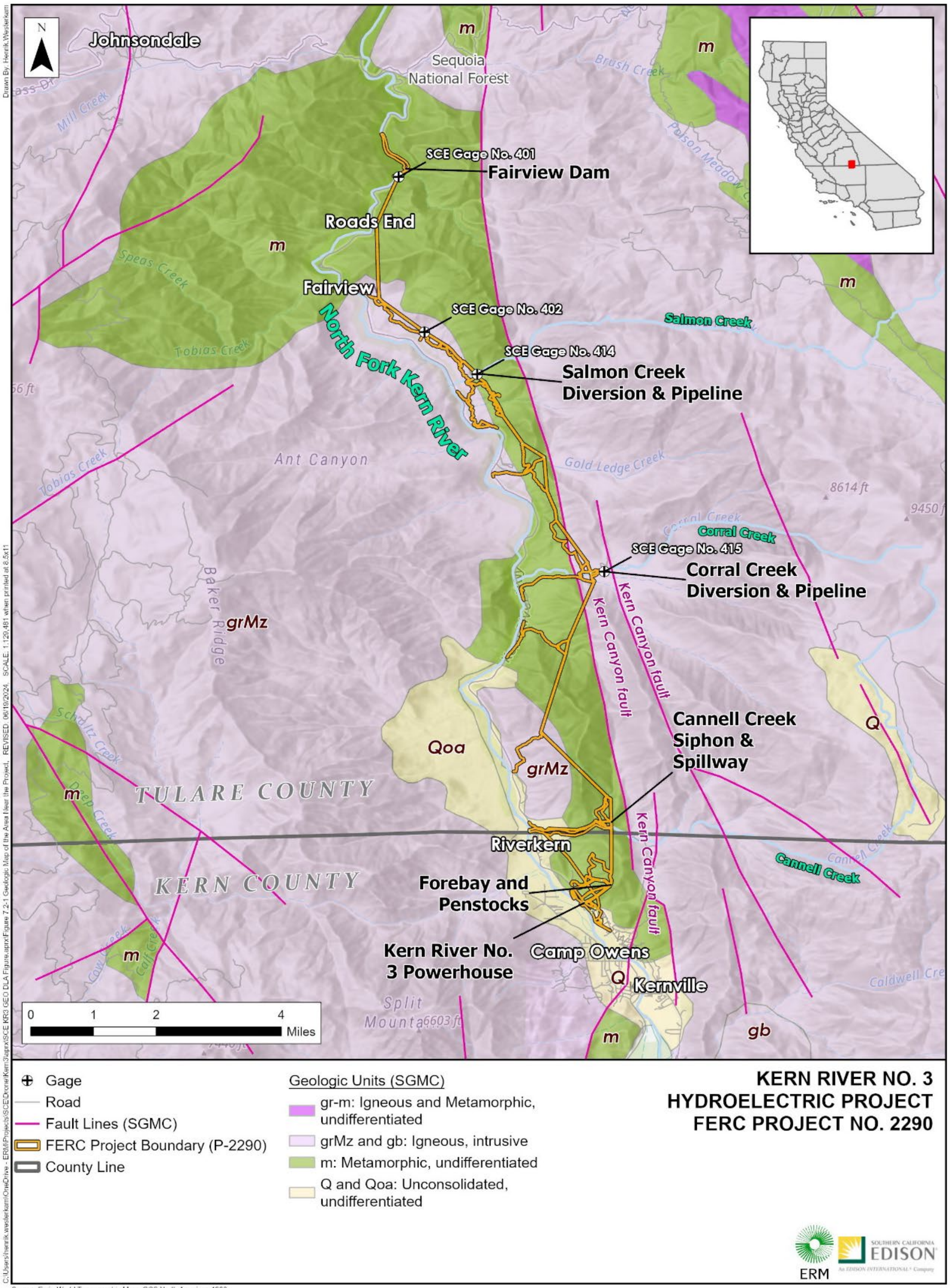
- LAND-1 Road Condition Assessment
- GEO-1 Erosion and Sedimentation

The LAND-1 and GEO-1 Technical Memoranda that support land use and geology and soils resource areas are provided in Appendix E.2. Related information pertinent to the discussion of geologic and soils resources is summarized herein and also discussed in detail in Section 7.8, *Land Use Management and Resources.*

7.2.1. Affected Environment

7.2.1.1. Geology and Soils Background

The Project is located on the western side of the Sierra Nevada in the southern part of the Sierra Nevada geologic province (CGS, 2002). The Sierra Nevada is a northwest-trending, 400-mile-long, 60- to 80-mile-wide mountain chain that formed as a result of uplift, deformation, and multiple intrusions of molten rock that primarily occurred during the Cretaceous period. In contrast to the eastern side, which consists of a high, rugged scarp, the western slope of the province is gently sloping and is cut with deep river canyons. The highest elevation in the province is the summit of Mount Whitney at 14,495 feet amsl (CGS, 2002). The NFKR and Project facilities generally run parallel to and west of the north-striking Kern Canyon Fault located north of Isabella Lake (FERC and Forest Service, 1996) at elevations of approximately 2,700 to 3,800 feet amsl (Figure 7.2-1).



Source: Horton et al., 2017

FERC = Federal Energy Regulatory Commission; SCE = Southern California Edison; SGMC = State Geologic Map Compilation

Figure 7.2-1. Geologic Map of the Area Near the Kern River No. 3 Hydroelectric Project.

Tectonic History

The quasi-rigid crustal block referred to as the Sierra Nevadan microplate comprises the Sierra Nevada and adjacent Central Valley. The microplate has a counter-clockwise rotation relative to the North American plate and is bounded by the San Andreas transpressive plate junction to the west. The Eastern California Shear Zone and Walker Lane Deformation Belt are located east of the Sierra Nevadan microplate and represent the western boundary of the Basin and Range extensional province (Nadin and Saleeby, 2010). As a result, fault structures within the region are subject to extensional forces and earthquakes from active plate movement.

The area that would become the Sierra Nevada was a shallow sea during most of the Paleozoic era (Bateman, 1968). Over millions of years, the shallow continental shelf sediments lithified into a thick marine sedimentary sequence primarily consisting of carbonates (dolomite and limestone). During the Mesozoic era (approximately 210 million years ago), a mountain-building event (i.e., orogeny) uplifted and deformed the sedimentary rocks into a northwest-trending fold. Between approximately 215 and 70 million years ago, as subduction of the oceanic Farallon Plate formed a volcanic arc on the West Coast, melting and extensional forces caused magma, or “plutons,” of varying compositions to intrude into the overlying deformed sedimentary rocks. As the volcanic arc continued to be active, these slowly cooling plutons merged, leading to the development of a large batholith with a complex form and mineralogy stretching more or less continuously from Baja California to western Nevada (Bateman, 1968). The NFKR watershed is located within the southern portion of the Sierra Nevada batholith.

Two major orogenies in the Sierra Nevada occurred during the Cenozoic era and formed the present-day mountain range (Wakabayashi and Sawyer, 2001). The complete subduction of the Farallon Plate at approximately 25 to 29 million years ago changed the tectonic regime from a convergent to a tangential motion in the southern Sierra Nevada and initiated movement along the San Andreas Fault. Simultaneously, the eastern edge of the present-day mountain range was uplifted along the Sierra Nevada Fault, which tilted the igneous batholith to the west. Based on characteristics of terraces and depths of stream incisions, the second major orogeny of the Sierra Nevada has been active since approximately 5 million years ago and has brought the mountains to their current elevation (Wakabayashi and Sawyer, 2001).

Bedrock Lithology and Stratigraphy

The bedrock lithology is generally divided into strongly deformed and weakly metamorphosed sedimentary, plutonic, and volcanic rocks dating to the Paleozoic and early Mesozoic-age (i.e., the “framework” rocks) and younger Mesozoic-age plutonic rocks that intruded into the framework rocks and slowly cooled. The various episodes of Mesozoic-age intrusion caused the plutonic rocks to merge into the Sierra Nevada batholith belt (Bateman, 1968).

The igneous plutonic rocks that make up the batholith primarily consist of coarse-grained crystalline rocks of varying compositions ranging from quartz diorite to alaskite (generally, dark- to light-colored granitic rocks). The igneous plutons were emplaced during several episodes dating to the Cretaceous period, between approximately 140 and 85 million years ago (Chapman et al., 2012). When these Cretaceous-age plutons intruded, the surrounding older sedimentary, plutonic, and volcanic rocks altered to schist, quartzite, and marble (among other types of metamorphic rocks) as a result of contact metamorphism and formed metamorphic structures referred to as roof pendants. Uplift during the Cenozoic era resulted in extensive erosion in the southern Sierra Nevada and the deposition of Paleogene-age sedimentary sequences and Quaternary-age unconsolidated alluvial deposits (Bateman, 1968).

Bedrock underlying the Project primarily consists of Cretaceous-age intrusive igneous rocks associated with the Sierra Nevada batholith, including granite, quartz monzonite, granodiorite, and quartz diorite. Metamorphic rocks near and partially within the FERC Project Boundary are interpreted to be metasedimentary and metavolcanic rocks, including slate, quartzite, hornfels, chert, phyllite, mylonite, schist, gneiss, and minor marble (Figure 7.2-1; CDC, 2010a). Unconsolidated, poorly sorted Pleistocene- to Holocene-age alluvium and terrace deposits overlying bedrock in the FERC Project Boundary are associated with episodic depositional events related to floods and debris flows (USACE, 2012).

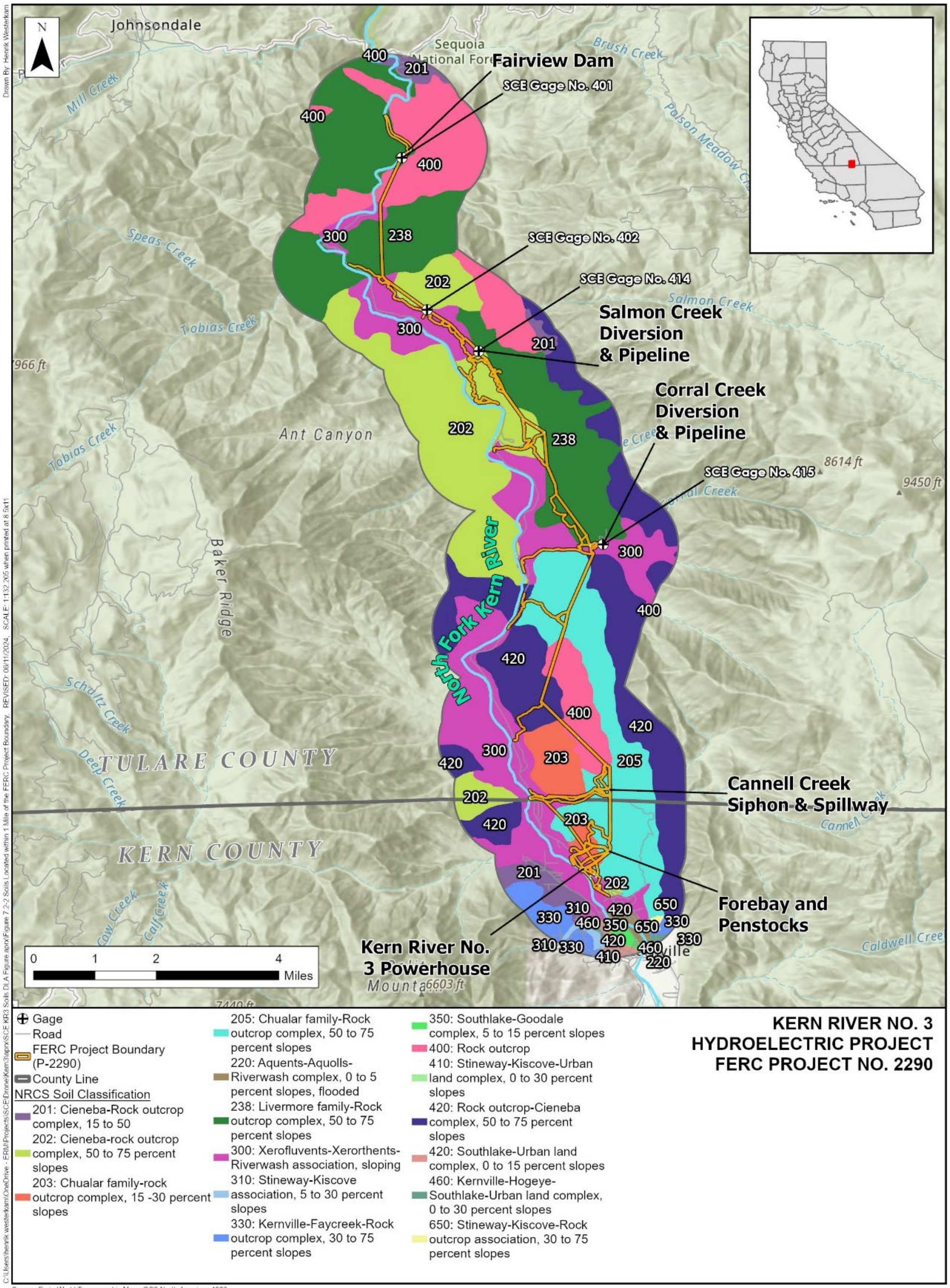
Seismicity and Faulting

A series of fault zones in the southern Sierra Nevada reflect the complex history of tectonic plate interactions and ongoing plate movement. The approximately 130-kilometer-long Kern Canyon Fault is a dextral strike-slip shear zone located generally parallel to and partially within the FERC Project Boundary (Figure 7.2-1). The California Geological Survey (CGS, 2002) indicates that displacement has occurred along the Kern Canyon Fault during the Holocene (i.e., within the last 11,700 years), with no recorded movement within the last 200 years (CDC, 2010b). However, some studies of the Kern Canyon Fault and surrounding area indicate that discontinuous scarps and locations of modern earthquakes provide evidence of recent activity along the southern part of the fault, with an estimated slip rate of 0.01 to 3 millimeters (mm) per year and the capacity to generate up to a 7.5-magnitude earthquake (Kelson et al., 2010; Nadin and Saleeby, 2010; USACE, 2012). Based on these studies, the average recurrence interval for surface earthquakes along the Kern Canyon Fault ranges from approximately 2,800 to 5,500 years (Kelson et al., 2010; URS, 2010).

Other local faults include the Breckenridge Fault and White Wolf Fault, which are located south of Isabella Lake. These faults exhibit fault creep, and the most recent displacement along the White Wolf Fault was recorded in 1952 during a 7.5-magnitude earthquake (CDC, 2010b; USACE, 2012). Larger-scale active faults in the general vicinity of the Project with the potential to generate large earthquakes include the Garlock Fault, approximately 35 miles to the south; the San Andreas Fault, approximately 65 miles to the west; and the Owens Valley Fault, approximately 40 miles to the northeast (CDC, 2010b; USACE, 2012).

Glacial Features

Although the Kern River Valley was affected by the Tioga and Tahoe glaciations, the glaciers terminated upstream of the FERC Project Boundary. The most extensive Kern River glacier terminated at 6,300 feet—several thousand feet above the FERC Project Boundary (Moore and Mack, 2008). Glacial till and moraines are not mapped within the FERC Project Boundary (see Figure 7.2-2; CDC, 2010a) but had a strong influence on the upstream watershed.



Source: gSSURGO, 2020

FERC = Federal Energy Regulatory Commission; NRCS = Natural Resources Conservation Service; SCE = Southern California Edison

Figure 7.2-2. Soils Located Within 1 Mile of the FERC Project Boundary.

Mineral Resources

Mineral resources located within 0.5 mile of the FERC Project Boundary were identified using the Mineral Resources Data System (USGS, 2020) and are summarized in Table 7.2-1. There are no active or inactive mines located within the FERC Project Boundary. According to Mineral Resources Data System records, the closest inactive mine is a former surface construction sand and gravel pit located approximately 1 mile south of the FERC Project Boundary.

As indicated in Table 7.2-1, mineral resource prospects located near the FERC Project Boundary are generally associated with quartz veins hosted within the granitic bedrock where native elements and sulfide minerals (e.g., copper, gold, silver, lead, and antimony) concentrated as the igneous intrusions cooled.

Table 7.2-1. Mineral Resources Within 0.5 Mile of the FERC Project Boundary

Mine Type	Name	Mineral Resource
Prospect	San George Mine	Antimony, copper, lead
Prospect	Onyx #1	Gemstone
Prospect	Thunderbird Millsite	Copper, gold, silver
Unknown	Jay Bird No. 1	Uranium
Unknown	Rainbow Lode Claim	Copper, gold, silver
Unknown	Los Tres Burros No. 1	Uranium

Source: USGS, 2020

Soils

Soils located within 1 mile of the Project are shown on Figure 7.2-2 and can be classified into two general categories that are primarily based on the sources of material:

- Soils derived from weathered granitic material tend to be coarse-grained, shallow to moderately deep, excessively to well drained, and located in areas of steep slopes.
- Soils formed in alluvium from erosion of sedimentary and metasedimentary rocks are fine-grained, very deep, well drained, and located on alluvial fans and terraces with gentle slopes.

Soil descriptions were sourced from the U.S. Department of Agriculture Natural Resources Conservation Service *Official Soil Series Descriptions*[13] and are summarized in Table 7.2-2. In addition, other soil classifications associated with a seasonally high water table and/or where frequent deposition prevents soil development (i.e., Aquents-Aquolls-Riverwash complex and Xerofluvents-Xerorthents-Riverwash

[13] Retrieved from: https://soilseries.sc.egov.usda.gov/osdname.aspx.

association) are located within the FERC Project Boundary. These soils are generally associated with floodplains and river deltas with a high sediment load (NRCS, 1999).

The U.S. Department of Agriculture Natural Resources Conservation Service rates susceptibility of a soil to sheet or rill erosion by assigning a K factor based on the soil's structure, hydraulic conductivity, and percentages of silt, sand, and organic matter. The K values are directly related to the soil's susceptibility to erosion (i.e., higher K values indicate a soil is more susceptible than soils with lower K values). K values within the FERC Project Boundary range from 0.10 to 0.37, indicating that soils with minimal vegetative cover have a low to moderate susceptibility to erosion.

Table 7.2-2. Overview of Soils Located Within 1 Mile of the FERC Project Boundary

NRCS Classification Number	Soil Complex / Association	General Characteristics	K Factor [a]	Acreage Within 1 Mile of FERC Project Boundary
201	Cieneba-Rock outcrop complex, 15 to 50 percent slopes	Cieneba soil series: Very shallow and shallow, somewhat excessively drained soils that formed in material weathered from granitic rock. These soils are located in mountainous areas.	0.2	519.40
202	Cieneba-Rock outcrop complex, 50 to 75 percent slopes	Cieneba soil series: Refer to the description above.	0.2	3,821.17
203	Chualar family-Rock outcrop complex, 15 to 30 percent slopes	Chualar soil series: Very deep, well drained soils formed in alluvial material from mixed rock sources. These soils are located on terraces and fans of coastal areas.	0.25	576.66
205	Chualar family-Rock outcrop complex, 50 to 75 percent slopes	Chualar soil series: Refer to the description above.	0.25	2,485.60
220	Aquents-Aquolls-Riverwash complex, 0 to 5 percent slopes, flooded	Seasonally high water table prevents soil development.	0.23	98.34
238	Livermore family-Rock outcrop complex, 50 to 75 percent slopes	Livermore soil series: Very deep, somewhat excessively drained soils that formed in very gravelly alluvium derived from sedimentary and metasedimentary rocks. These soils are located on low, nearly level terraces and gently sloping alluvial fans.	0.23	4,795.27

NRCS Classification Number	Soil Complex / Association	General Characteristics	K Factor [a]	Acreage Within 1 Mile of FERC Project Boundary
300	Xerofluvents-Xerorthents-Riverwash association, sloping	Seasonally high water table prevents soil development.	N/A	4,362.30
310	Stineway-Kiscove association, 5 to 30 percent slopes	Stineway soil series: Shallow, well drained soils that formed in material weathered from metamorphic rock. Stineway soils are on hills and mountains. Kiscove soil series: Shallow and very shallow well drained soils that formed in material weathered from metamorphic rock. Kiscove soils are on hills and mountains.	0.4	57.13
330	Kernville-Faycreek-Rock outcrop complex, 30 to 75 percent slopes	Kernville and Faycreek soil series: Shallow to a lithic contact, somewhat excessively drained soils formed in material weathered from granitic rocks. These soils are located in mountainous areas. Rock outcrops are intermixed with soil.	0.22	407.88
350	Southlake-Goodale complex, 5 to 15 percent slopes	Southlake soil series: Refer to the description above. Goodale soil series: Very deep, somewhat excessively drained soils formed in granitic (or in small areas mixed) alluvium. These soils are located on boulder alluvial fans and fan terraces.	0.22	61.03
400	Rock outcrop	Undefined rock outcrops.	N/A	2,807.35
410	Stineway-Kiscove-Urban land complex, 0 to 30 percent slopes	Stineway and Kiscove soil series: Refer to the descriptions above. This complex is found in urban areas.	0.4	7.68
420	Rock outcrop-Cieneba complex, 50 to 75 percent slopes	Cieneba soil series: Refer to the description above. Rock outcrops are intermixed with soil.	0.2	4,015.36
420	Southlake-Urban land complex, 0 to 15 percent slopes	Very deep, well drained soils that formed in mixed alluvium. These soils are located on alluvial fans.	0.26	79.39

NRCS Classification Number	Soil Complex / Association	General Characteristics	K Factor [a]	Acreage Within 1 Mile of FERC Project Boundary
460	Kernville-Hogeye-Southlake-Urban land complex, 0 to 30 percent slopes	Kernville and Southlake soil series: Refer to the descriptions above. Hogeye soil series: Moderately deep, well drained soils that formed in material weathered from granitic rock. These soils are located in mountainous areas.	0.2	37.05
650	Stineway-Kiscove-Rock outcrop association, 30 to 75 percent slopes	Stineway and Kiscove soil series: Refer to the descriptions above. Rock outcrops are intermixed with soil.	0.43	27.62

Source: NRCS, 2007, 2020, 2021

FERC = Federal Energy Regulatory Commission; N/A = data not available; NRCS = Natural Resources Conservation Service

Note:

[a] The K Factor is an index of soil erodibility. Values range from 0.02 for the least erodible soils to 0.64 for the most erodible soils.

7.2.1.2. Channel Geomorphology

The NFKR is the principal drainage in the southern Sierra Nevada and cuts a north–south course for approximately 70 miles from its headwaters near the Kern–Kings drainage divide to Isabella Lake. From its headwaters to Fairview Dam, the NFKR is an undammed river that alternates between steep, rocky canyons and nearly level valleys. The course of the NFKR generally parallels the strike of the Kern Canyon Fault Zone and flanks the tallest peaks of the Sierra Nevada. Downstream of Isabella Lake, the lower Kern River turns westward and flows for approximately 60 miles before emptying in the San Joaquin River Basin near Bakersfield. The NFKR north of Soda Springs (near the confluence with the Little Kern River) exhibits classical alpine glaciated terrain and is characterized by broad, U-shaped valleys with relatively wider and lower-gradient channels than the comparatively narrower and deeply incised canyon downstream (Webb, 1946). This portion of the river separates the broad, high-elevation, low-relief Kern Plateau to the east from the Great Western Divide to the west.

The Project-affected reach of the NFKR begins at Fairview Dam and flows 16 miles south to the KR3 Powerhouse, where the Project water conveyance system returns diverted water to the river. This section of the reach is referred to as the Fairview Dam Bypass Reach. Small diversions are also located on Salmon and Corral Creeks, tributaries on the east side of the NFKR. The Cannell Creek Siphon and Spillway are located on Cannell Creek, an eastern tributary that enters the NFKR roughly 1.5 miles upstream of the KR3 Powerhouse. A longitudinal profile of the NFKR with Project features and tributaries is included on Figure 7.2-3.

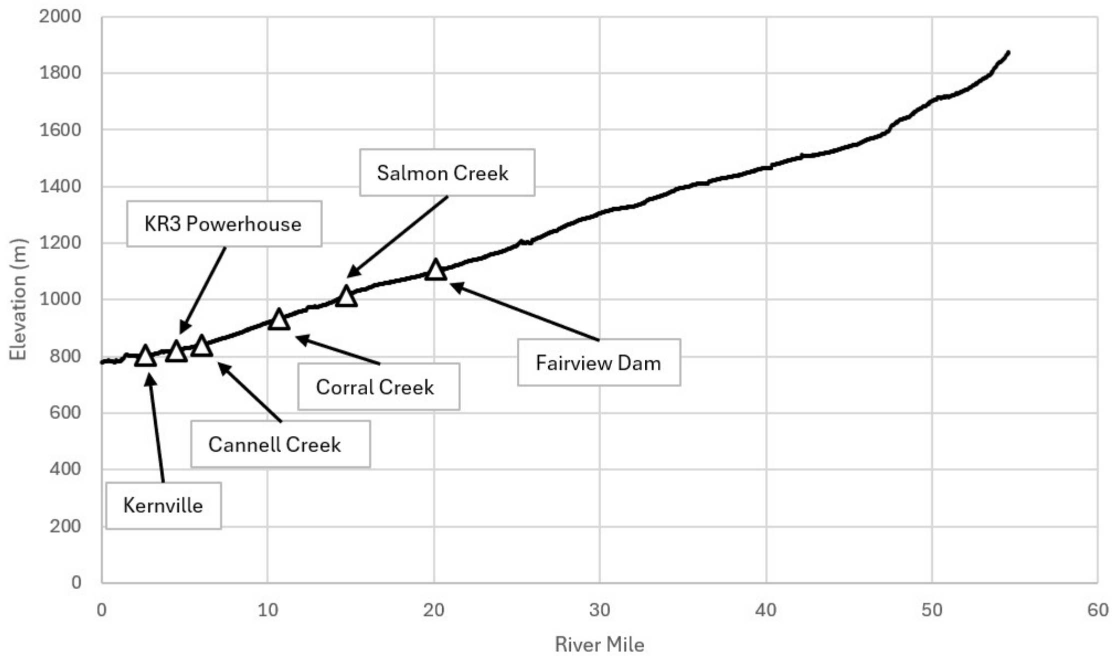
The landscape surrounding the Project is characterized by steep slopes and deeply incised canyon topography, primarily formed during periods of rapid Kern River incision correlated with increased seismic activity of the Kern Canyon Fault in the past 3.5 to 6 million years (Stock et al., 2004; Krugh and Foreshee, 2018). The NFKR in the Fairview Dam Bypass Reach is constrained within a single, narrow channel from Fairview Dam downstream to Hospital Flat Campground (RM 10.0), after which the river transitions to a less-constrained reach, occasionally supporting lateral channel bars and a braided morphology (FERC and Forest Service, 1996). Despite varying channel morphologies, the NFKR in the Fairview Dam Bypass Reach maintains an approximately 1.1 percent channel gradient from 1.5 miles upstream of Fairview Dam to the KR3 Powerhouse (Table 7.2-3). The valley floor is generally composed of bedrock pediments covered by broad alluvial fans; the toes of these fans are incised by the modern NFKR. Two tributaries (Salmon and Corral Creeks) along the Fairview Dam Bypass Reach are diverted into the Project flowline, and one tributary (Cannell Creek) may receive supplemental water from the Cannell Creek Spillway during emergency outages (i.e., a unit trips at the powerhouse) or during periodic changes in flows that may occur when bringing a unit online or offline (Figure 7.2-1). All of these affected tributaries have average slopes exceeding 7 percent between the point of diversion or supplementation and the confluence with the NFKR (Table 7.2-3).

The Project region is characterized by a Mediterranean climate with cool, wet winters and warm, dry summers. Winter precipitation generally occurs as snow within the upper elevations of the watershed, with peak run-off in the spring. Convective precipitation is common at higher elevations in the summer. Average monthly streamflows above Fairview Dam range between 100 and 400 cfs in the fall and winter to between 1,000 and 2,000 cfs during the spring snowmelt period. Average monthly flows downstream of Fairview Dam range between 40 and 130 cfs in fall and winter to between 400 cfs and 1,400 cfs in late spring. The channel bankfull discharge (1.5-year recurrence interval flood) is approximately 1,700 cfs (Figure 7.2-4).

Table 7.2-3. Channel Gradients Near the Kern River No. 3 Hydroelectric Project

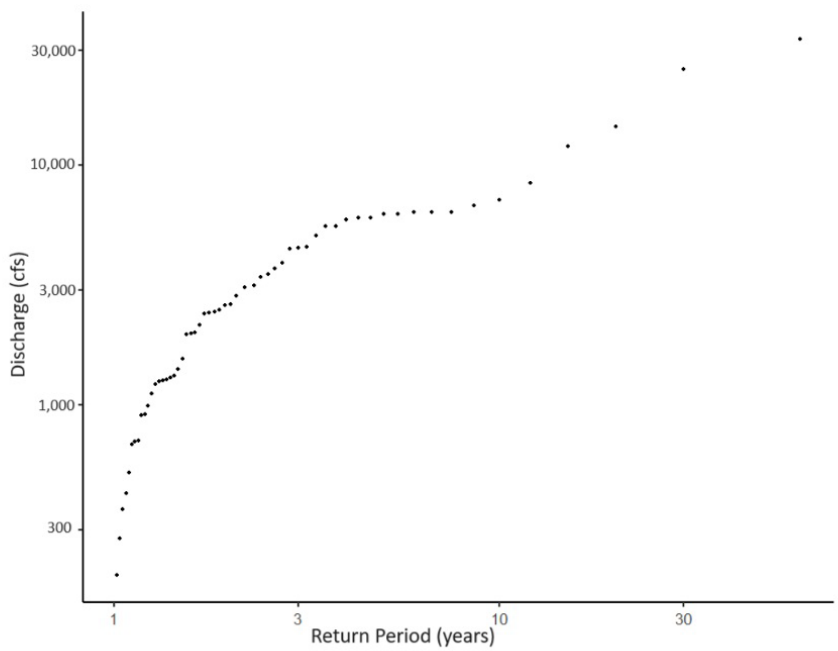
Reach	Stream Gradient (feet/mile)	Slope [a]
NFKR 1.5 miles upstream of Fairview Dam to Fairview Dam	61	1.1%
NFKR between Fairview Dam and KR3 Powerhouse (Fairview Dam Bypass Reach)	60	1.1%
NFKR between KR3 Powerhouse and Isabella Lake	24	0.5%
Salmon Creek downstream of diversion	535	10.2%
Corral Creek downstream of diversion	453	8.6%
Cannell Creek downstream of spillway	391	7.4%

KR3 = Kern River No. 3; NFKR = North Fork Kern River
Note:
[a] Average gradients (percent slope) were calculated using 1/3 arc-second resolution digital elevation models (USGS, 2019).



KR3 = Kern River No. 3; m = meter

Figure 7.2-3. Longitudinal Profile of the North Fork Kern River from Isabella Lake (River Mile 0) to the River's High-elevation Headwaters.



cfs = cubic feet per second; SCE = Southern California Edison; USGS = U.S. Geological Survey

Figure 7.2-4. Annual Flood Frequency Curve for the North Fork Kern River Below Fairview Dam, 1961–2019 (USGS Gage 111860000, SCE Gage 401).

Sediment Transport

The Fairview Dam Bypass Reach is a boulder- and bedrock-dominated system with high transport capacity, where relatively high stream gradients and the regular occurrence of high flows result in the rapid transport of gravel and coarse sand through the system until deposited in overflow channels and along river margins (ENTRIX, 1997; FERC and Forest Service, 1996). The large framework grains that dominate the channel bed in the Fairview Dam Bypass Reach are likely only mobilized during large, infrequent flood events, while more frequent peak flows (e.g., 1.3- to 1.5-year recurrence interval) mobilize smaller grains (e.g.*,* gravel and sand).

Upstream of Fairview Dam, most of the sediment delivered to the NFKR is fine-grained sand or decomposed granite (Stephens et al., 1995). Downstream of Fairview Dam, sediments include well sorted sand deposits, including large sandy bars, and poorly sorted mixed cobble, gravel, and sand substrates, while large-bed elements such as boulders and bedrock outcrops form persistent, permanent features of the reach. The sand bars contain a large supply of sand-sized sediment that can be easily transported as part of the total sediment load. Flows greater than 350 cfs are sufficient to transport fine sediment downstream and toward the banks without deposition in spawning riffles in the bypass reach (ENTRIX, 1992).

Debris Flows

Similar to other basins in the southern Sierra Nevada, large debris flows triggered by intense rainfall occur infrequently but have outsized and long-lasting impacts on the landscape and stream channel morphology (DeGraff et al., 2011). Two such extreme climatic events, discussed below, generated exceptionally large floods, delivered large volumes of sediment and wood debris, and dramatically altered streams in the Project and surrounding areas. However, even with large deposits of material, the frequency of sediment mobilizing events in the NFKR regularly scour finer material.

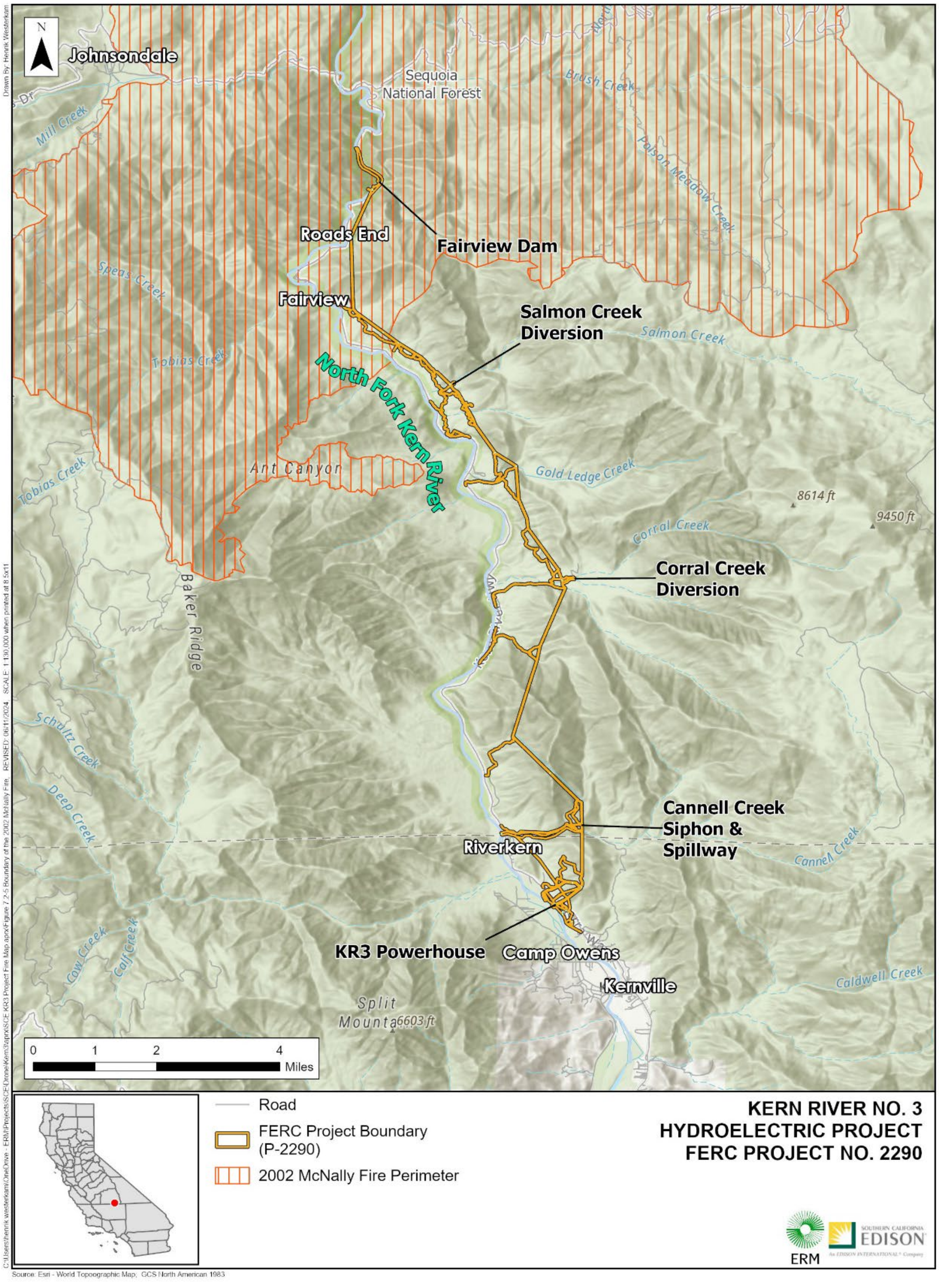
December 1966 Flood

The flood of record occurred in December 1966 with a peak discharge of 60,000 cfs in the NFKR at the Kernville gaging station located below Fairview Dam (USGS gage 11186000, SCE gage 401). This flood significantly altered the stream channels at the Project. Flood depths in the mainstem Kern River exceeded 25 feet, occupied all previous flood channels, and transported boulders up to 15 feet in diameter. Common geomorphic expressions of the flood flows included (1) pervasive overland flow, (2) widespread gullying on hillslopes, (3) debris flows transported through high-gradient tributaries, (4) appreciable aggradation in the NFKR, (5) altered channel morphology, and (6) debris jams. The pool behind Fairview Dam was reportedly “completely filled with flood detritus” (Dean and Scott, 1971).

2002 McNally Fire and Subsequent Storm

In August 2002, the McNally Fire burned approximately 150,000 acres of the Kern River watershed, impacting the northern portion of the Project (Figure 7.2-5). The fire removed extensive vegetation that had stabilized upland soil-mantled hillslopes. A 100-year storm event that released 22 inches of precipitation in a 30-hour period occurred shortly after the fire on November 7, 2002 (Tormey et al., 2020). This storm delivered approximately 200,000 cubic yards of sediment from upland areas to the main channel of the Kern River. The channel bed was transformed from boulder and cobble to fine sand and gravel in much of the Fairview Dam Bypass Reach.

Although subsequent high flows in 2005 and 2006 scoured much of the deposited sediment in the Fairview Dam Bypass Reach, in July 2008, heavy thunderstorms caused a landslide in an area that was destabilized by the McNally Fire, resulting in increased sediment supply to the Fairview Dam Bypass Reach and leaving a veneer of fine-grained sand on banks and sandbars (ENTRIX, 2009). Despite this and other major sediment delivery events, habitat typing of the NFKR in 2023 indicated that habitat conditions within the Fairview Dam Bypass Reach were generally consistent with the habitat conditions described in SCE (1991) with only minor differences (see Section 7.4.3.1, subsection *Stream Habitat*).



Source: CAL FIRE, 2024

FERC = Federal Energy Regulatory Commission; KR3 = Kern River No. 3

Figure 7.2-5. Extent of the 2002 McNally Fire in Area Surrounding the Kern River No. 3 Hydroelectric Project.

Bank Stability

The impoundment pool behind Fairview Dam is small and is operated with minimal surface fluctuation that would affect bank stability (outside of natural high flows; SCE, 1991). Cross-section surveys during the 5-year (1997 to 2001) sediment study in the Fairview Dam Bypass Reach indicated that streambanks were generally stable, even following the 110-year reoccurrence interval flood flows in 1997 (ENTRIX, 2002).

The Cannell Creek Siphon and Spillway, located approximately 1 mile upstream of the KR3 Forebay along the flowline, consists of a 45-foot-long concrete spillway followed by a 470-foot rock-lined spill channel that connects to Cannell Creek. Water releases from the flowline at the siphon flow down the spillway and into Cannell Creek before joining the NFKR approximately 1 mile downstream. If excess pressure within the flowline needs to be reduced (e.g., a unit trips at the powerhouse), the upstream section of the siphon is equipped to automatically release water from the flowline down the Cannell Creek Spillway and spill into Cannell Creek. These releases typically occur on average a couple times per month. Cannell Creek below the spillway is a bedrock channel with little potential for erosion.

The KR3 Powerhouse Forebay Spillway channel runs west adjacent to the two penstocks along the hill slope until it rejoins with the NFKR approximately 700 feet upstream from the KR3 Powerhouse and also releases excess water within the flowline located between the siphon and forebay. The spillway channel is approximately 0.5 mile long with an elevation change of approximately 815 feet. The spillway has channelized a course through hillslope sediment and now exhibits a bedrock substrate. Previous erosion along the KR3 Powerhouse Forebay Spillway channel preceded channel stabilization efforts in 1995, when SCE placed riprap along a 200- to 300-foot-long length of the channel. In 1997, SCE developed the *Plan for Control of Erosion, Stream Sedimentation, Soil Mass Movement, and Dust* (Erosion Management Plan [SCE, 1997]). Although no further erosion issues had been identified in the spillway channel since development of the Erosion Management Plan, the plan includes the application of erosion control structures as protective measures against erosion, including structures such as riprap and rock in areas prone to significant flows and erosion.

7.2.1.3. Project Facilities with the Potential to Affect Sediment Transport

Project Roads

The FERC Project Boundary encompasses 33 roads, creating more than 18 miles of roadway. Most of these roads are located on federal lands, with one roadway on SCE-owned lands. Most of the roads are publicly accessible (i.e., not gated), with the exception of access roads around Project facilities including Fairview Dam, the Cannell Creek Siphon, and KR3 Powerhouse. Erosion and sedimentation around Project roads have been managed under the Erosion Management Plan (SCE, 1997).

Fairview Dam and Sandbox

Fairview Dam is a mass concrete overflow structure where the crest of the dam also serves as a spillway. Accumulated sediment behind Fairview Dam is generally scoured out by yearly pulse flows. Large woody debris typically flows up and over the crest of the dam but can be physically dislodged by heavy equipment if necessary. For more information on Fairview Dam, see Exhibit A, Section 1.1.1, *Fairview Dam*.

Water is diverted from the NFKR at Fairview Dam's east abutment through two intake gates with trash racks and then flows through a settling basin, or sandbox, before entering the Project flowline. The sandbox allows fine sand and larger sediments to drop out of the water column before flow enters the flowline. Two fish screens at the downstream end of the sandbox prevent most fish from entering the flowline. For more information on the sandbox, see Exhibit A, Section 1.3.1, *Sandbox*.

Over time, sediment accumulates within the sandbox and is subsequently removed by opening the outlet gate located in the middle of the sandbox and allowing water and sediment to flow back into the NFKR, in accordance with License Article 402, *Sandbox Flushing* (130 FERC ¶ 62,013 (2010)).

SCE previously conducted a sediment transport analysis to determine the flushing flow rates necessary to prevent fine sediment deposition in spawning gravel in the Fairview Dam Bypass Reach (ENTRIX, 1992). Flows greater than 350 cfs were shown to transport finer sediment downstream and toward the banks without deposition in spawning riffles (ENTRIX, 1992). Additionally, the *Fairview Dam Sandbox Flushing Study Assessment* (ENTRIX, 2002) monitored sand accumulation downstream of the sandbox from 1997 to 2001 and found that flows equal to or greater than 350 cfs have sufficient sediment transport capacity to carry sand-sized particles collected from the sandbox without depositing them in gravel beds at three sites within a 1.6-mile stretch downstream of Fairview Dam, reaffirming the previous result. Peak flows of 350 cfs or greater occur during nearly all years (Figure 7.2-4), typically between March and July (ENTRIX, 2002).

Prior to the 1997 to 2001 study, the sandbox was typically flushed every week, independent of flow magnitude. Following the study, FERC issued an order temporarily approving a modified flushing protocol that restricted sandbox flushing to every 2 weeks and only when flows downstream of Fairview Dam were at least 350 cfs, while SCE completed an additional 2 years of monitoring at the riffle downstream of the sandbox drain (101 FERC ¶ 62,189). Implementation of the modified flushing protocol and associated monitoring was delayed until March 2007 due to significant sediment deposition following the 2002 McNally Fire (see Section 7.2.1.2, *2002 McNally Fire* subsection). Upon completion of the second year of monitoring in February 2009, the flushing protocol reverted to the previous weekly schedule until analysis of the monitoring results was complete. The monitoring results indicated no adverse effects on channel morphology from the modified flushing protocol (ENTRIX, 2009). The study noted overall increases in the extent of downstream gravel in addition to a localized area of increased fine sediment and recommended long-term adoption of the modified flushing protocol (i.e., flushing every 2 weeks when flows are at or greater than 350 cfs), which formally began in 2010 (130 FERC ¶ 62,013).

7.2.2. Proposed Environmental Measures

SCE proposes to implement the following environmental measures related to geologic and soils resources:

- Measure WR-1, *Minimum Instream Flows*
- Measure WR-4, *Sediment Management Plan*
- Measure WR-5, *Recreational Boating Flows*
- Measure LU-1, *Project Roads and Facilities Management Plan*

The proposed measures and their key features related to geology and soils are described below. Refer to Appendix E.1 for the complete description of measures SCE proposes to include in any new license issued for the Project.

7.2.3. Potential Project Effects

Under the No-Action Alternative, the Project would continue to operate under the terms and conditions of the current license, as described in Section 5.1. The No-Action Alternative is considered the environmental baseline for this analysis of potential effects. Potential effects on geology and soil resources were identified in FERC's SD2 (FERC, 2022) and were based on an evaluation of continued O&M activities described as part of the proposed Project (Section 5.2, *Proposed Action Alternative*). Potential effects identified in FERC's SD2 include the following:

- Effects of continued Project operation on turbidity and suspended sediment loads; and
- Effects of continued use and maintenance of Project access roads and soil erosion.

The following sections describe the potential effects of the proposed Project, including the proposed environmental measures, on geology and soil resources. Unavoidable adverse effects on geology and soils are discussed at the end of this section and summarized in Section 10.0, *Conclusions and Recommendations*.

7.2.3.1. Project Operations and Maintenance

With the implementation of the proposed Measures WR-1, WR-4, WR-5, and LU-1, proposed Project O&M activities (described in Section 5.1, *No-Action Alternative*, and Section 5.2, *Proposed Action Alternative*) would have, at most, minor, local, and short-term direct and/or indirect adverse effects on geology and soils, including direct and indirect effects related to erosion near Project features and sediment transport, channel geomorphology, and the free-flowing condition of the river relative to the baseline current conditions.

With the exception of the proposed environmental measures, SCE proposes to continue to operate the Project as it is currently operated. Implementation of SCE's proposed measures would ensure that potentially adverse effects on geology and soils resulting from Project O&M activities would be avoided or reduced to minor levels, as described below.

Proposed Measure LU-1 will be developed and would include identifying, treating, monitoring, and reporting of erosion sites on Project roads. The plan would describe measures to reduce or eliminate potential effects caused by Project road maintenance activities by outlining procedures for maintenance of Project roads, drainage structures, stream crossings, and travel-way surfaces; identifying routine inspections; and implementing best management practice (BMP) measures. Finally, the plan would incorporate the existing Erosion Management Plan (SCE, 1997) to (1) reduce the potential for a failure along the Project water conveyance system, (2) reduce impacts in the event of a flowline failure, and (3) describe inspections and outline steps required to address any future erosion issues that arise at Project facilities.

Proposed Measure WR-4 will be developed and outline sediment flushing procedures to pass sediment captured within the sandbox back to the Fairview Dam Bypass Reach. Under proposed Measure WR-4, SCE would continue to flush the sandbox once every 2 weeks when river flows downstream of Fairview Dam exceed 350 cfs. Additionally, to decrease the period between flushing, SCE proposes to routinely inspect the sandbox when flows are below 350 cfs, and, if necessary, SCE would drain one or both sides of the sandbox to remove accumulated sediment between July 1 and February 15, outside the rainbow trout spawning season. Additionally, proposed Measure WR-4 would describe sediment management activities at the two smaller diversions—Salmon Creek Diversion and Corral Creek Diversion—when there is a need to periodically remove accumulated sediment from behind the diversion to maintain flows into the diversion infrastructure and minimum instream flow release valves. As described in the measure, SCE would open the pond drain when not diverting flows to allow accumulated sediment to naturally move downstream and use hand tools to clear the pond drain if it is blocked by sediment.

Proposed Measure WR-5 would include a new, pre-scheduled 10-day (including 2 weekends) period when the Project would not divert flow at Fairview Dam during the ascending limb of the spring snowmelt run-off period, thereby passing the full natural flow downstream of Fairview Dam and potentially increase the duration of flows greater than 350 cfs downstream of Fairview Dam. While this measure would enhance recreational boating opportunities, it also provides an additional opportunity to mobilize and distribute fine sediments that may have accumulated within the Fairview Dam Bypass Reach.

The potential effects of ongoing and proposed changes in Project O&M and new environmental measures (i.e., management plans and environmental programs) on geology and soils are presented below.

Erosion Near Project Features

The proposed Project would have, at most, minor, local, short-term effects on erosion along Project roads, water conveyance system, spillway channels, historical spoil piles, and other Project facilities. Evidence of minor erosion and sedimentation related to Project features was observed in a field and desktop analysis of areas within the FERC Project Boundary (see GEO-1 Technical Memorandum, provided in Appendix E.2). Sources of erosion and sedimentation within the FERC Project Boundary include failed culverts, road fill prism failures, and surface erosion of legacy spoil sites. Activities that may affect erosion near Project facilities include maintenance of access roads, dam and diversion structures, water conveyance system, buildings; removal of accumulated sediment/large debris from the diversion pools; and/or implementation of any other maintenance activities that FERC may require based on periodic inspections. SCE does not propose any major changes to current facilities or Project O&M activities that would increase erosion (see Section 5.0, *Proposed Action and Alternatives*). Proposed Measure LU-1 would reduce potential adverse effects from erosion by requiring the monitoring and treatment of erosion sites along Project roads and features, including the implementation of maintenance BMPs and measures to reduce the potential for failure along the water conveyance system.

Project Roads

The condition of Project roads was assessed as part of the relicensing studies (see LAND-1 Technical Memorandum and GEO-1 Technical Memorandum, provided in Appendix E.2). Most of the erosion observed in the field was minor, including rills and drainage ditch erosion, with some exceptions. Several roads were not passable due to more severe erosion concerns and damage from past rain and high-flow events. One road had a failed road crossing and a graded pad constructed using legacy spoils within an unnamed tributary channel (see Tunnel Nos. 9B/10 spoil site in Table 7.2-4). Based on historical imagery, the failure occurred sometime between April 2010 and April 2013, and continues to be a site of minor active erosion. Significant sources of erosion and sedimentation documented in the GEO-1 Technical Memorandum are summarized in Table 7.2-4.

Effects of Project road erosion will be mitigated by the implementation of proposed Measure LU-1. This plan will be developed and would reduce the effects of erosion sites along Project roads on water quality, channel geomorphology, and aquatic habitats by identifying, treating, monitoring, and reporting erosion sites, and implementing specific measures to protect habitats for sensitive biological or terrestrial species and in areas identified as having cultural resources. Routine inspections would be conducted to identify erosion sites on Project roads and erosion sites will be treated using appropriate BMPs.

Table 7.2-4. Identified Sources of Erosion and Sedimentation at GEO-1 Study Sites

Site	Photograph Nos. in GEO-1 Technical Memorandum (Appendix E.2)	Volume (cubic yard)	Description
Fairview Dam and sandbox	A-1 to A-4	N/A	Significant erosion of (non-Project) Mountain Highway 99 road fill prism and basal area surrounding intake flume of the sandbox occurred during significant March 2023 flood event as a result of failed culvert.
	A-5 to A-6	<1	Minor surface rilling and road fill prism failure at small access road leading to parking area located at the southwestern area of the Fairview Dam sandbox.
Tunnel Nos. 6/7 spoil site	A-10 to A-13	3	Small failure located along the distal margin of the graded pad area of the Tunnel Nos. 6/7 spoil site caused by concentrated surface drainage (Figure A-13).
Tunnel Nos. 9B/10 spoil site	A-22 to A-25	N/A	Failed road crossing immediately downstream of an exposed section of Tunnel Nos. 9B/10 spoil site. Legacy material from tunnel excavation was likely placed directly in the watercourse and the road crossing was built using the spoil material. Based on review of satellite imagery, the failure occurred sometime between April 2010 and April 2013. An unnamed tributary continues to erode the spoil material.
Tunnel No. 18 spoil site	A-48 to A-49	1 to 2	Surface erosion and direct delivery of sediment to watercourse at Corral South Tunnel No. 18 spoil site. This legacy spoil pile was placed directly within the watercourse, and subsequent channelization of the legacy spoil pile is resulting in steep banks and active erosion of the toe and spoil pile margins.
Tunnel Nos. 19/20 spoil site	A-52 to A-53	N/A	The legacy spoil material was placed directly within the watercourse where the exposed tunnel segment crosses an unnamed drainage swale. Spoil material is actively being reworked and captured by run-off, and the disrupted surface drainage patterns are forcing run-off toward an access road. A small gulley is forming within the inboard ditch of the access road.
KR3 Spillway channel	A-56 to A-63	N/A	The spillway channel was formed in native hillslope colluvial mantle. According to historical records, most erosion and sedimentation occurred shortly after operations began. Spillway channel banks continue to actively erode but at low rates. Numerous knickpoints were observed but are generally stable.
KR3 Powerhouse	A-64 to A-68	1 to 2	Scour and bank erosion occurs along the KR3 Powerhouse retaining wall and access road. Large volumes of sediment and debris from March 2023 flood accumulated within Kern River floodplain and powerhouse maintenance storage yard.

KR3 = Kern River No. 3 Hydroelectric Project; N/A = data not available

Water Conveyance System: Flowline

The proposed Project would have minor to no adverse effects on geology and soils as a result of erosion on or near the Project's water conveyance system. The aboveground segments of the flowline generally conform to the contours of the hillside. A few areas are susceptible to cut-and-fill activities that may cause erosion. To prevent the effects of erosion, SCE would implement the requirements in the *Project Roads and Facilities Management Plan*, which include installing erosion control structures such as riprap, rock gabions, or concrete retaining structures around erosional features. The erosion and sediment control structures would be monitored during and after storm events, and results would be provided to applicable agencies as required. Additionally, in the event of a tunnel or flume rupture or slope failure along the flowline, SCE would perform, in consultation with the Forest Service, any remedial actions, which may involve re-grading, stabilizing slopes, and/or installing erosion control structures, where needed. The entire 13-mile water conveyance system would be inspected routinely to identify potential maintenance issues, and issues would be addressed in a timely manner. In the event of a flowline failure, flow would be shut off as soon as possible. Repairs would be conducted as soon as practicable given engineering constraints, site conditions, and environmental protection responsibilities.

KR3 Powerhouse Forebay Spillway Channel

Erosion in the forebay spillway channel would not affect geology and soils within the FERC Project Boundary. Because the channel bottom in the upper portion of the spillway is currently exposed bedrock and has little potential for further erosion, erosion along the spillway would be minimal. However, during the previous license filing, FERC identified a portion of the lower spillway channel that had the potential for further erosion and channel widening (FERC, 1995). In response to the FERC finding, SCE placed riprap along a 200- to 300-foot-long length of the spillway channel to prevent further erosion. In the final environmental assessment for the Project, FERC and Forest Service (1996) stated that with the placement of riprap, the spillway is adequately protected from further significant erosion. Historical aerial imagery shows that the channel planform pattern and degree of incision appears largely unchanged between 2005 and 2022. For further details of the spillway channel assessment, refer to the GEO-1 Technical Memorandum provided in Appendix E.2.

Cannell Creek Spillway Channel

Similar to the KR3 Powerhouse Forebay Spillway channel, erosion in the Cannell Creek Siphon Spillway channel is expected to have minor to no effects on geology and soils. Field observations indicated that the bedrock-lined channel has little potential for erosion, and based on an analysis using aerial imagery, the Cannell Creek Spillway has remained largely unchanged since 2005. The spillway discharges directly onto the hillslope and has channelized a watercourse through native material (see GEO-1 Technical Memorandum provided in Appendix E.2). Because SCE does not propose major changes to the O&M of the Cannell Creek Spillway channel, the channel is not expected to experience effects from erosion.

Spoil Piles

The GEO-1 Study identified minor erosion at four spoil pile sites within the FERC Project Boundary. Spoil material was generated during original tunneling for the flowline that runs from Fairview Dam to the KR3 Powerhouse. Spoils were stockpiled onsite and, in some cases, were used to construct access roads. Some spoil piles were placed in the watercourse along tributaries to the NFKR and contribute small amounts of sediment to the channel (Table 7.2-4).

SCE would include measures as part of the *Project Roads and Facilities Management Plan* to mitigate the potential effects of identified erosion issues on Project roads and facilities. This plan would include provisions for managing erosion around Project roads and parking areas constructed from spoil piles. Additionally, the *Project Roads and Facilities Management Plan* would include the implementation of basic BMPs during O&M activities to minimize erosion and prevent sediment from flowing into the watercourse. With this plan in place, minor to no adverse effects are expected from erosion around spoil piles.

Sediment Transport, Channel Geomorphology, and the Free-flowing Condition of the River

The proposed Project may have, at most, minor, local, short-term effects on sediment transport. Sediment delivery to the NFKR from the Project is generally limited to the erosion of sandy material around roads and the flowline and flushing of the sandbox at the head of the flowline. Flows of 350 cfs or greater occur in the Project-affected reach of the NFKR on a near yearly basis (Figure 7.2-4) and were shown to mobilize and sort fine-grained sediment (i.e., sands) within the river channel, transporting it downstream (ENTRIX, 2002). Additionally, the diversion at Fairview Dam is typically closed during late summer/fall storm run-off events to avoid an influx of sediment into the flowline, allowing sediment to naturally move through the river channel. The *BIO-6 Stream Habitat Typing Technical Memorandum* (Appendix E.2) found that stream habitat types and distribution downstream of Fairview Dam were generally consistent between 1991 and 2023, indicating that no major changes in channel morphology are occurring as a result of Project O&M.

Proposed Measure WR-1 would include only minor changes when compared with existing minimum instream flows to better align release with the natural hydrograph (see Section 7.3.1.1, *Water Use and Hydrology*, for details). Proposed Measure WR-5 includes a pre-scheduled 10-day period when the Project would not divert flows at Fairview Dam during the ascending limb of the spring snowmelt period. This measure would result in an increase of up to 600 cfs in the Fairview Dam Bypass Reach; however, the proposed Measure WR-5 releases are not anticipated to exceed peak flows that regularly occur in the reach during natural spring run-off events (see Section 7.3.1.1, *Water Use and Hydrology*), and therefore would not increase the potential for increased erosion on the banks of the NFKR. Because recreational boating releases would not exceed normal peak flow conditions that were observed during the previous licensing period, no effects on geology and soils are expected.

Similarly, because river conditions would remain consistent and proposed flow measures would modify releases to be more in alignment with the natural hydrograph, the proposed Project would not affect in-channel conditions or the free-flowing nature of the river relative to the baseline current conditions.

Sandbox Flushing

With the implementation of proposed Measure WR-4, continued sandbox flushing would have minor to no adverse effects on Project geology and soils. ENTRIX (2002, 2009) evaluated sandbox flushing activities between 1997 and 2009 and found no significant effects on channel conditions downstream of Fairview Dam when flushing activities were conducted at flows greater than 350 cfs. However, proposed Measure WR-4 would extend the current flushing condition and includes additional provisions to allow flushing activities at flows less than 350 cfs between July 1 and February 15, which is outside the rainbow trout spawning period. Flushing activities at flows less than 350 cfs may have minor, local, short-term effects on sediment transport because sediment from the sandbox may be deposited between higher flow events (i.e., flows greater than 350 cfs). Discussion of the current flushing regime and changes described in proposed Measure WR-4 are discussed in more detail below.

Effects from sandbox flushing were initially evaluated from 1997 to 2001 during a 5-year monitoring program. The monitoring program entailed measuring sediment volumes and characteristics in pools and riffles below Fairview Dam under a regime of weekly flushing when flows were at or above 350 cfs downstream of Fairview Dam (ENTRIX, 2002). Conditions at the sandbox and at three sites downstream of the Fairview Dam were monitored for net percent change in cross-sectional area, substrate embeddedness, dominant/subdominant bed particle size, fine sediment, and bulk sediment. No significant effects as a result of the flushing activities were observed on pool habitat conditions, the particle size of sediments in pools, or the quantity of fine sediments deposited in pools. SCE subsequently modified the sandbox flushing protocol to include flushing once every 2 weeks when instream flows were above 350 cfs. Additional monitoring from 2007 to 2009 was conducted at a site 200 feet downstream of the dam. No adverse effects from sedimentation on channel morphology were observed from the modified procedures (ENTRIX, 2009).

Proposed Measure WR-4 would provide for additional sandbox flushing activities between July 1 and February 15, outside the rainbow trout spawning season, at flows less than 350 cfs. Although small amounts of sand and finer material may be deposited at the outlet of the sandbox, these sediment deposits would be localized and would occur outside the typical spawning window for rainbow trout and other native fish species known to occur in the Fairview Dam Bypass Reach (see Section 7.4.1.2, *Fish Populations*, Figure 7.4-2). Flushing during flows less than 350 cfs would be conducted as needed and typically concentrated in late summer or fall. Passed sediment during these activities would be distributed by naturally occurring higher flow events in the winter and spring, resulting in only minor, local, short-term effects on sediment in the stream channel. See Figure 7.2-4 for the timing and reoccurrence interval of flow greater than 350 cfs.

Although minor, local effects on sediment transport are possible with the implementation of proposed Measure WR-4, any fish within the sandbox would benefit from the increased frequency of flushing activities by reducing the time between flushings (Section 7.4, *Fish and Aquatic Resources*) for a description of downstream passage at Fairview Dam and the sandbox.

Salmon and Corral Creek Diversion Sediment Removal

Sediment management at the Salmon and Corral Creek Diversions would not affect geology and soils within the FERC Project Boundary. Accumulated sediment is periodically removed at these diversions to maintain flows into the diversion infrastructure. With implementation of proposed Measure WR-4, SCE would, as needed, open the impoundment drain when the diversion is turned out (i.e., not diverting flow) to allow any accumulated sediment to naturally flush downstream. If accumulated sediment does not naturally flush downstream through the pond drain, sediment may need to be physically removed and relocated downstream using small hand tools.

7.2.3.2. Unavoidable Adverse Effects

The proposed Project would not result in unavoidable adverse effects on geology and soil resources.

7.3. WATER RESOURCES

This section describes water resources and the applicable management direction regarding water resources with the potential to occur in the FERC Project Boundary and lands surrounding the Project, specifically Project-affected stream reaches including the Fairview Dam Bypass Reach and Salmon and Corral Creeks downstream of Salmon and Corral Creek Diversions (Figure 7.3-1). Section 7.3.1 describes the affected environment and resource conditions under current Project O&M (i.e., baseline condition). Section 7.3.2 identifies environmental measures, management plans, and programs that are included in the proposed Project. Section 7.3.3 includes an analysis of ongoing or new environmental effects of O&M activities from the proposed Project, including potential effects from proposed measures. The full description of proposed measures is provided in Appendix E.1.

The descriptions within this section were developed using existing, relevant, and reasonably available information and include results from the following relicensing studies where additional information was collected to further describe the resources:

- WR-1 Water Quality
- WR-2 Hydrology

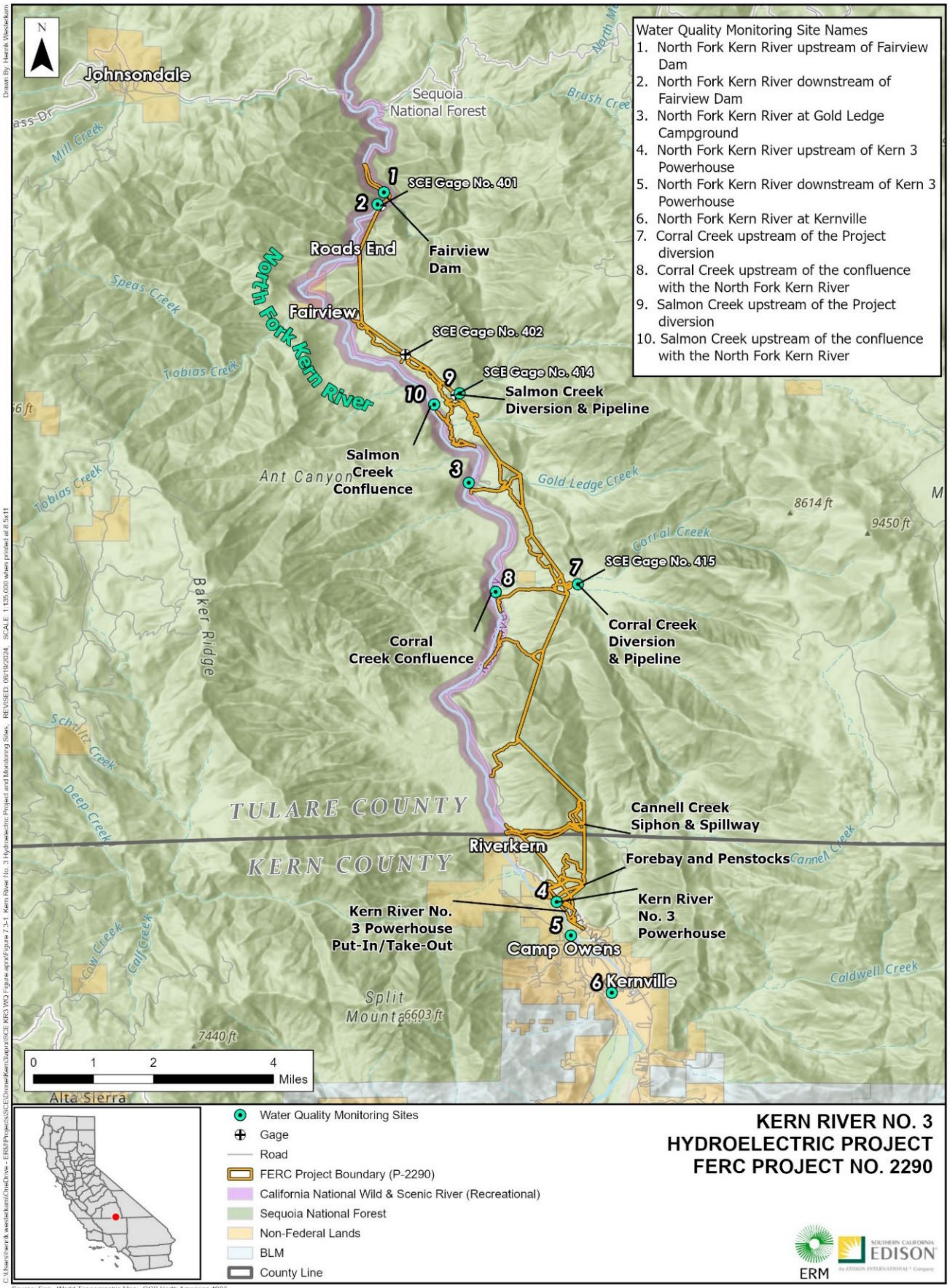
Components of the WR-1 and WR-2 Technical Memoranda are in progress, and their respective Interim Technical Memoranda are provided in Appendix E.2.

SCE is collecting additional data as part of the WR-1 Study on water temperature, dissolved oxygen (DO), and bacteria in 2024. Preliminary data and information collected for temperature and bacteria during 2022 and 2023 are summarized below, and placeholders are noted where final data analysis is pending. SCE anticipates final data collection and analysis to be complete and included as part of the FLA.

SCE is collecting additional flow data as part of the WR-2 Study to inform the flow travel-time calculations and is also compiling and summarizing flow data from Salmon and Corral Creeks. The hourly gage data for WYs 1997 to 2021, WY 2022, and WY 2023 were provided to relicensing Stakeholders on June 30, 2023; March 29, 2024; and July 1, 2024, respectively, and a summary of the data is included below. SCE anticipates final data collection and analysis to be complete and included as part of the FLA.

As directed by FERC staff in their May 30, 2024, Determination on Requests for Study Modifications and New Studies, SCE will conduct a supplemental hydrologic analysis over the period of record, excluding times when the Project was non-operational, to further describe the operational effects of the Project on flows in the Fairview Dam Bypass Reach. The analysis will be included as part of the USR and incorporated into the FLA, as applicable.

Related resource information pertinent to the discussion of water use and water quality is presented in Section 7.2, *Geologic and Soils Resources*.



BLM =Bureau of Land Management; FERC = Federal Energy Regulatory Commission

Figure 7.3-1. Kern River No. 3 Hydroelectric Project and WR-1 Study Monitoring Sites, 2022–2023.

7.3.1. Affected Environment

7.3.1.1. Water Use and Hydrology

Drainage Area

The NFKR watershed upstream of Isabella Lake encompasses 1,050 square miles of the 2,460-square-mile Kern River basin, of which 842 square miles are upstream of Fairview Dam (FERC and Forest Service, 1996; USGS, 2024). Potentially affected stream reaches also include three tributaries to the NFKR, including portions of Salmon Creek with a watershed of 26 square miles, Corral Creek with a watershed of 9 square miles, and Cannell Creek with a watershed of 17 square miles (USGS, 2020).

Existing Flow Gages

SCE maintains two gaging stations that monitor and record water flow for Project compliance. Under contract with SCE, USGS provides data review of annual streamflow records at the USGS gages, including flow records for the Fairview Dam Bypass Reach (USGS gage 11186000, SCE gage 401) and the KR3 water conveyance system (USGS gage 11185500, SCE gage 402) (Figure 7.3-1). Gage data are published annually on the USGS website.

SCE also maintains and inspects two other non-recording gaging stations associated with the small diversions in the Corral Creek Diversion Bypass Reach (USGS gage 11186750, SCE gage 415) and the Salmon Creek Diversion Bypass Reach (USGS gage 11186550, SCE gage 414). These gages are inspected monthly to observe flow conditions at the fixed-geometry orifice flow-release point. See Section 5.1.2.5, *Gages*, for additional information on Project gages.

Hydrology

The Project is operated as a run-of-river facility. The Project diverts water from the NFKR at Fairview Dam into the water conveyance system that transports the water through an approximately 13-mile-long flowline[14] situated along the eastern hillside above the NFKR before entering KR3 Powerhouse and returning to the NFKR.

Flow data are available to assess watershed hydrology from the two Project gages at the Fairview Dam Bypass Reach and the flowline over the period of record (1960 to 2022), including the current license period (i.e., WY 1997, beginning October 1, 1996, through WY 2022, ending September 30, 2022).[15] The complete dataset for the period of record provides a reference for long-term climatic conditions. A preliminary quality assurance / quality control review of the data was performed to identify anomalies (e.g., data gaps, outliers, or gage limitations).

[14] The flowline is shorter than the Fairview Dam Bypass reach due to the sinuosity of the NFKR.

[15] Flow data for WY 2023 was not available for inclusion in the analysis at the time this document was prepared. The summary of 2023 data will be included in the FLA.

Monthly mean, median, minimum, and maximum mean daily flows for the Fairview Dam Bypass Reach and the flowline at Adit 6/7 are presented in Table 7.3-1 and Table 7.3-2, respectively. The highest mean daily flow measured in the Fairview Dam Bypass Reach during the current license period was 25,100 cfs on January 3, 1997. The highest mean daily flow measured in the flowline at Adit 6/7 during the current license period was 594 cfs, also on January 3, 1997. Flows in the Fairview Dam Bypass Reach are most consistently high during spring (May through June), and the maximum annual flow most often occurs during the spring run-off (Figure 7.3-2). Diversion from the NFKR was generally highest from April through June (greater than 400 cfs) and lowest from August through January (less than 200 cfs). Both Salmon and Corral Creeks are intermittent, and water is seasonally diverted to the flowline from both creeks. MIF requirements in Salmon and Corral Creeks are met through fixed-geometry orifice flow releases.

Table 7.3-1. Monthly Flow Statistics for Fairview Dam Bypass Reach, USGS Gage 11186000, SCE Gage 401, 1997–2022

Month	Current License Term Water Year 1997–2022[a]			
	Mean of Mean Daily Flow (cfs)	Median of Mean Daily Flow (cfs)	Maximum of Mean Daily Flow (cfs)	Minimum of Mean Daily Flow (cfs)
October	133	99	1,752	27
November	133	62	6,030	40
December	136	56	6,245	40
January	268	57	25,100[b]	41
February	212	58	5,997	42
March	370	182	3,048	72
April	693	425	4,552	102
May	1,449	1,049	6,350	101
June	1,427	583	7,120	88
July	620	153	5,370	71
August	188	141	1,486	29
September	126	112	596	26

Source: SCE, 2023

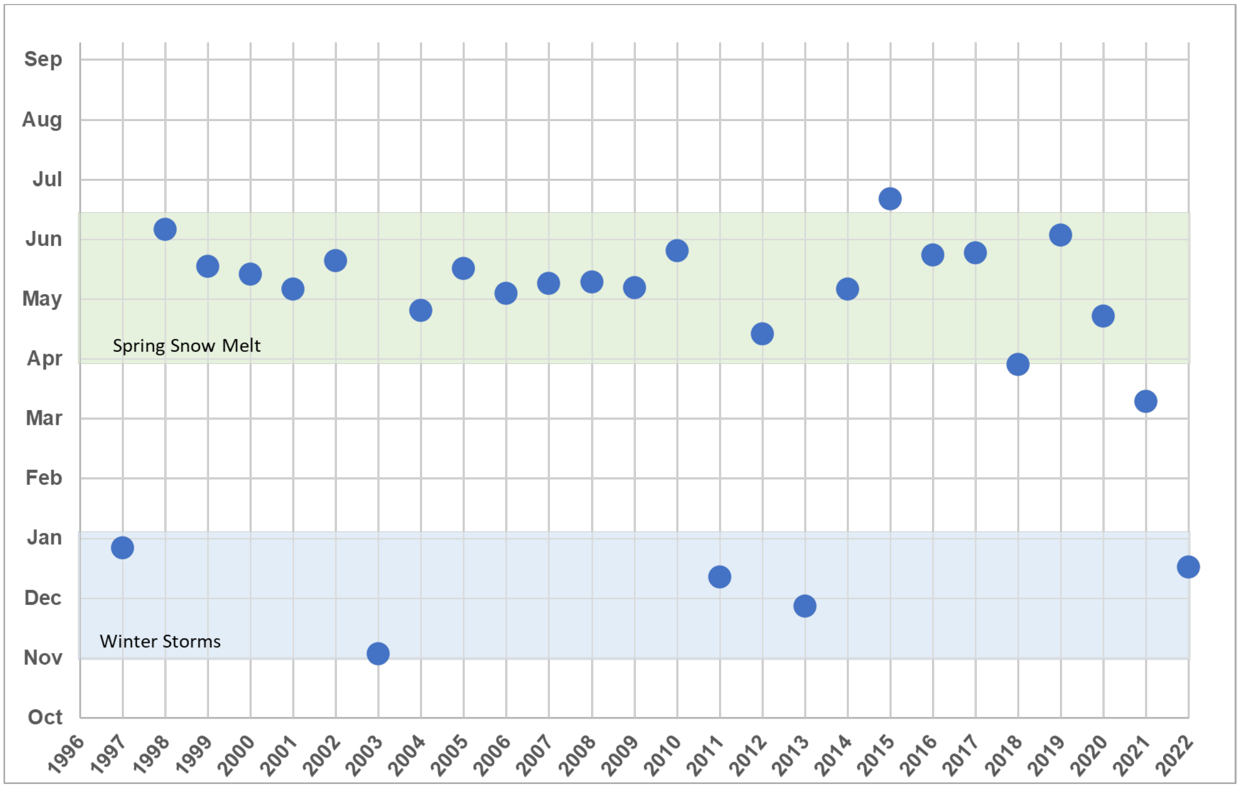
cfs = cubic feet per second
Notes:
[a] Includes months and years when the Project was offline (not generating) or had reduced generation capacity (only utilize one unit) due to extended maintenance outages. Refer to Table 2-1 in Exhibit B, *Project Operation and Resource Utilization Draft License Application*, for additional information.
[b] Maximum daily flow recorded on January 3, 1997.

Table 7.3-2. Monthly Flow Statistics for Project Flowline at Adit 6/7, USGS Gage 11185500, SCE Gage 402, 1997–2022

Month	Current License Term Water Year 1997–2022[a]			
	Mean of Mean Daily Flow (cfs)	Median of Mean Daily Flow (cfs)	Maximum Mean Daily Flow (cfs)	Minimum Mean Daily Flow (cfs)
October	81	42	525	0
November	119	103	574	0
December	157	143	591	0
January	197	194	594[b]	0
February	261	260	589	0
March	297	301	593	0
April	421	471	591	0
May	450	557	590	0
June	400	441	588	0
July	274	239	588	0
August	167	49	584	0
September	93	41	586	0

Source: SCE, 2023

cfs = cubic feet per second
Notes:
[a] Includes months and years when the Project was offline (not generating) or had reduced generation capacity (only utilize one unit) due to extended maintenance outages. Refer to Table 2-1 in Exhibit B, *Project Operation and Resource Utilization Draft License Application*, for additional information.
[b] Maximum daily flow recorded on January 3, 1997.



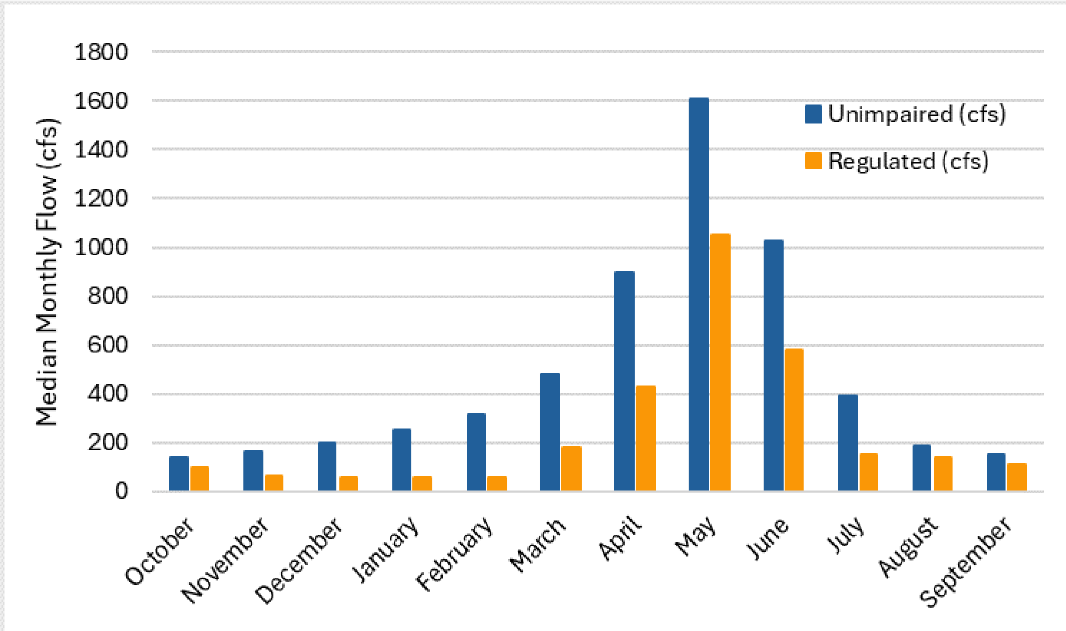
Source: SCE, 2023

Figure 7.3-2. Date of Annual Maximum Flow for the North Fork Kern River Fairview Dam Bypass Reach, Water Years 1996–2022.

<u>Comparison of Unimpaired and Regulated Flows</u>

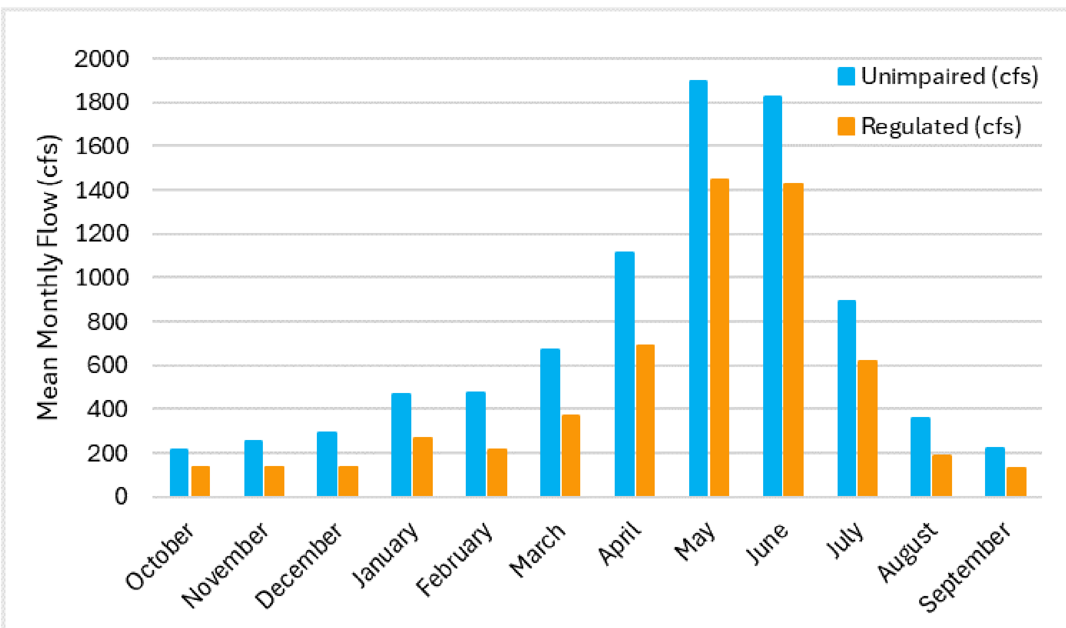
Flows in the NFKR upstream and downstream of Fairview Dam were compared using the gage data from existing gages in the Fairview Dam Bypass Reach (USGS gage 11186000, SCE gage 401) and the flowline (USGS gage 11185500, SCE gage 402). Unimpaired flow is calculated as the sum of flows at these two gages and represents the streamflow that would be present without the diversion of water at Fairview Dam, whereas regulated flow is a result of current Project operations and is represented by gage flow in the bypass reach (USGS gage 11186000, SCE gage 401).

The NFKR has a hydrograph similar to other west-slope Sierra Nevada rivers—drier summer and fall periods and winter precipitation predominantly occurring as snow in the upper basin. Peak snowmelt run-off generally occurs in late April or early May and tapers off by September (Stephens et al., 1995). Figures 7.3-3 and 7.3-4 show median and mean monthly flows at NFKR, where unimpaired flow is the sum of USGS gages 11185500 and 11186000 (SCE gages 401 and 402, respectively) and the regulated flow is USGS gage 11186000 (SCE gage 401).



cfs = cubic feet per second

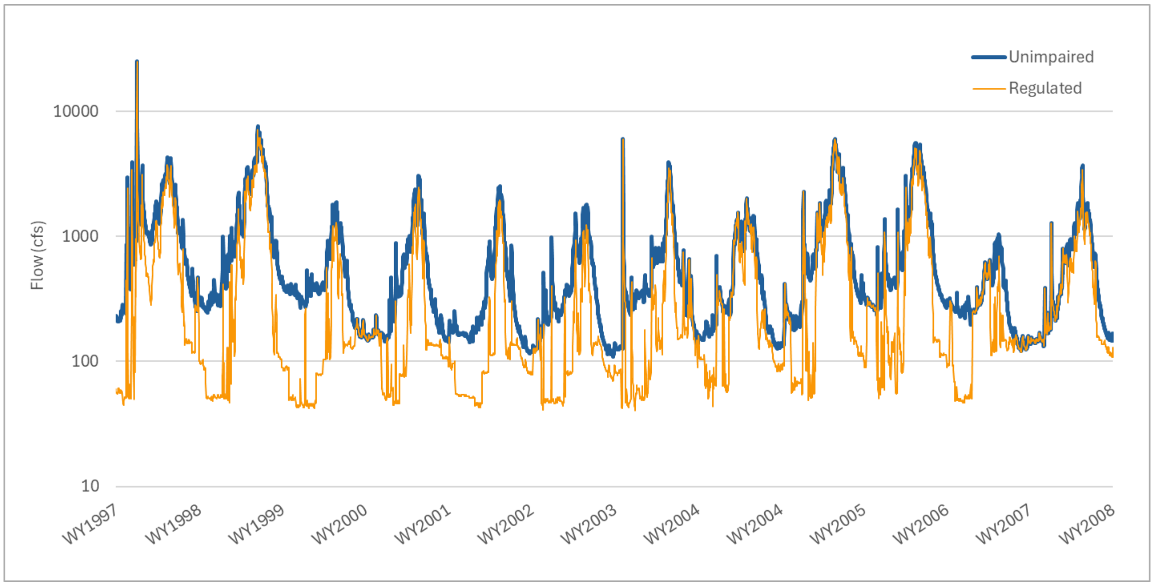
Figure 7.3-3. Median Monthly Unimpaired Flow (Sum of USGS Gages 11185500 and 11186000, SCE Gages 401 and 402) and Regulated (USGS Gage 11186000, SCE Gage 401) in the North Fork Kern River, Water Years 1997–2022.



cfs = cubic feet per second

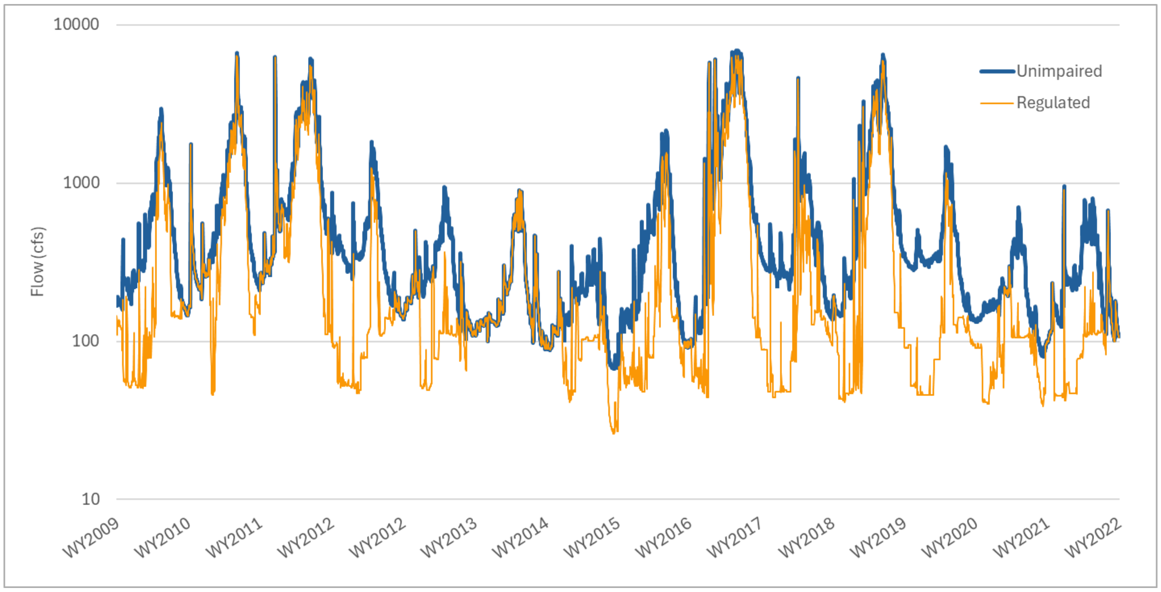
Figure 7.3-4. Mean Monthly Unimpaired Flow (Sum of USGS Gages 11185500 and 11186000, SCE Gages 401 and 402) and Regulated (USGS Gage 11186000, SCE Gage 401) in the North Fork Kern River, Water Years 1997–2022.

Figures 7.3-5 and 7.3-6 show hydrographs of daily flows over the current license period (WY 1997 to WY 2008 and WY 2009 to WY 2022, respectively). Data includes months and years when the Project was offline (not generating) or had reduced generation capacity (only utilize one unit) due to extended maintenance outages (refer to Table 2-1 in Exhibit B, *Project Operation and Resource Utilization Draft License Application*, for additional information).



cfs = cubic feet per second

Figure 7.3-5. Mean Daily Unimpaired Flow for the North Fork Kern River and the Regulated Fairview Dam Bypass Reach, Water Years 1997–2008.



cfs = cubic feet per second

Figure 7.3-6. Mean Daily Unimpaired Flow for the North Fork Kern River and the Regulated Fairview Dam Bypass Reach, Water Years 2009–2022.

Flow Duration Curves

Annual flow duration curves for the regulated Fairview Dam Bypass Reach (USGS gage 11186000, SCE gage 401) and unimpaired flow (calculated summation of the gage at Fairview Dam Bypass Reach [USGS gage 11186000, SCE gage 401] and the flowline at Adit 6/7 [USGS gage 11185500, SCE gage 402]) are shown in Appendix B.1, Figure B.1-1 and Figure B.1-2, respectively; monthly flow duration curves are in Figure B.1-3 through Figure B.1-13.

7.3.1.2. Water Quality

This section describes water quality in the NFKR using existing, relevant, and reasonably available information.

Beneficial Uses

The Central Valley Regional Water Quality Control Board designated the following beneficial uses for the Kern River upstream of Isabella Lake in the *Water Quality Control Plan for the Tulare Lake Basin* (Basin Plan; CVRWQCB, 2018), which includes the reach of the NFKR in which the Project is located:

- Municipal and Domestic Water Supply (MUN)
- Hydropower Generation (POW)
- Water Contact Recreation (REC-1)

- Non-Contact Water Recreation (REC-2)
- Warm Freshwater Habitat (WARM)
- Coldwater Habitat (COLD)
- Wildlife Habitat (WILD)
- Rare, Threatened, or Endangered Species (RARE)
- Spawning, Reproduction, and/or Early Development (SPWN)
- Freshwater Replenishment (FRSH)

Basin Plan Water Quality Objectives

The State Water Board establishes Basin Plan water quality objectives with consideration of past, present, and probable future beneficial uses; environmental characteristics of the hydrographic unit; water quality conditions that can reasonably be achieved; economic considerations; the need for housing development; and the need to develop and use recycled water. Table 7.3-3 summarizes the Basin Plan water quality objectives for the NFKR.

Table 7.3-3. Central Valley Regional Water Quality Control Board Basin Plan Objectives for the North Fork Kern River

Water Quality Parameter	Objective for Upper North Fork Kern River
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[a]	A 6-week rolling geometric mean of *Escherichia 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.
Biostimulatory substances	No biostimulatory substances in concentrations that promote aquatic growth to the extent that such growth cause nuisance or adversely affect beneficial uses.
Chemical constituents	Cannot contain CCs in concentrations that adversely affect beneficial uses. Concentrations shall not exceed MCLs specified in the Title 22 of the California Code of Regulations.
Color	Waters shall be free of discoloration that causes nuisance or adversely affects beneficial uses.
Dissolved oxygen	Dissolved oxygen concentrations for the Kern River above Isabella Lake shall not be less than 8 mg/L, waters designated as WARM shall not be less than 5.0 mg/L, and waters designated COLD or SPWN shall not be less than 7.0 mg/L. Where ambient dissolved oxygen is less than these objectives, discharges shall not cause a further decrease in dissolved oxygen concentrations.
Floating material	Waters shall not contain floating material in concentrations that cause nuisance or adversely affect beneficial uses.
Oil and grease	No oils, greases, waxes, or other materials in concentrations that cause nuisance, result in a film or coating on the surface of the water or on objects in the water, or otherwise adversely affect beneficial uses.
Pesticides	Waters shall not contain pesticides in concentrations that adversely affect beneficial uses. At a minimum, waters designated MUN shall not contain concentrations of pesticide constituents in excess of the MCLs.
pH	Cannot be depressed below 6.5 or increased above 8.3, nor altered more than 0.3 from ambient pH.
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. At a minimum, waters designated MUN shall not contain concentrations of radionuclides in excess of the MCLs.
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 Isabella Lake is 200 microsiemen per centimeter.

Water Quality Parameter	Objective for Upper North Fork Kern River
Sediment	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.
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	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 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	Cannot 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, increase cannot exceed 10 NTUs.

Source: CVRWQCB, 2018; 2019

°F = degrees Fahrenheit; CC = chemical constituent; CFU = colony forming units; MCL = maximum contaminant levels; mg/L = milligrams per liter; mL = milliliter; N = nitrogen; NTU = nephelometric turbidity unit

Note:

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

California List of Impaired Waters

The current CWA Section 303(d) list of impaired waterbodies and total maximum daily load does not include the NFKR (State Water Board, 2022).

Consistency with Basin Plan Water Quality Objectives

Water quality information discussed in this section includes data collected during 2022 and 2023 relicensing surveys (see WR-1 Technical Memorandum in Appendix E.2), water quality data collected by USGS downstream of the Project in the Kern River near Kernville at USGS gage 11187000 between 1966 and 1993 (USGS, 2020), a DO study (ENTRIX, 1993a), and other existing and relevant data (e.g., SCE, 1992; ENTRIX, 1990, 1993b). These data include water temperature, DO, pH, conductivity, water chemistry (general chemistry, metals, minerals, nutrients), turbidity, and bacteria.

Currently available water quality data indicate that water quality in the NFKR is typical of west-slope Sierra Nevada mid-elevation rivers, with low concentrations of minerals, metals, and nutrients; low turbidity; low hardness (11 to 57.9 milligrams per liter [mg/L]; USGS, 2020); and low alkalinity (18 to 88 mg/L; USGS, 2020). Available data were compared with Basin Plan water quality objectives (Table 7.3-3). No inconsistencies were identified in 17 of the 19 applicable Basin Plan water quality objectives:

- Ammonia
- Bacteria
- Biostimulatory substances
- Color
- Floating material
- Oil and grease
- Pesticides
- pH
- Radioactivity
- Salinity
- Sediment
- Settleable material
- Suspended material
- Tastes and odors
- Temperature
- Toxicity
- Turbidity

Some inconsistencies were observed for two objectives—chemical constituents (CCs) and DO—that were not attributed to the Project.

Ammonia

The Basin Plan states that waters shall not contain un-ionized ammonia in amounts that adversely affect beneficial uses. Total ammonia concentrations were low (below laboratory detection [BD] to 0.12 mg/L) in samples collected downstream of the Project in the Kern River near Kernville between 1979 and 1993 (USGS, 2020), and calculated un-ionized ammonia is near zero.

Bacteria

In waters designated for contact recreation (REC-1), the statewide water quality objective for bacteria is a 6-week rolling geometric mean of *Escherichia coli* (*E. coli)* of less than 100 colony forming units per 100 milliliters (CFU/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. Bacteria samples were collected at two locations in the Fairview Dam Bypass Reach, one location just upstream of Fairview Dam, and in Salmon and Corral Creeks before their confluences with the NFKR. *E. coli* levels were low (less than 100 most probable number per 100 milliliters [MPN/100 mL])[16] during 2022 and 2023 in the Fairview Dam Bypass Reach (Sites 3 and 4), Corral Creek Diversion Bypass Reach (Site 8), Salmon Creek Diversion Bypass Reach (Site 10), and the NFKR upstream of Fairview Dam (Site 1), except for one sample collected in the Salmon Creek Diversion Bypass Reach (Site 10) that was 230 MPN/100 mL (Table 7.3-4; Figure 7.3-1). These results suggest that *E. coli* levels in Project-affected stream reaches generally do not exceed the statewide water quality objective for bacteria. SCE will conduct additional *E. coli* sampling and report the results, in accordance with statewide water quality objective requirements, in the FLA.

Table 7.3-4. Bacteria Data Collected During Relicensing WR-1 Study

Analyte (units)	Site #	Site Name	Range (min–max)	Geometric Mean	Number of Samples	Period of Record
Escherichia coli (MPN/100 mL)	1	NFKR upstream of Fairview Dam[1]	Less than 1–28	5.3	4	2022–2023
	3	NFKR at Gold Ledge Campground	5.2–28	8.3	4	2022–2023
	4	NFKR upstream of KR3 Powerhouse	2–34	5.8	4	2022–2023
	8	Corral Creek upstream of NFKR confluence	1–40	8.7	4	2022–2023
	10	Salmon Creek upstream of NFKR confluence	2–240	13.1	4	2022–2023
Fecal coliform (MPN/100 mL)	1	NFKR upstream of Fairview Dam	2.2–3.6	2.6	3	2022
			1.8–34	7.2	5	2023
	3	NFKR at Gold Ledge Campground	2.2–9.2	4.7	3	2022
			2–230	11.1	5	2023
	4		3.6–16	7.4	3	2022

[16] 1 CFU/100 mL is equivalent to 1 MPN/100 mL.

Analyte (units)	Site #	Site Name	Range (min–max)	Geometric Mean	Number of Samples	Period of Record
		NFKR immediately upstream of the KR3 Powerhouse	2–78	12.7	5	2023
	8	Corral Creek upstream of NFKR confluence	1.1–2.2	1.6	2	2022
			4.5–46	11.9	5	2023
	10	Salmon Creek upstream of NFKR confluence	1.1–9.2	4.5	3	2022
			11–230	39.3	5	2023

KR3 = Kern River No. 3; MPN/100 mL = most probable number per 100 milliliters; NFKR = North Fork Kern River

[1] Site 1 is located upstream of the influence of the Fairview Dam impoundment pool and reflects conditions upstream of the Project.

Preceding the adoption of the statewide water quality objective, fecal coliform[17] was assessed for impairment. Fecal coliform levels were low (less than 100 MPN/100 mL) during 2022 and 2023 sampling in the Fairview Dam Bypass Reach (Sites 3 and 4), Corral Creek Diversion Bypass Reach (Site 8), Salmon Creek Diversion Bypass Reach (Site 10), and the NFKR upstream of the Fairview Dam (Site 1), except for one sample collected in the NFKR at Gold Ledge Campground (Site 3) and one sample collected in the Salmon Creek Diversion Bypass Reach upstream of the NFKR confluence (Site 10) (Table 7.3-4; Appendix E.2, WR-1 Technical Memorandum). Consistent with 2022 and 2023 results, high levels of fecal coliform have occasionally been detected during historical sampling events. As directed by FERC staff in their May 30, 2024, *Determination on Requests for Study Modifications and New Studies*, SCE will conduct additional monitoring of fecal coliform and present the results in the FLA.

Biostimulatory Substances

The Basin Plan requires that water shall not contain biostimulatory substances that promote aquatic growth in concentrations that cause nuisance or adversely affect designated beneficial uses. Algal nutrient concentrations, including nitrogen (i.e., ammonia, nitrate, nitrite, total Kjeldahl nitrogen, organic nitrogen, and total nitrogen) and phosphorus species (i.e., orthophosphate and total phosphorus), were low in samples collected downstream of the Project in the Kern River near Kernville between 1974 and 1993 (Table 7.3-5; USGS, 2020). These low nutrient concentrations are consistent with snowmelt run-off sources to the upper Kern River, with occasional increases primarily related to seasonal decreases in flow.

[17] Basin Plan water quality objective state that in a minimum of five samples for a 30-day period, geometric mean cannot exceed 200/100 mL, nor can more than 10 percent of total number of samples during a 30-day period exceed 400/100 mL.

Table 7.3-5. Nutrient Water Quality Numerical Objectives and Data Collected at the Kern River near Kernville (USGS Gage 11187000)

Analyte (unit)	Water Quality Objective[a]	MCL[b]	Range (min–max)	Mean	Number of Samples	Period of Record
Total ammonia as N (mg/L)	N/A	N/A	BD–0.12	0.03	89	1979–1993
Nitrate as N (mg/L)	CC	45	BD–0.62	0.08	58	1975–1993
Nitrite as N (mg/L)	CC	1	0.01–0.02	0.01	57	1975–1993
Total Kjeldahl nitrogen as N (mg/L)	N/A	N/A	0.05–2.2	0.38	115	1974–1993
Organic nitrogen as N (mg/L)	N/A	N/A	0.04–2.1	0.37	109	1977–1993
Total nitrogen as N (mg/L)	N/A	N/A	0.06–2.8	0.48	106	1978–1993
Orthophosphate as P (mg/L)	N/A	N/A	0.01–0.06	0.01	84	1974–1993
Total phosphorus as P (mg/L)	N/A	N/A	0.01–0.47	0.04	121	1974–1993

Source: USGS, 2020; CVRWQCB, 2018; CDPH, 2017

BD = below laboratory detection limit; CC = chemical constituent; mg/L = milligrams per liter; MCL = maximum contaminant level; N/A = no data available; N = nitrogen; P = phosphorus

Notes:

[a] Central Valley Regional Water Quality Control Board Basin Plan water quality objective (CVRWQCB, 2018).

[b] MCLs specified in Title 22 of the California Code of Regulations (CDPH, 2017).

Chemical Constituents

The Basin Plan requires that water shall not contain CCs in concentrations that adversely affect beneficial uses. It also requires that waters designated for use as MUN shall not contain concentrations of CCs that exceed maximum contaminant levels (MCLs) specified in Title 22 of the California Code of Regulations. Historical sampling indicates that CCs are typically low and less than Title 22 MCLs in waters surrounding the Project, with four exceptions: arsenic, iron, manganese, and sodium.

Trace metals, minerals, and other CC (i.e., specific conductivity, nitrate, nitrite) concentrations were generally low in samples collected downstream of the Project in the Kern River near Kernville between 1974 and 1993 (Table 7.3-5 and 7.3-6; USGS, 2020); iron, manganese, and sodium concentrations exceeded the Title 22 MCLs on occasion. Total arsenic was detected at concentrations greater than the Title 22 MCLs (10 micrograms per liter [µg/L]) in water samples collected in the NFKR downstream of Fairview Dam during September 1989 (less than 10 to 16 µg/L) (ENTRIX, 1990); however, total arsenic was not detected in samples collected upstream of Fairview Dam in June 1993 (less than 2.0 µg/L) (ENTRIX, 1993b). Downstream of the Project in the Kern River near Kernville, arsenic was detected at low levels (1 to 8 µg/L) in samples collected between 1974 and 1993 (Table 7.3-6; USGS, 2020). There have been no other instances of other CC concentrations (i.e., un-ionized ammonia [see *Ammonia* subsection in Section 7.3.1.2, *Water Quality*] and organic materials [see the *Oil and Grease* subsection in Section 7.3.1.2, *Water Quality*]) that exceeded Basin Plan water quality objectives.

Table 7.3-6. Trace Metals, Minerals, and Other Chemical Water Quality Numerical Objectives and Data Collected at the Kern River near Kernville (USGS Gage 11187000)

Analyte (units)	Water Quality Objective[a]	MCL[b]	Range (min–max)	Mean	Number of Samples	Period of Record
Metals						
Aluminum (µg/L)	CC	2,000	10–80	22.6	42	1982–1993
	T&O	200				
Arsenic (µg/L)	CC	10	1–8	4.0	18	1978–1982
Barium (µg/L)	N/A	1,000	BD–200	83.3	18	1978–1982
Beryllium (µg/L)	N/A	4	0.5–1	0.5	35	1982–1991
Boron (µg/L)	N/A	N/A	20–200	114	10	1974–1980
Cadmium (µg/L)	N/A	5	BD–2	0.8	10	1979–1982
Chromium (µg/L)	N/A	N/A	BD–20	5.4	13	1978–1982
Cobalt (µg/L)	N/A	N/A	BD–2	0.7	9	1978–1982
Copper (µg/L)	CC	1,000	1–30	17.9	9	1978–1982
	T&O	1,300				
Iron (µg/L)	CC, T&O	300	130–2,900	519	18	1978–1982
Lead (µg/L)	N/A	15	BD–49	9.7	13	1979–1982
Lithium (µg/L)	N/A	N/A	4–40	20.9	42	1982–1993
Manganese (µg/L)	CC	50	10–60	21.2	17	1978–1982
Mercury (µg/L)	CC	20	BD–1.9	0.3	18	1978–1982
Molybdenum (µg/L)	N/A	N/A	10–10	10.0	43	1982–1993
Nickel (µg/L)	CC	10	1–1	1.0	2	1979–1982
Selenium (µg/L)	CC	50	0–1	0.6	18	1978–1982
Silver (µg/L)	CC, T&O	1,000	BD–2	0.4	17	1978–1982
Strontium (µg/L)	N/A	N/A	27–120	74.3	43	1982–1993
Vanadium (µg/L)	N/A	N/A	6–6	6.0	43	1982–1993
Zinc (µg/L)	CC, T&O	5,000	BD–120	33.9	18	1978–1993
Minerals						
Calcium (mg/L)	N/A	N/A	3.6–18	10.32	124	1974–1993

Analyte (units)	Water Quality Objective[a]	MCL[b]	Range (min–max)	Mean	Number of Samples	Period of Record
Chloride (mg/L)	CC, T&O	250	0.7–12	3.84	124	1974–1993
Fluoride (mg/L)	N/A	N/A	BD–0.4	0.18	112	1977–1993
Magnesium (mg/L)	N/A	N/A	0.1–3.2	1.64	123	1974–1993
Potassium (mg/L)	N/A	N/A	0.5–2.4	1.30	114	1977–1993
Silica (mg/L)	N/A	N/A	3.3–22	14.63	112	1977–1993
Sodium (mg/L)	CC	20	2.2–21	9.85	124	1974–1993
Sulfate (mg/L)	CC	2,500	0.7–17	7.32	124	1974–1993
Other						
Specific Conductance (μS/cm)	CC, T&O	900	32–202	108.4	222	1974–1993
Organic Carbon (mg/L)	N/A	N/A	0.9–8.4	2.9	16	1978–1981

Source: USGS, 2020; CVRWQCB, 2018; CDPH, 2017

μg/L = micrograms per liter; μS/cm = microsiemens per centimeter; BD = below laboratory detection limit; CC = chemical constituent; MCL = maximum contaminant level; mg/L = milligrams per liter; N/A = no value available; T&O = taste and odor

Notes:

[a] Basin Plan water quality objective (CVRWQCB, 2018).

[b] MCLs specified in Title 22 of the California Code of Regulations (CDPH, 2017).

Color

The Basin Plan states waters shall be free of coloration that causes nuisance conditions or other adverse effects on beneficial uses. SCE's compilation and review of data for the PAD and development of the WR-1 Study Plan (SCE, 2022) revealed no instances in which color in Project-affected reaches of the NFKR was a nuisance or adversely affected beneficial uses.

Dissolved Oxygen

The Basin Plan states that DO concentrations in the Kern River upstream of Isabella Lake shall not be less than 8 mg/L, waters designated as WARM shall not be less than 5.0 mg/L, and waters designated COLD or SPWN shall not be less than 7.0 mg/L. Where ambient DO is less than these objectives, discharges shall not cause a further decrease in DO concentrations. The WR-1 Study is currently assessing DO at 10 sites: 7 locations within 3 Project-affected reaches (NFKR Fairview Dam Bypass Reach [Sites 2 through 6], Corral Creek Diversion Bypass Reach [Site 8], and Salmon Creek Diversion Bypass Reach [Site 10]), and 3 comparison sites upstream of the FERC Project Boundary (NFKR upstream of Fairview Dam [Site 1],[18] Corral Creek upstream of the diversion [Site 7], and Salmon Creek upstream of the diversion [Site 9]) (Figure 7.3-1). SCE will conduct additional DO monitoring and data quality assurance and quality control review, and present the results in the FLA.

Due to historical observations of DO below the 8 mg/L water quality objectives, previous monitoring studies were undertaken to determine the timing, duration, and magnitude of reduced DO concentrations in waters surrounding the Project, including the NFKR upstream of Fairview Dam, the Fairview Dam Bypass Reach, Corral Creek upstream of the diversion, Corral Creek Diversion Bypass Reach, Salmon Creek Diversion Bypass Reach, and Salmon Creek upstream of the diversion (ENTRIX, 1993a). The 1993 study found that reduced DO was primarily related to elevated temperature rather than Project-related variations in stream flow. DO concentrations were generally similar upstream and downstream of the diversions and within the Fairview Dam Bypass Reach throughout the summer study period. In the NFKR and Salmon Creek, DO concentrations were consistently greater than the Basin Plan water quality objective of 8 mg/L during the study period. In Corral Creek, DO less than 8 mg/L was recorded downstream of the diversion; however, no water was being diverted by the Project during this period. DO within the Corral Creek Bypass Reach reflected concentrations upstream of the diversion, indicating that low concentrations were unrelated to Project operations.

Floating Material

Waters shall not contain floating material in concentrations that cause nuisance or adversely affect beneficial uses. SCE's compilation and review of data for the PAD revealed no instances in which floating material in Project-affected reaches of the NFKR has affected beneficial uses.

Oil and Grease

The concentration of oils, greases, or other film- or coat-generating substances shall not be altered according to the Basin Plan. SCE's compilation and review of data for the PAD revealed no instances of oil and grease spills or observations of film or coating on the surface of the water or on objects in the water. Under current routine Project O&M, the Project does not release oil and grease to surface waters, and existing environmental measures include an *Oil and Hazardous Waste Storage and Spill Prevention and Cleanup Plan* (approved by FERC on March 2, 1998 [82 FERC ¶ 62,142 (1998), *Order Approving Articles 401, 403, 404, and 405*]), which includes oil spill prevention and cleanup measures.

Pesticides

The Basin Plan states that waters shall not contain pesticides in concentrations that adversely affect beneficial uses. At a minimum, waters designated MUN shall not contain concentrations of pesticide constituents in excess of the MCLs. SCE's compilation and

[18] Site 1 is located upstream of the influence of the Fairview Dam impoundment pool and generally reflects conditions upstream of the Project.

review of data for the PAD revealed no instances in which pesticides have been detected in waters in Project-affected reaches or adversely affected beneficial uses. No legacy pesticides (i.e., Dichlorodiphenyltrichloroethane and metabolites) or polychlorinated biphenyl congeners were detected during a one-time screening survey by USGS downstream of the Project at the Kern River in Kernville in 1979 (USGS, 2020). Project vegetation management includes annual herbicide use around Project facilities (sandbox, forebay, pressure tunnel, penstocks, and powerhouse) (Section 5.1.5, *Project Maintenance*).

pH

The Basin Plan requires that pH shall not be depressed below 6.5, raised above 8.5, or altered more than 0.3 from ambient pH. SCE's compilation and review of data for the PAD revealed no instances where pH has been altered or adversely affected beneficial uses. Historical pH measurements (n=223) collected downstream of the Project in the Kern River near Kernville between 1974 and 1993 indicate pH measurements (5.8 to 8.6 standard units; mean=7.7 standard units) are predominantly within the Basin Plan water quality objective (USGS, 2020).

Radioactivity

In waters designated as MUN, radionuclides shall not be present in concentrations that are deleterious to human, plant, animal, or aquatic life or that result in the accumulation of radionuclides in the food web to an extent that presents a hazard to human, plant, animal, or aquatic life. The Project does not release radionuclides and SCE is unaware of any instances in which radionuclides have been detected in Project-affected stream reaches.

Salinity

Waters shall be maintained as close to natural concentrations of dissolved matter as is reasonable considering careful use of the water resources and the maximum electrical conductivity objective of 200 micromhos per centimeter in the Kern River upstream of Isabella Lake.[19] The Project does not release constituents that affect salinity, and SCE is unaware of any instances in which salinity in the NFKR has adversely affected beneficial uses. Specific conductivity concentrations were generally low (32 to 202 microsiemens per centimeter) in samples collected downstream of the Project in the Kern River near Kernville between 1974 and 1993, and measurements were typically below the Basin Plan numerical water quality objective (Table 7.3-6; USGS, 2020).

Sediment

The Basin Plan states that sediment shall not be altered in such a manner as to cause nuisance or adversely affect beneficial uses. Sediment sources from the Project to the NFKR and relevant tributaries primarily consist of erosion around Project roads and other features (e.g., dam and diversion structures, the flowline, and buildings). Streambanks

[19] One µmhos /cm is equivalent to 1 microsiemen per centimeter.

are generally stable, and there is no indication of channel degradation (ENTRIX, 2002). In general, these sources are minor and do not cause nuisance or adverse effects on beneficial uses. In 1997, SCE developed and implemented the *Plan for Control of Erosion, Stream Sedimentation, Soil Mass Movement, and Dust* (Erosion Management Plan; SCE, 1997). The plan includes using erosion-control structures as protective measures against erosion, including structures such as riprap and rock in areas prone to significant flows and in areas prone to erosion. Updated BMPs from the 1997 Erosion Management Plan will be included in proposed Measures LU-1, *Project Roads and Facilities Management Plan*, and WR-4, *Sediment Management Plan*. Additional discussion on sediment transport and bank stability in the vicinity of the Project and current management plans is provided in Section 7.2, *Geologic and Soils Resources*.

Settleable Material

According to the Basin Plan, waters shall not contain substances in concentrations that result in the deposition of material that causes nuisance or adversely affects beneficial uses. Settleable materials have been deposited in the Project bypass reaches during naturally occurring flood events. Large volumes of sediment and wood debris were delivered to the NFKR during debris flows triggered by intense rainfall in 1966 and 2002. These naturally occurring events dramatically altered streams surrounding the Project.

Project sediment and woody debris management maintenance activities include sandbox flushing, natural flushing, and physical removal/relocation (Section 5.1.5, *Project Maintenance*). During peak flows, the Project diversions are closed, allowing sediment and woody debris to naturally flush downstream. Sandbox flushing and other sediment removal under current Project operations do not result in sediment deposition in concentrations that cause nuisance or adversely affect beneficial uses. Sandbox flushing monitoring between 2007 and 2009 did not identify increased sand deposition rates due to sediment flushing in pool or riffle habitats (ENTRIX, 2002).

Additional discussion on debris flow and sediment management maintenance activities in the vicinity of the Project and current management plans is provided in Section 7.2, *Geologic and Soils Resources*.

Suspended Material

The Basin Plan states that waters shall not contain suspended material in concentrations that cause nuisance or adversely affect beneficial uses. Suspended sediment concentrations are generally low in the NFKR and consistently meet the Basin Plan water quality objective. Suspended sediment loads in the NFKR depend on local site conditions, flows, and debris flow events. Suspended sediment concentration samples (n=237) collected downstream of the Project in Kern River at Kernville between 1966 and 1993 ranged from BD to 1,320 mg/L (USGS, 2020). Large debris flows triggered by intense rainfall rarely occur but are the primary cause of elevated suspended sediment loads in the NFKR. Additional discussion of suspended sediment loads and debris flows and current management plans is provided in Section 7.2, *Geologic and Soils Resources*.

Tastes and Odors

In accordance with the Basin Plan, 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, other edible products of aquatic origin, or domestic or municipal water supplies. SCE is unaware of instances where tastes and odors have adversely affected beneficial uses. Available historical data collected downstream of the Project in Kern River at Kernville between 1966 and 1993 indicate that compounds associated with tastes and odors (e.g., aluminum, copper, iron, silver, zinc, chloride, and specific conductance) are typically low and less than the Title 22 MCLs (Table 7.3-6).

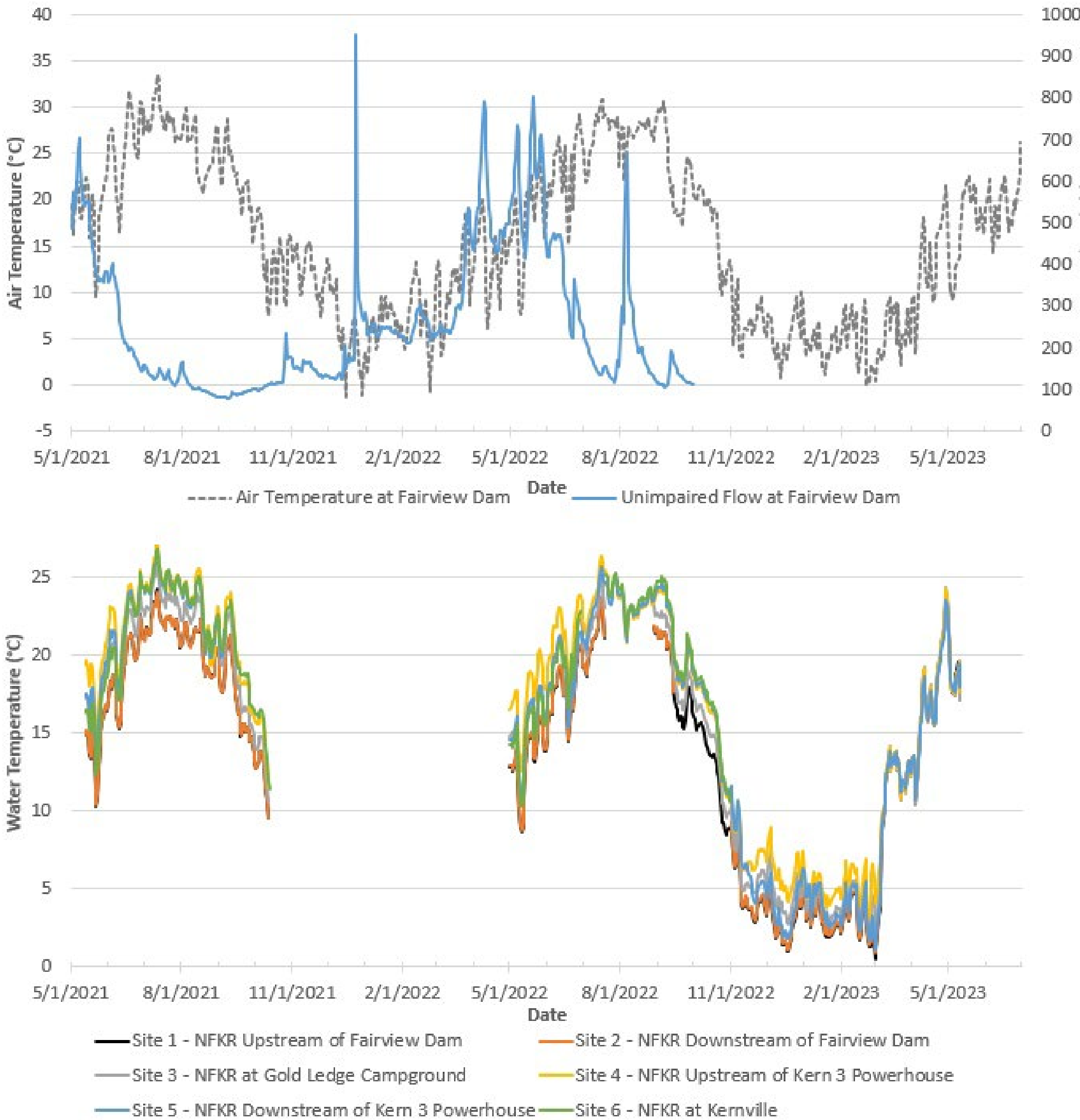
Temperature

The Basin Plan states that water temperatures 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 9 degrees Celsius (°C) (5 °F) above natural receiving water temperature.

The WR-1 Study is currently assessing water temperature at 10 sites: 7 locations within 3 Project-affected reaches (NFKR Fairview Dam Bypass Reach [Sites 2 through 6], Corral Creek Diversion Bypass Reach [Site 8], and Salmon Creek Diversion Bypass Reach [Site 10]), and 3 comparison sites upstream of the FERC Project Boundary (NFKR upstream of Fairview Dam [Site 1], Corral Creek upstream of the diversion [Site 7], and Salmon Creek upstream of the diversion [Site 9]) (Figure 7.3-1; Appendix E.2, WR-1 Technical Memorandum). Monthly mean water temperatures ranged from 2.0 ºC to 26.0 ºC (35.6 °F to 78.8 °F) in the NFKR, Corral Creek, and Salmon Creek sites between May 2021 and July 2023 (Figures 7.3-7 through 7.3-9). Water temperatures were coldest during the winter when stream flows were higher and air temperatures were cooler, and warmest during the summer when stream flows were lower and air temperatures were warmer. In the NFKR, water temperatures were typically lower in the upstream reaches and higher in downstream reaches, except downstream of the KR3 Powerhouse, which typically exhibited cooler temperatures than upstream of the KR3 Powerhouse. In Corral and Salmon Creeks, water temperatures were generally similar upstream and downstream of Project diversions, except during summer months when water temperatures were warmer at sites downstream of Project diversions. Based on current data, the differences in water temperature between the stream sites upstream and downstream of Project diversions were less than the 9 °C (5 °F) water quality objective for receiving waters in the Basin Plan (Figures 7.3-7 through 7.3-9).

Water temperature in the NFKR supports a variety of aquatic resources (Section 7.4, *Fish and Aquatic Resources*), including both coldwater and transitional zone fish assemblages, because water temperatures vary seasonally from lows during peak snowmelt periods to highs at or above 20 °C (68 °F) in late summer, including upstream of the Fairview Dam Bypass Reach.

SCE will conduct additional water temperature monitoring as directed by FERC staff in their May 30, 2024, *Determination on Requests for Study Modifications and New Studies*. Additional bacteria sampling will be conducted in September 2024 (including Labor Day weekend). Updated results will be included in the FLA.



°C = degrees Celsius; cfs = cubic feet per second; NFKR = North Fork Kern River

Figure 7.3-7. Mean Daily Air Temperature at Fairview Dam (top), Mean Daily Unimpaired Flow in the North Fork Kern River at Fairview Dam (top), and Mean Daily Water Temperature at Seven Sites in the North Fork Kern River (bottom), May 2021 to June 2023.

°C = degrees Celsius

Figure 7.3-8. Mean Daily Water Temperature in Corral Creek Upstream and Downstream of the Project Diversion.

°C = degrees Celsius

Figure 7.3-9. Mean Daily Water Temperature in Salmon Creek Upstream and Downstream of the Project Diversion.

Toxicity

The Basin Plan states that all waters shall be maintained free of toxic substances in concentrations that are toxic or produce detrimental physiological responses in human, plant, animal, or aquatic life. SCE is unaware of any instances in which toxicity in Project-affected stream reaches has adversely affected beneficial uses. The Project does not release toxic materials, and historical data collected downstream of the Project in Kern River at Kernville between 1966 and 1993 indicate that un-ionized ammonia and total metals are not approaching toxicity limits (see the *Ammonia* and *Chemical Constituents* subsections in Section 7.3.1.2, *Water Quality*).

Turbidity

The Basin Plan states that waters shall be free of changes in turbidity that cause nuisance or adversely affect the water for beneficial uses. SCE is unaware of instances in which turbidity has been altered by Project operations or has adversely affected beneficial uses. Historical turbidity measurements (n=108) collected downstream of the Project in the Kern River near Kernville between 1978 and 1993 indicate that turbidity (0.2 to 55 nephelometric turbidity units; mean=3.5 nephelometric turbidity units) is generally low (USGS, 2020).

7.3.2. Proposed Environmental Measures

SCE proposes to implement the following environmental measures related to water resources:

- Measure WR-1, *Minimum Instream Flows*
- Measure WR-2, *Ramping Rates*
- Measure WR-4, *Sediment Management Plan*
- Measure WR-5, *Recreational Boating Flows*
- Measure LU-1, *Project Roads and Facilities Management Plan*
- Measure LU-4*, Oil and Hazardous Substances Management Plan*
- Measure TB-1, *Vegetation Management Plan*

The proposed measures and their key features related to water use and quality are described below. Refer to Appendix E.1 for the complete description of measures SCE proposes to include in any new license issued for the Project.

7.3.3. Potential Project Effects

Under the No-Action Alternative, the Project would continue to operate under the terms and conditions of the current license, as described in Section 5.1. The No-Action

Alternative is considered the environmental baseline for this analysis of potential effects. Potential effects on water use, hydrology, and water quality were identified in FERC's SD2 (FERC, 2022) and were based on an evaluation of continued Project O&M activities described as part of the proposed Project (Section 5.2, *Proposed Action Alternative*). Potential effects identified in FERC's SD2 include the following:

- Effects of continued Project operation on the hydrology of the NFKR in the Project bypass reaches and downstream of the KR3 Powerhouse;
- Effects of continued Project operation on water quality, including water temperature and DO, in the Project bypass reaches and downstream of the KR3 Powerhouse and for human activities or consumption in the Project-affected area; and
- Effects of continued Project operation on water availability for use by local communities in the Project-affected area.

The following sections describe the potential effects of the proposed Project, including the proposed environmental measures, on water resources. Potential effects on the Wild and Scenic River Segments are discussed in Section 7.8, *Land Use Management and Resources*, and Section 7.9, *Aesthetic Resources.* Unavoidable adverse effects on water resources are discussed at the end of this section and summarized in Section 10.0, *Conclusions and Recommendations*.

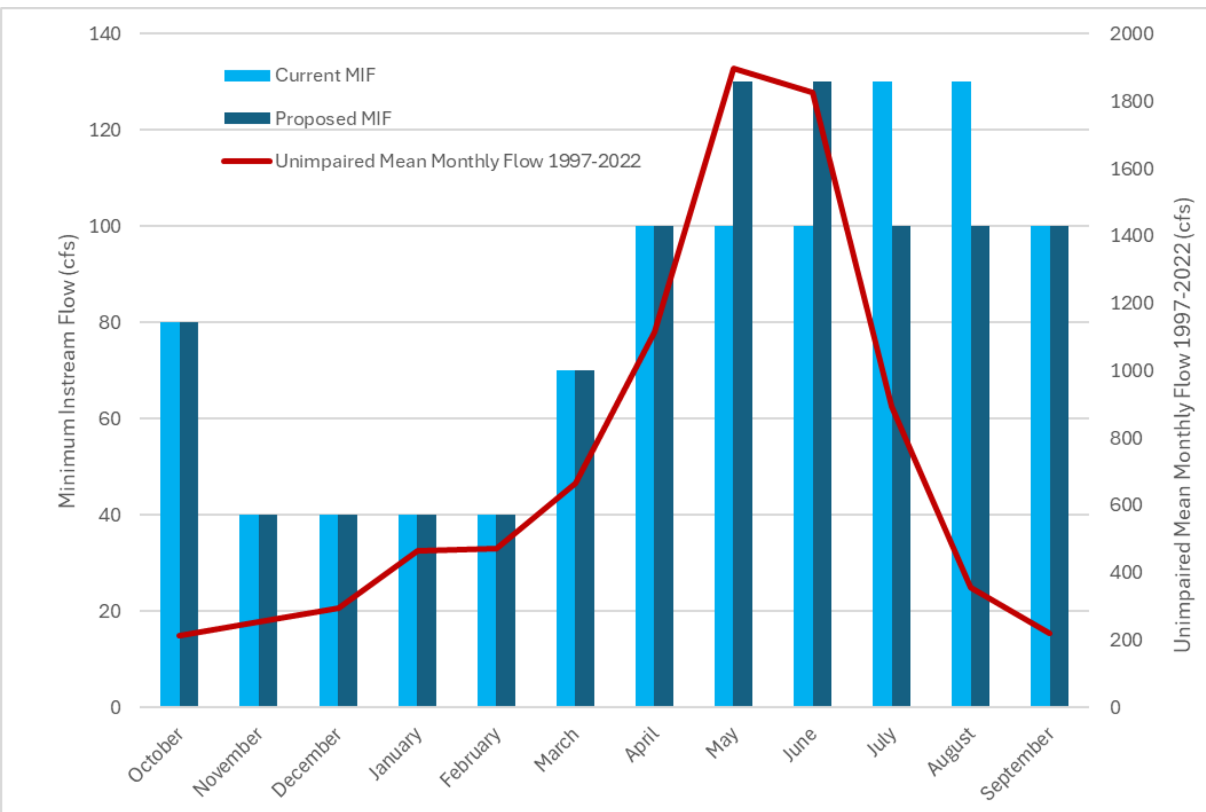
7.3.3.1. Water Use and Hydrology

With the implementation of SCE's proposed measures WR-1, WR-2, and WR-5, proposed Project O&M activities (described in Section 5.1, *No-Action Alternative*, and 5.2, *Proposed Action Alternative*) would have no effect on water quantity or use, or will enhance conditions in the NFKR. SCE proposes to continue to operate the Project as it is currently operated with modifications intended to benefit water uses and environmental flows.

Proposed Measure WR-1 would enhance current flow conditions downstream of Fairview Dam by shifting the timing of greater MIFs from the summer months of July and August to the spring months of May and June to align with the spring snowmelt and the natural hydrograph (Figure 7.3-10). Because riverine ecological processes are driven by the annual hydrograph, this measure's shift in flow timing would benefit aquatic resources by providing flows that mimic the natural conditions to which native species are adapted.

Proposed Measure WR-2 would continue to protect aquatic species in the NFKR by continuing the current ramping requirement at Fairview Dam when making changes to flows diverted into the Project water conveyance system. Proposed Measure WR-2 would continue to restrict the rate of change (i.e., ramping) when increasing diversions into the Project water conveyance system, which effectively restricts the rate of change when decreasing flows within the Fairview Dam Bypass Reach. The proposed Project would include a maximum of 30 percent change of the existing flow per half-hour when decreasing flows downstream of Fairview Dam.

Project operations and current whitewater boating flow releases, as described in Section 5.1, *No-Action Alternative*, also influence the magnitude of flow variability downstream of the KR3 Powerhouse during changes to diversion rates. Because water travels more rapidly through the 13-mile long flowline than through the 16-mile long bypass reach, an increase in releases into the Fairview Dam Bypass Reach may result in a minor, localized, short-term decrease in flow downstream of the KR3 Powerhouse a few hours following the change. This travel-time effect may have a duration of a few hours until the increase in flow at the Fairview Dam is realized downstream of the KR3 Powerhouse. Conversely, a decrease in flow at the Fairview Dam Bypass Reach may result in a minor, localized, short-term increase in flow downstream of the KR3 Powerhouse a few hours later. However, this travel-time effect is often masked by natural fluctuations in flow, such as daily flow fluctuations during the snowmelt period. Proposed Measure WR-2 combined with current O&M during diversion decreases (increasing flows downstream of Fairview Dam), would continue to elongate the period during flow changes, minimizing any adverse effects due to flow fluctuations on aquatic beneficial uses downstream of the KR3 Powerhouse. The streamflow travel-time assessment is ongoing and will be completed prior to the issuance of the FLA.



cfs = cubic feet per second; MIF = minimum instream flows

Figure 7.3-10. Comparison of Minimum Instream Flows Under Proposed Measure WR-1 With Current Minimum Instream Flows and the Flow Patterns of the Natural Hydrograph.

Proposed Measure WR-5 would enhance current flow conditions in the Fairview Dam Bypass Reach by including a new 10-day period when the Project would not divert flow at Fairview Dam during the ascending limb of the spring snowmelt run-off period, thereby passing the full natural flow downstream of Fairview Dam. Although the Project has no storage capacity and spills regularly in the spring, the addition of full natural flows in spring would be more closely aligned with the natural hydrograph, and would result in fewer daily fluctuations from the current whitewater boating flows condition. Therefore, implementation of Measure WR-5 is expected to benefit hydrology and beneficial uses within the Fairview Dam Bypass Reach.

Ongoing Project O&M activities are not anticipated to affect the hydrology in Salmon Creek and Corral Creek Bypass Reaches, or in the NFKR downstream of the KR3 Powerhouse. Therefore, the proposed Project would result in net benefits to water quantity and use.

7.3.3.2. Water Quality

SCE would implement Measure WR-1, Measure WR-4, Measure WR-5, Measure LU-1, and Measure LU-4 (provided in Appendix E.1) during routine Project O&M activities (described in Section 5.1*, No-Action Alternative*) in or adjacent to water resources. The implementation of these proposed measures would have minor to beneficial effects on water quality in Project-affected stream reaches.

Proposed Measure WR-1 would enhance current flow conditions by shifting the higher base flows from summer to spring to align flows with natural flow patterns and benefit native aquatic species by providing flows that mimic natural stream conditions (i.e., higher spring flows). This slightly modified release schedule is intended to balance resource objectives between sportfish (trout) and native species; proposed Measure WR-1 would enhance water temperatures for native fishes, namely hardhead (*Mylopharodon conocephalus*), resulting in slightly warmer temperatures in the lower portions of the Fairview Dam Bypass Reach.

Proposed Measure WR-4 would implement sandbox flushing procedures to pass sediment diverted at Fairview Dam into the water conveyance system back into the Fairview Dam Bypass Reach. Proposed Measure WR-4 is a modification of an existing measure that regulates the passage of sediment into the Fairview Dam Bypass Reach. The proposed measure would add a low-flow flushing option to reduce the time between sandbox flushings (see Section 7.2.3.1, *Project Operations and Maintenance*, for more information on sedimentation). Proposed Measure WR-4 would also implement sediment management activities at the two smaller diversions—Salmon Creek Diversion and Corral Creek Diversion—when there is a need to periodically pass accumulated sediment from behind the diversions into the downstream reach (to maintain flows into the diversion infrastructure) and MIF release valves (to reduce accumulated settleable material).

Proposed Measure WR-5 would concentrate releases into a scheduled 10-day period of unimpaired flows in spring during the ascending limb of the hydrograph. The proposed flows align better with the natural hydrograph and would reduce the number of flow fluctuations and subsequent water temperature fluctuations in late spring and early summer within the Fairview Dam Bypass Reach (see Section 7.4, *Fish and Aquatic Resources*, for effects of water temperatures on aquatic species).

Proposed Measure LU-1 would address road maintenance to minimize erosion and sediment delivery to the stream channels when conducting work around roads or facilities that may result in run-off to nearby drainages.

Proposed Measure LU-4 would include spill prevention and cleanup measures to control spills and prevent leaks into the Project waters.

<u>Ammonia</u>

The proposed Project would not affect ammonia concentrations within Project-affected stream reaches. The current Project does not, and the proposed Project would not, discharge ammonia into Corral Creek or Salmon Creek; calculated un-ionized ammonia is near zero in the Project-affected reaches; and SCE is unaware of any instances in which concentrations of ammonia in the NFKR have adversely affected beneficial uses.

<u>Bacteria</u>

Based on current information, Project operations are not expected to affect bacteria levels within Project-affected stream reaches. Project-affected reaches of the NFKR generally have low levels of bacteria due to the lotic (i.e., flowing) conditions at riverine sites and low hydraulic retention of Fairview Dam and other diversions. *E. coli* levels were low (less than MPN/100 mL) during 2022 and 2023, except for one sample collected in Salmon Creek. Historically, high concentrations of fecal coliform associated with high flows were likely the result of surrounding land use (i.e., cattle grazing). SCE will conduct additional *E. coli* and fecal coliform monitoring and present the results in the FLA.

<u>Biostimulatory Substances</u>

The proposed Project would not increase the concentration of biostimulatory substances that promote aquatic growth or cause nuisance or adversely affect designated beneficial uses. The Project does not release nutrients into the NFKR, Corral Creek, or Salmon Creek; nutrient concentrations are low in the Kern River near Kernville; and SCE is unaware of any instances in which concentrations of nutrients in the bypass reaches have caused aquatic growth to be a nuisance or have adversely affected beneficial uses.

<u>Chemical Constituents</u>

The proposed Project would not affect the concentrations of CCs in Project waters. The Project does not release CCs into the NFKR, Corral Creek, or Salmon Creek; concentrations of CCs are generally less than Title 22 MCLs in the Kern River near Kernville; and SCE is unaware of any instances in which concentrations of CCs have adversely affected beneficial uses. The source of the historically elevated arsenic concentrations in the NFKR is unknown but may be attributed to mining activities in the watershed.

Color

The proposed Project would not affect the color of Project waters. The Project does not release constituents into the NFKR, Corral Creek, or Salmon Creek that would affect water color; and SCE is unaware of any instances in which the color of Project-affected stream reaches has adversely affected beneficial uses.

Dissolved Oxygen

Proposed changes to MIFs would likely have no significant effects on DO. However, there is a potential for minor effects related to an increase in summer water temperature. The concentration of DO in water is related to water temperature; as water temperatures increase, the solubility of DO decreases and DO concentrations decline. Proposed Measure WR-1 would enhance current flow conditions by shifting the higher base flows from summer to spring, in alignment with natural flow patterns. The changes in streamflow have the potential to cause lower DO concentrations in the Fairview Dam Bypass Reach because water temperatures would be warmer (see the *Temperature* subsection in Section 7.3.3.2, *Water Quality*). Based on currently available data, DO concentrations are generally greater than the 8 mg/L Basin Plan water quality objective, and any changes to DO concentrations would likely be minor and follow water temperature patterns that are associated with the natural hydrograph. SCE will conduct additional DO monitoring and present the results in the FLA.

Floating Material

The proposed Project would not affect concentrations of floating material in the NFKR, Corral Creek, or Salmon Creek, and SCE is unaware of any instances in which floating material was a nuisance or adversely affected beneficial uses.

Oil and Grease

The proposed Project is not expected to result in the release oil and grease that would adversely affect water quality or the beneficial uses of Project-affected waters. Under current routine Project O&M, the Project does not release oil and grease into to surface waters, and no reportable spills have occurred. Proposed Measure LU-4 would include spill prevention and cleanup measures.

Pesticides

Future pesticide use, including herbicide use, at the proposed Project is not expected to adversely affect water quality. Vegetation management at the proposed Project includes annual herbicide use around Project facilities (sandbox, forebay, pressure tunnel, penstocks, and powerhouse) (Section 5.1.5, *Project Maintenance*). Under current Project maintenance, pesticides have not been spilled into the NFKR, Corral Creek, or Salmon Creek, and SCE is unaware of any instances in which pesticides have adversely affected beneficial uses. To protect sensitive habitats and species, proposed Measure TB-1 would include limitations and/or requirements during application herbicides for control or eradication of invasive species.

pH

The proposed Project would not affect pH levels. The Project does not release constituents that would affect pH levels in the NFKR, Corral Creek, or Salmon Creek; pH levels in the Kern River near Kernville generally fall within the Basin Plan's numerical water quality objectives; and SCE is unaware of any instances in which pH has adversely affected beneficial uses.

Radioactivity

The proposed Project would not affect radionuclide concentrations. The Project does not release radionuclides, and SCE is unaware of any instances in which radionuclides in the NFKR, Corral Creek, or Salmon Creek have adversely affected beneficial uses.

Salinity

The proposed Project would not affect salinity levels in Project-affected waters. The Project does not release constituents that would affect salinity in the NFKR, Corral Creek, or Salmon Creek, and SCE is unaware of any instances in which salinity has adversely affected beneficial uses.

Sediment

With the implementation of proposed Measure LU-1 and proposed Measure WR-4, operation of the Project is unlikely to affect sediments within the NFKR, Corral Creek, or Salmon Creek in concentrations that cause nuisance or adversely affect beneficial uses. With the exception of the proposed measures, SCE proposes to continue to operate the Project as it is currently operated. Implementation of SCE's proposed measures would ensure that potentially adverse effects on sediment transport resulting from Project O&M activities would be avoided or reduced to minor levels, local, and short-term, as described below.

The KR3 Powerhouse Forebay Spillway channel is adequately protected from significant erosion because the spillway is exposed bedrock and riprap was placed along portions of the channel following prior erosion observations. The Cannell Creek Spillway channel is a bedrock-lined channel that has little potential for erosion. No significant source of sediment associated with the Project access roads was identified.

Proposed Measure LU-1 would include BMPs (e.g., re-grading roads, installation of water bars, slope stabilization) during O&M activities to minimize erosion and prevent sediment from flowing into the watercourse. Measure LU-1 would also include measures to minimize the potential effects of erosion on Project roads and facilities, including provisions for managing erosion around parking areas constructed from spoil piles.

Proposed Measure WR-4 outlines sandbox flushing procedures and sediment activities at Salmon Creek and Corral Creek Diversions. Under Measure WR-4, SCE would continue bi-weekly (once every 2 weeks) sandbox flushing when river flows downstream of Fairview Dam exceed 350 cfs. SCE would also routinely inspect the sandbox between

July 1 and February 15, or outside the rainbow trout (*Oncorhynchus mykiss*) spawning season, when flows are below 350 cfs, and drain one or both sides of the sandbox to pass accumulated sediment, if necessary. Additionally, under proposed Measure WR-4, SCE would open the pond drain in Salmon Creek and Corral Creek Diversions when not diverting flows to allow accumulated sediment to naturally move downstream and may use hand tools to clear the pond drain if it is blocked by sediment. Flushing activities at flows less than 350 cfs may have minor, local, short-term effects on sediment transport because sediment from the sandbox may be deposited between higher flow events (i.e., flows greater than 350 cfs). Discussion of the current flushing regime and changes described in proposed Measure WR-4 are discussed in more detail in the *Sediment Transport, Channel Geomorphology, and the Free-flowing Condition of the River* subsection in Section 7.2.3.1, *Project Operations and Maintenance*.

Given the measures to minimize sedimentation into waterways resulting from erosion, and continuation of sediment passage at Project dams and diversions, the proposed Project would have no effect, or at most minor, local, and short-term effects, on sediments within potentially affected stream reaches.

<u>Settleable Material</u>

Proposed Project O&M activities are unlikely to result in sediment or other settleable material accumulation in Project-affected waters in concentrations that cause nuisance or adversely affect beneficial uses. Project sediment management maintenance activities, including natural flushing, sandbox flushing, and physical relocation, would prevent the accumulation of sediment or other settleable materials. Higher natural flows (greater than 350 cfs) regularly occur in the Project-affected reach of the NFKR and mobilize settleable materials (i.e., sands and finer material) within the river channel, distributing and sorting sediments downstream (ENTRIX, 2002). During peak flows, the Project diversion at Fairview Dam is often closed to allow settleable materials to naturally move through the bypass reach.

Implementation of proposed Measure WR-4 continues regular passage of settleable material downstream of Fairview Dam, Salmon Creek Diversion, and Corral Creek Diversion. Measure WR-4 outlines sandbox flushing procedures to pass sediment diverted at Fairview Dam from the flowline back into the Fairview Dam Bypass Reach. Under proposed Measure WR-4, SCE would continue to flush the sandbox once every 2 weeks when river flows downstream of Fairview Dam exceed 350 cfs. Additionally, to decrease the period between flushing, SCE proposes to routinely inspect the sandbox when flows are below 350 cfs, and if necessary, SCE would drain one or both sides of the sandbox to remove accumulated sediment between July 1 and February 15, or outside the rainbow trout spawning season. Additionally, proposed Measure WR-4 describes sediment management activities at the two smaller diversions—Salmon Creek Diversion and Corral Creek Diversion—when there is a need to periodically remove accumulated sediment from behind the diversion to maintain flows into the diversion infrastructure and minimum instream flow-release valves. As described in the measure, SCE may open the pond drain when not diverting flows to allow accumulated sediment to naturally move downstream and may use hand tools to clear the pond drain if it is blocked by sediment.

Given the measures to minimize sedimentation into waterways resulting from erosion, and continuation of sediment passage at Project dams and diversions, the proposed Project would have no effect, or at most, minor, local, and short-term effects, on sediments within potentially affected stream reaches.

<u>Suspended Material</u>

Proposed Project O&M activities are unlikely to contribute significant concentrations of suspended materials to the NFKR, Corral Creek, or Salmon Creek. Suspended sediment concentrations are generally low in the Kern River near Kernville, and elevated suspended sediment loads in the NFKR are primarily related to large debris flows triggered by intense rainfall. Proposed Measure LU-1 and proposed Measure WR-4 would control potential sediment input from Project features by implementing regular inspections and applying BMPs to areas with erosion. SCE is unaware of any instances in which suspended materials were a nuisance or adversely affected beneficial uses.

<u>Tastes and Odors</u>

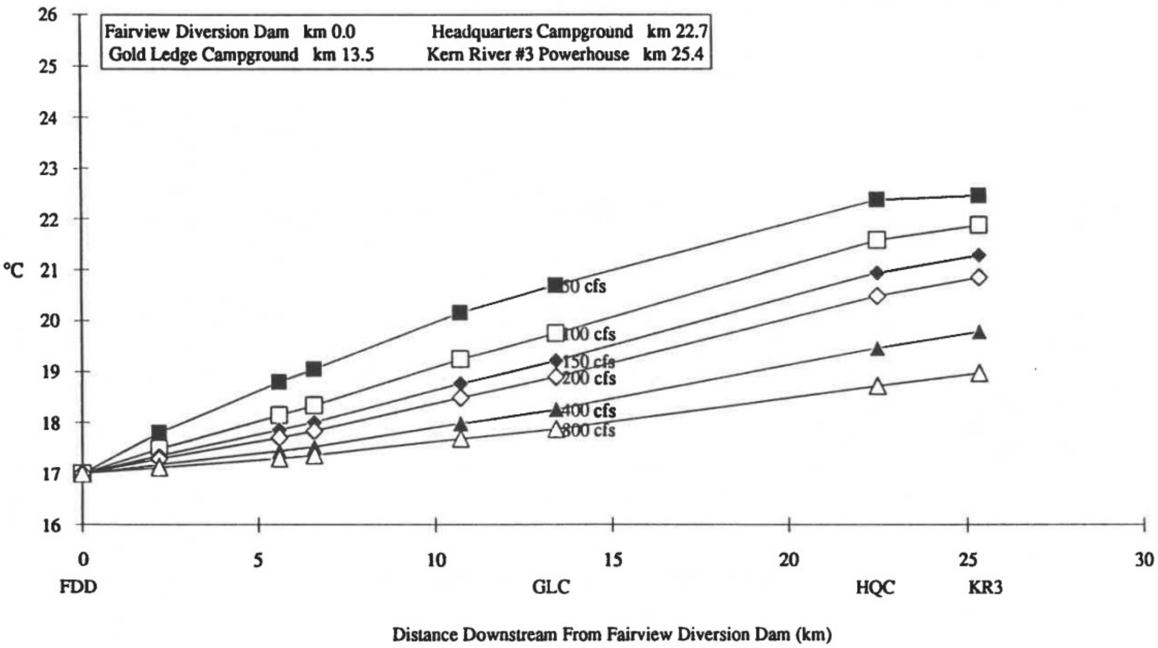
The proposed Project would not affect the taste or odor of water in Project-affected stream reaches. The Project does not release substances in the NFKR, Corral Creek, or Salmon Creek that would affect the taste and odors of water; compounds associated with tastes and odors (aluminum, copper, iron, silver, zinc, chloride, and specific conductance) are typically low and less than Title 22 MCLs; and SCE is unaware of any instances in which tastes and odors were a nuisance or adversely affected beneficial uses.

<u>Temperature</u>

Proposed changes to MIFs have the potential to affect water temperatures. Prior water temperature modeling for the Fairview Dam Bypass Reach indicated that stream temperature was primarily a function of flow and air temperature (SCE, 1991). The model assessed stream temperatures in the Fairview Dam Bypass Reach under a variety of hydrologic and meteorologic conditions (selected results are presented in Figures 7.3-11 through 7.3-13). Following model development, a 5-year temperature monitoring program was implemented and verified model results in WY types ranging from dry to wet (ENTRIX, 2003).

Proposed Measure WR-1 would enhance current flow conditions by shifting the higher base flows (130 cfs) in the Fairview Dam Bypass Reach from summer to spring in alignment with natural flow patterns. Temperature model results indicate that water temperatures in August would increase by less than 1 °C (1.8 °F) (Figures 7.3-11 through 7.3-13; SCE, 1991). Warmer water temperatures would also likely be observed farther upstream than if flows remained at 130 cfs. However, these slightly warmer water temperatures would follow patterns that are associated with the natural hydrograph and are expected to benefit native transitional zone fish species (Section 7.4, *Fish and Aquatic*

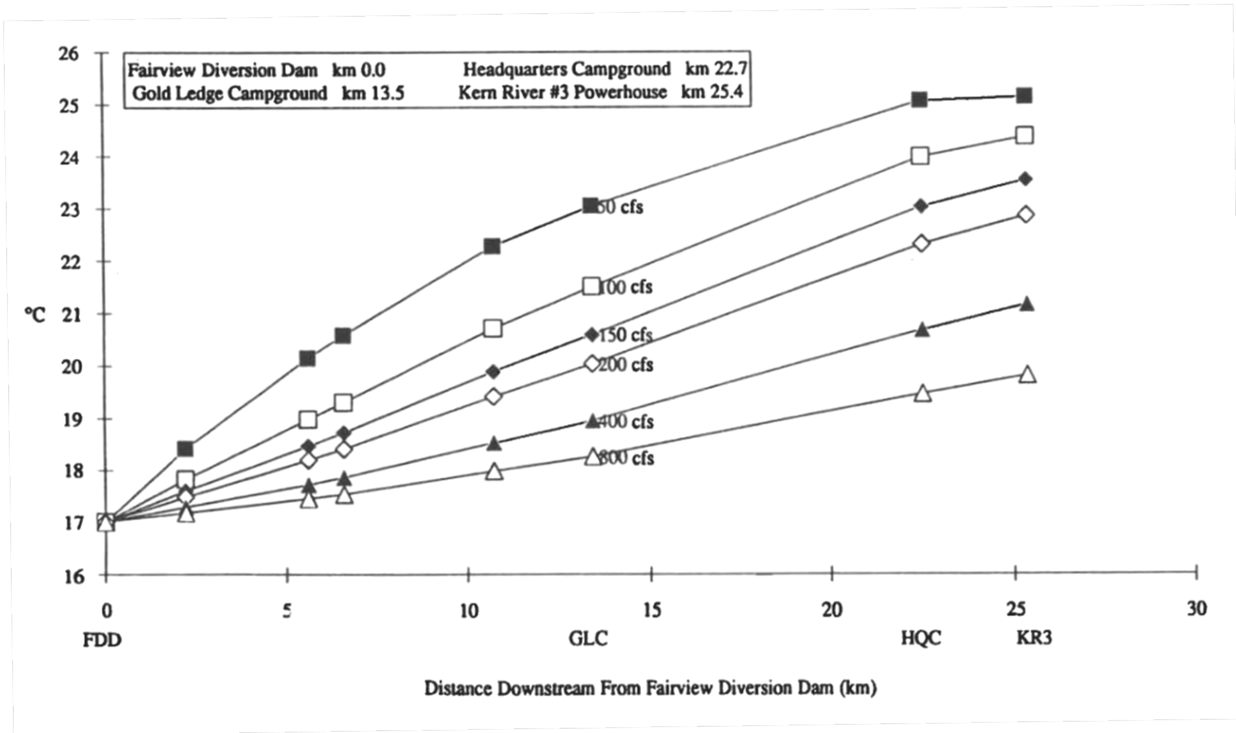
Resources). SCE is currently conducting additional water temperature monitoring and will present the results in the FLA.



Source: SCE, 1991

°C = degrees Celsius; cfs = cubic feet per second; FDD = Fairview Diversion Dam; GLC = Gold Ledge Campground; HQC = Headquarters Campground; km = kilometer; KR3 = Kern River No. 3

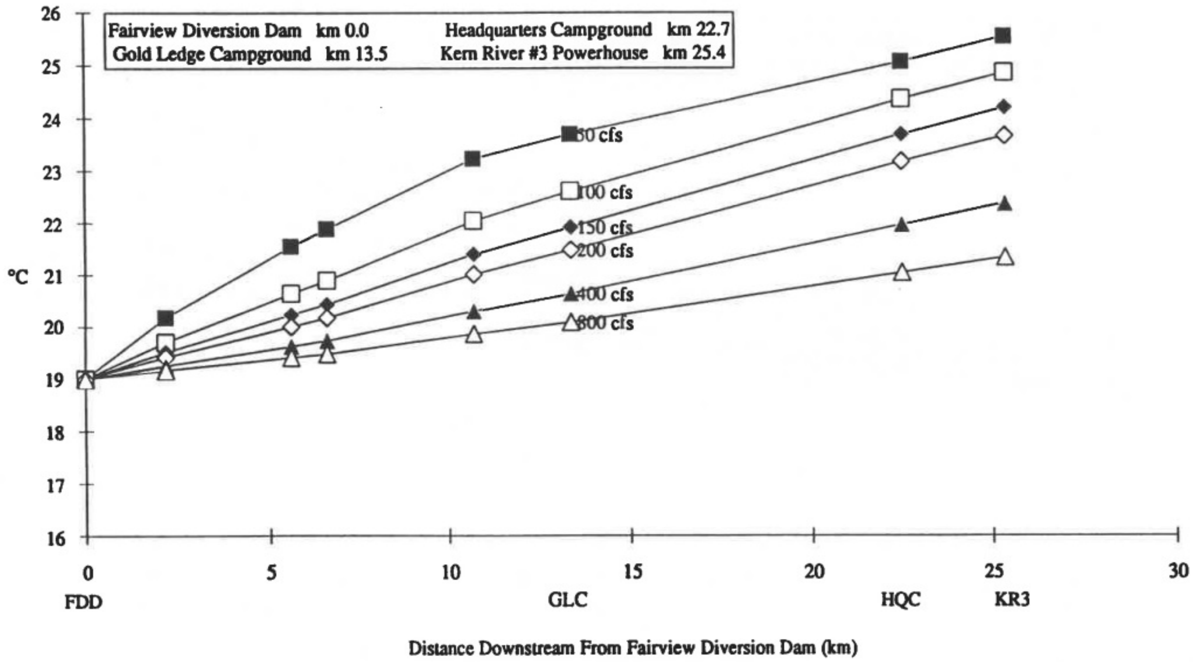
Figure 7.3-11. Simulated August Stream Temperature Profiles in the Fairview Diversion Dam for Streamflows between 50 and 800 cfs, for 7-day Hydrologic and Meteorologic Conditions Representing Normal Run-off and Normal Air Temperature Conditions.



Source: SCE, 1991

°C = degrees Celsius; cfs = cubic feet per second; FDD = Fairview Diversion Dam; GLC = Gold Ledge Campground; HQC = Headquarters Campground; km = kilometer; KR3 = Kern River No. 3

Figure 7.3-12. Simulated August Stream Temperature Profiles in the Fairview Diversion Dam for Streamflows between 50 and 800 cfs, for 7-day Hydrologic and Meteorologic Conditions Representing Normal Run-off and Hot Air Temperature Conditions.



Source: SCE, 1991

°C = degrees Celsius; cfs = cubic feet per second; FDD = Fairview Diversion Dam; GLC = Gold Ledge Campground; HQC = Headquarters Campground; km = kilometer; KR3 = Kern River No. 3

Figure 7.3-13. Simulated August Stream Temperature Profiles in the Fairview Diversion Dam for Streamflows between 50 and 800 cfs, for 7-day Hydrologic and Meteorologic Conditions Representing Low Run-off and Hot Air Temperature Conditions.

<u>Toxicity</u>

The proposed Project is not expected to result in toxin concentrations that adversely affect water quality or beneficial uses with the implementation of proposed Measure LU-4. The Project does not directly release or mobilize toxins (e.g., trace metals, oil and grease). SCE is unaware of any instances in which toxicity in Project-affected stream reaches has adversely affected beneficial uses.

<u>Turbidity</u>

Proposed Project O&M activities are unlikely to contribute significant concentrations of turbidity in the NFKR, Corral Creek, or Salmon Creek. Turbidity in the Kern River near Kernville is low and SCE is unaware of any instances in which turbidity was a nuisance or adversely affected beneficial uses beyond natural inflows of sediment following major fire events. Proposed Measure LU-1 would control any major potential sediment input from Project features by implementing regular inspections and applying basic BMPs (e.g., re-grading roads, installation of water bars, slope stabilization) during O&M activities to minimize erosion and prevent sediment from flowing into the watercourse. Sandbox flushing activities, described in proposed Measure WR-4 may result in increased turbidity and would therefore be timed with higher flows (i.e., greater than 350 cfs) or outside of the trout spawning period to minimize any effects of increased turbidity on aquatic species.

7.3.3.3. Water Availability for Use by Local Communities

No effects on water availability for use by local communities in the Project-affected area are anticipated under continued Project operations. All of the water is returned to the river at the KR3 Powerhouse.

7.3.3.4. Unavoidable Adverse Effects

The proposed Project would not result in unavoidable adverse effects on water use or water quality.

7.4. FISH AND AQUATIC RESOURCES

This section describes applicable management direction regarding fish and aquatic resources with the potential to occur in the FERC Project Boundary, lands surrounding the Project, and potentially affected stream reaches, including the Fairview Dam Bypass Reach and the smaller Salmon and Corral Creek Diversion Bypass Reaches (Figure 2-1 in Section 2.0, *Application*). Section 7.4.1 discusses existing aquatic resources conditions under current Project O&M activities (i.e., baseline condition). Section 7.4.2 identifies environmental measures, management plans, and programs that are included in the proposed Project. Section 7.4.3 includes an analysis of ongoing or new environmental effects of O&M activities from the proposed Project, including potential effects from proposed measures. The full description of proposed measures is provided in Appendix E.1.

The descriptions within this section were developed using existing, relevant, and reasonably available information and include results from the following relicensing studies where additional information was collected to further describe the resources:

- BIO-1 Foothill Yellow-legged Frog
- BIO-4 Benthic Macroinvertebrate
- BIO-5 Western Pond Turtle
- BIO-6 Stream Habitat Typing

Data and information collected to date are summarized below and Technical Memoranda for the relicensing studies are provided in Appendix E.2. SCE anticipates final data collection for outstanding study components and analysis associated with the BIO-1 Study to be completed in 2024 and included as part of the FLA.

Additionally, SCE conducted fish population monitoring as part of the existing license monitoring (under Article 411). The monitoring was completed in 2023 and the report was filed with FERC in 2024 (Stillwater Sciences and ERM, 2024).

7.4.1. AFFECTED ENVIRONMENT

7.4.1.1. Aquatic Habitat

The NFKR has a typical hydrograph for a west-slope Sierra Nevada river—summer and fall periods are dry and winter precipitation predominantly occurs as snow in the upper basin. Peak snowmelt run-off generally occurs in late April or early May and tapers off by June or July (Stephens et al., 1995; Section 7.3, *Water Resources*). Average monthly instream flows upstream of Fairview Dam range from 200 to 400 cfs during the fall and winter and from 1,000 to 2,000 cfs during the spring snowmelt period. Median monthly flows within the Fairview Dam Bypass Reach range from MIFs in fall and winter to between 200 cfs and 1,400 cfs in spring and summer (see Figure 7.3-1 in Section 7.3.1.1, *Water Use and Hydrology,* and the *WR-2 Hydrology Interim Technical Memorandum* provided in Appendix E.2).

The NFKR within the Fairview Dam Bypass Reach is characterized by a variety of habitat types, including high-gradient riffles, cascades, runs, pools, and pocket water. The impoundment pool behind Fairview Dam is small (less than 2 AF), with minimal surface fluctuation (Exhibit A, Section 2.0, *Storage Capacity*). Stream habitat within the Fairview Dam Bypass Reach was mapped in 1991 and again in 2023, with similar results (SCE, 1991; the BIO-6 Technical Memorandum is provided in Appendix E.2). The reach has two distinct river segments: Segment 1 extends from Fairview Dam (RM 18.6) downstream to Hospital Flat Campground (RM 7.3), where the river is constrained within a narrow, single channel with a 2 to 3 percent gradient; Segment 2 extends from Hospital Flat Campground to the KR3 Powerhouse (RM 3.1), where the river transitions to a wider, lower gradient (1 to 2 percent) segment with some split channels and normal bar development (see Figure 3-1 in the BIO-6 Technical Memorandum provided in Appendix E.2*;* FERC and Forest Service, 1996).

The Fairview Dam Bypass Reach average gradient ranges from 1 to 3 percent, and the predominant habitat type (80 percent) is flatwater (further divided into 47 percent run, boulder run, and pocket water habitat, and 33 percent deep and shallow pool habitats); riffles and cascades account for 22 percent of the reach (Table 7.4-1). NFKR Segment 1 (RM 18.6 to RM 7.3) primarily consists of low-gradient pools, runs, and pocket water. Most of the segment is a single channel with wetted channel widths ranging from 33 to 164 feet and averaging 77 feet. NFKR Segment 2 (RM 7.3 to RM 3.1) is primarily characterized by boulder runs, shallow pools, riffles, and runs. The channel is split throughout several portions of the segment with wetted widths ranging from 33 to 138 feet and averaging 86 feet. The substrate in both segments of the NFKR is primarily composed of boulder and cobble (see the BIO-6 Technical Memorandum provided in Appendix E.2).

The Fairview Dam Bypass Reach contains few backwater and nursery areas for juvenile fish and amphibians. The substrate is composed primarily of large boulders with coarse sand along the river margins. Fish spawning gravel deposits are limited due to limited gravel within the system, regularly occurring high flows, and the flushing action of peak storm and run-off events (see Section 7.2.1.2, *Channel Geomorphology*, for a description of sediment transport within the reach).

Table 7.4-1. Habitat Composition in the North Fork Kern River between Fairview Dam and the Kern River No. 3 Hydroelectric Project Powerhouse, 2023

Habitat Type	Total Length (feet)	Length Relative Frequency (%)	Number of Habitat Units	Unit Relative Frequency (%)
Boulder Pocket Water	3,961	5	12	5
Boulder Run	20,436	25	54	22
Cascade	3,726	5	24	10
Deep Pool	8,425	10	18	7

Habitat Type	Total Length (feet)	Length Relative Frequency (%)	Number of Habitat Units	Unit Relative Frequency (%)
Shallow Pool	18,795	23	43	17
Run	14,035	17	45	18
Riffle	13,920	17	53	21
Total	83,298	102[a]	249	100

Note:
[a] Sum is greater than 100 due to rounding.

Both the Salmon Creek Diversion and Corral Creek Diversion Bypass Reaches have narrow, steep channels (10.2 percent and 8.6 percent average gradients, respectively). Salmon and Corral Creeks are intermittent during dry years. During the 2023 relicensing studies, Salmon Creek (from the confluence with the NFKR upstream to 0.1 mile upstream of the diversion) was mainly composed of long, high-gradient boulder and bedrock cascades, punctuated by a few deep pools and runs throughout the reach. The primary substrates for most of the assessed portion of Salmon Creek were boulders and bedrock. Corral Creek, from its confluence with the NFKR upstream to 0.1 mile past the diversion, was characterized by boulder cascades and riffles with small sections of flatwater habitat. Corral Creek was primarily composed of boulder substrate with some sections of cobble and bedrock.

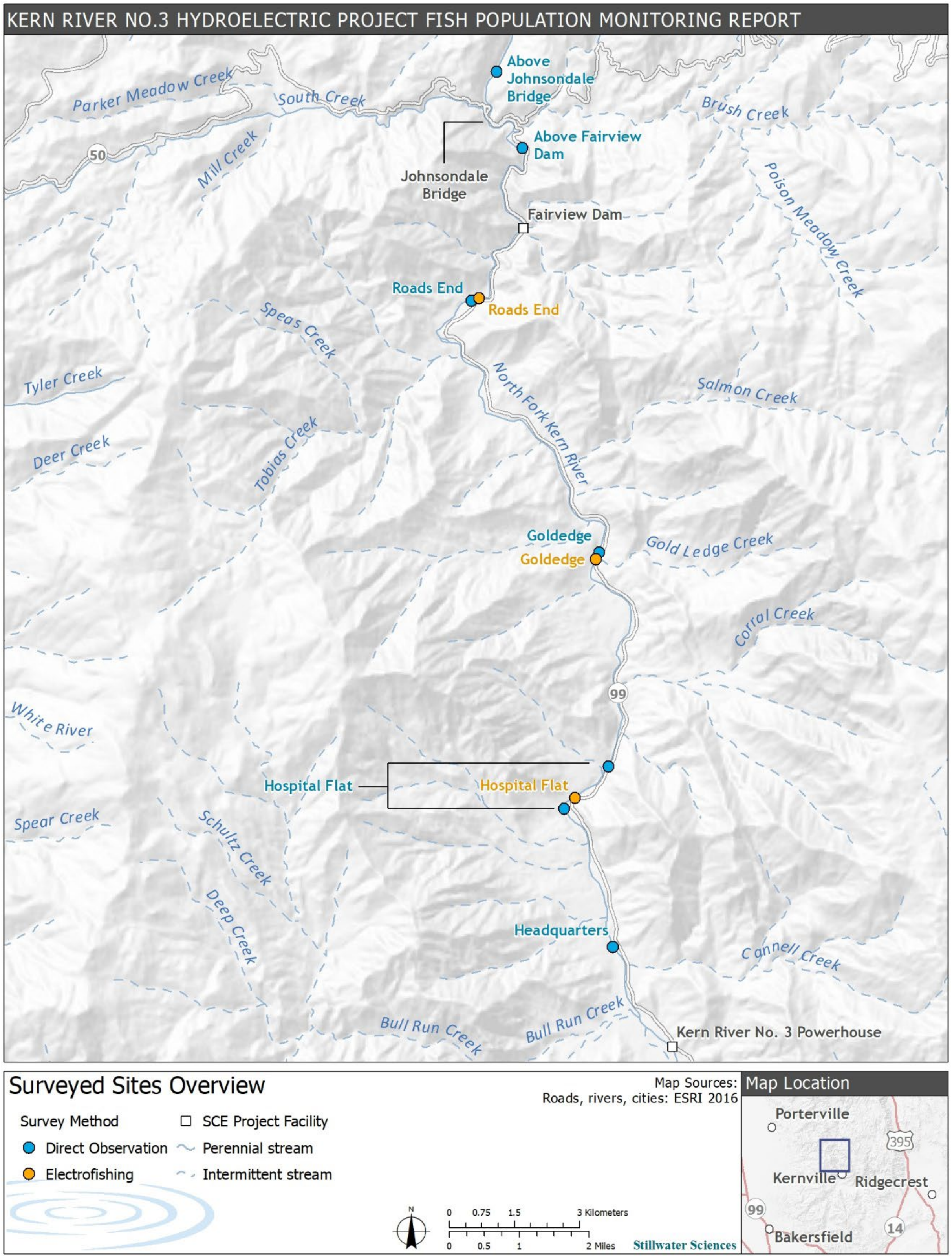
Cannell Creek downstream of the Cannell Creek Spillway also has a high gradient (7.2 percent) (USGS, 2019). Cannell Creek is intermittent and fishless but does contain suitable habitat for the northwestern pond turtle (Section 7.4.1.5, *Amphibian and Aquatic Reptiles*). Details on aquatic habitat in the NFKR, Corral Creek, and Salmon Creek are included in the BIO-6 Technical Memorandum provided in Appendix E.2.

On the NFKR, SCE currently diverts 35 cfs at Fairview Dam year-round to provide cooler water to CDFW's Kern River Planting Base Hatchery. Secondary to the hatchery diversion obligation, MIF requirements within the Fairview Dam Bypass Reach range from 40 to 130 cfs, or natural inflow, if less. MIFs in the Salmon Creek Diversion and Corral Creek Diversion Bypass Reaches range from 1 to 4 cfs and 0.5 to 1 cfs, respectively, or natural inflow, if less. Refer to Section 2.0, *Capacity and Production*, in Exhibit B for additional information on existing instream flow requirements.

7.4.1.2. Fish Populations

This section provides information on fish populations and related habitat conditions within potentially affected stream reaches. SCE has monitored fish populations at five sites on the NFKR since 1989. Fish population surveys were conducted prior to the current license (from 1989 to 1991) and under of the current license (License Article 411) in 2006, 2011, 2016, and 2023 to monitor populations following changes to MIF releases in 1996 (FERC and Forest Service, 1996; Stillwater Sciences and ERM, 2024). In 2023, six sites were surveyed, including an additional site at Headquarters Campground, to target additional adult hardhead (*Mylopharodon conocephalus*) habitat (Figure 7.4-1).

Fish populations upstream and downstream of Fairview Dam reflect water temperatures and fish stocking practices. Water temperature and quality in the NFKR support overlapping coldwater (e.g., trout) and transitional zone (e.g., pikeminnow-hardhead-sucker) fish assemblages. Water temperatures within the Fairview Dam Bypass Reach are influenced by ambient air temperature and increase from upstream to downstream during spring and summer (Section 7.3.1.2, *Water Quality*; *WR-1 Water Quality Interim Technical Memorandum* provided in Appendix E.2). Monthly average water temperatures within the Fairview Dam Bypass Reach measured during the relicensing WR-1 Study ranged from 2.0 °C to 26.0 °C and align with trout preferences within the upstream sections of Fairview Dam Bypass Reach and transitional zone fish within the downstream sections of Fairview Dam Bypass Reach; however, both assemblages are present throughout the reach. DO concentrations measured in the NFKR at Kernville from 1974 to 1993 and in Salmon and Corral Creeks were high (generally above 8 mg/L) and align with trout and transitional zone fish preferences (USGS, 2020; Moyle, 2002).



SCE = Southern California Edison

Figure 7.4-1. Fish Monitoring Site Locations, North Fork Kern River, 2023.

Composition and Distribution

Fish within the Fairview Dam Bypass Reach include suckers, minnows, catfish, and trout. Fish species in the NFKR from upstream of Fairview Diversion to Isabella Lake are summarized in Table 7.4-2. Corral Creek, Salmon Creek, and Cannell Creek are intermittent during dry years and fishless upstream of the Mountain Highway 99 crossings.

Table 7.4-2. Fish Species Within the North Fork Kern River from the Fairview Diversion Impoundment to the Kern River No. 3 Hydroelectric Project Powerhouse

Family	Common Name	Scientific Name	Status	Distribution		
				Upstream of Fairview Dam	Fairview Dam to KR3 Powerhouse	KR3 Powerhouse to Isabella Lake
Catostomidae (suckers)	Sacramento sucker	*Catostomus occidentalis*	N	X, O	X, O	O
Centrarchidae (sunfish)	Green sunfish	*Lepomis cyanellus*	I	N/A	O	O
Cyprinidae (minnows)	Sacramento pikeminnow	*Ptychocheilus grandis*	N	X, O	X, O	N/A[a]
	Hardhead	*Mylopharodon conocephalus*	N / SSC	N/A	O	N/A
	Common carp	*Cyprinus carpio*	I	N/A	X, O	O
Ictaluridae (catfish)	Channel catfish	*Ictalurus punctatus*	I	N/A	X	N/A[a]
Salmonidae (trout)	Rainbow trout	*Oncorhynchus mykiss*	N[b]	X, O	X, O	O
	Brown trout	*Salmo trutta*	I	O	O	O
	Chinook salmon	*Oncorhynchus tshawytscha*	N[c]	N/A	O	N/A

Sources: Stephens et al., 1995; SCE, 2017; FERC and Forest Service, 1996; Stillwater Sciences and ERM, 2024

I = Introduced; N/A = No data available; N = Native; SSC = designated as a California species of special concern; O = Historical observations; X = Current (2023)

Notes:

[a] No data available, but species expected to be found in the NFKR downstream of the KR3 Powerhouse

[b] Native to California, but current populations introduced into the NFKR upstream and downstream of Fairview Dam

[c] Outside native range; historical populations introduced in Isabella Lake for angling in 1996

Upstream of Fairview Dam, Sacramento sucker (*Catostomus occidentalis*) was the most abundant species observed in 2023, with fewer nonnative rainbow trout (*Oncorhynchus mykiss*) (Table 7.4-3). During prior monitoring years, the most abundant species upstream of Fairview Dam varied between Sacramento sucker, rainbow trout, and Sacramento pikeminnow (*Ptychocheilus grandis*), but was most often Sacramento sucker (ENTRIX, 1999; ECORP, 2007; SCE, 2012a, 2017).

Historically, Sacramento sucker was the most abundant species within the Fairview Dam Bypass Reach, and lower abundances of rainbow trout and Sacramento pikeminnow were also consistently observed throughout the reach. Brown trout (*Salmo trutta*) and warmwater species (i.e., common carp [*Cyprinus carpio*], green sunfish [*Lepomis cyanellus*], and catfish) have also been observed in low numbers within the reach (ENTRIX, 1999; ECORP, 2007; SCE, 2012a, 2017; Stillwater Sciences and ERM, 2024). In 2023, native Sacramento sucker and Sacramento pikeminnow and nonnative rainbow trout and catfish (channel catfish [*Ictalurus punctatus*] and unidentified catfish species) were observed, with Sacramento sucker continuing to be the dominant species across all sites (Figure 7.4-2). A total of 61 rainbow trout were observed across all 6 direct observation sites, whereas only 3 rainbow trout were captured at the 3 electrofishing sites. Sacramento pikeminnow were only observed at the two sites farthest downstream (Hospital Flat and Headquarters). Catfish were observed in the NFKR for the first time during the fish population monitoring efforts in 2023; however, they were observed only at the farthest downstream site (Headquarters), which was added in 2023 (Stillwater Sciences and ERM, 2024). Numerous larval fish were observed and identified as either cyprinid or catostomid. The total number of each fish species captured by electrofishing and highest count of each fish species observed during snorkeling at each of the sampling sites in 2023 are provided in Table 7.4-3 and Figure 7.4-2.

Trout densities were relatively low in 2023 across all survey sites compared with prior survey years. While Sacramento pikeminnow have been observed in low numbers historically across all survey sites, they were absent from most sites in 2023. Conversely, Sacramento sucker densities were relatively high at the deeper snorkel sites and relatively low to moderate at electrofishing sites compared with prior survey years, with no discernable patterns over time (Stillwater Sciences and ERM, 2024).

Table 7.4-3. Number of Fish Observed by Electrofishing and Direct Observation at Monitoring Sites, North Fork Kern River, 2023

Site	Number Observed by Electrofishing[a]			Number Observed by Direct Observation[a]					
	RBT	SKR	UNKC	RBT	PKM	SKR	UNKC	CAT	UNKT
Above Johnsondale Bridge	NA			1	0	24	0	0	0
Above Fairview Dam	NA			10	0	47	0	0	1
Roads End	1	94	8	12	0	236	0	0	0
Goldledge	1	140	0	5	0	262	0	0	0
Hospital Flat	1	35	3	4	26	587	80	0	0
Headquarters	NA			29	37	497	21	4	0

CAT = catfish species; NA = not applicable; RBT = rainbow trout; PKM = Sacramento pikeminnow; SKR = Sacramento sucker; UNKC = unidentified cyprinid (minnow) or catostomid (sucker); UNKT = unidentified trout

Note:

[a] The total number of fish captured (electrofishing) or highest count observed in one pass (snorkeling) by species was used to determine observation totals.

Downstream of the KR3 Powerhouse, the NFKR likely supports a range of coldwater to warmwater fish. Isabella Lake supports a warmwater sport fishery and fish within the lake can migrate upstream into the NFKR, including Fairview Dam Bypass Reach. Sampling data from 1998 through 2011 documented that Isabella Lake contains a variety of warmwater fishes, including common carp, threadfin shad (*Dorosoma petenense*), channel catfish, blue catfish (*Ictalurus furcatus*), bluegill (*Lepomis macrochirus*), largemouth bass (*Micropterus salmoides*), smallmouth bass (*Micropterus dolomieu*), black crappie (*Pomoxis nigromaculatus*), and white crappie (*Pomoxis annularis*) (Forest Service, 2009). Of these species, common carp and green sunfish have been previously observed at the Hospital Flat electrofishing site, and catfish have been observed in 2023 at the Headquarters snorkel site (SCE 2017; Table 7.4-3).

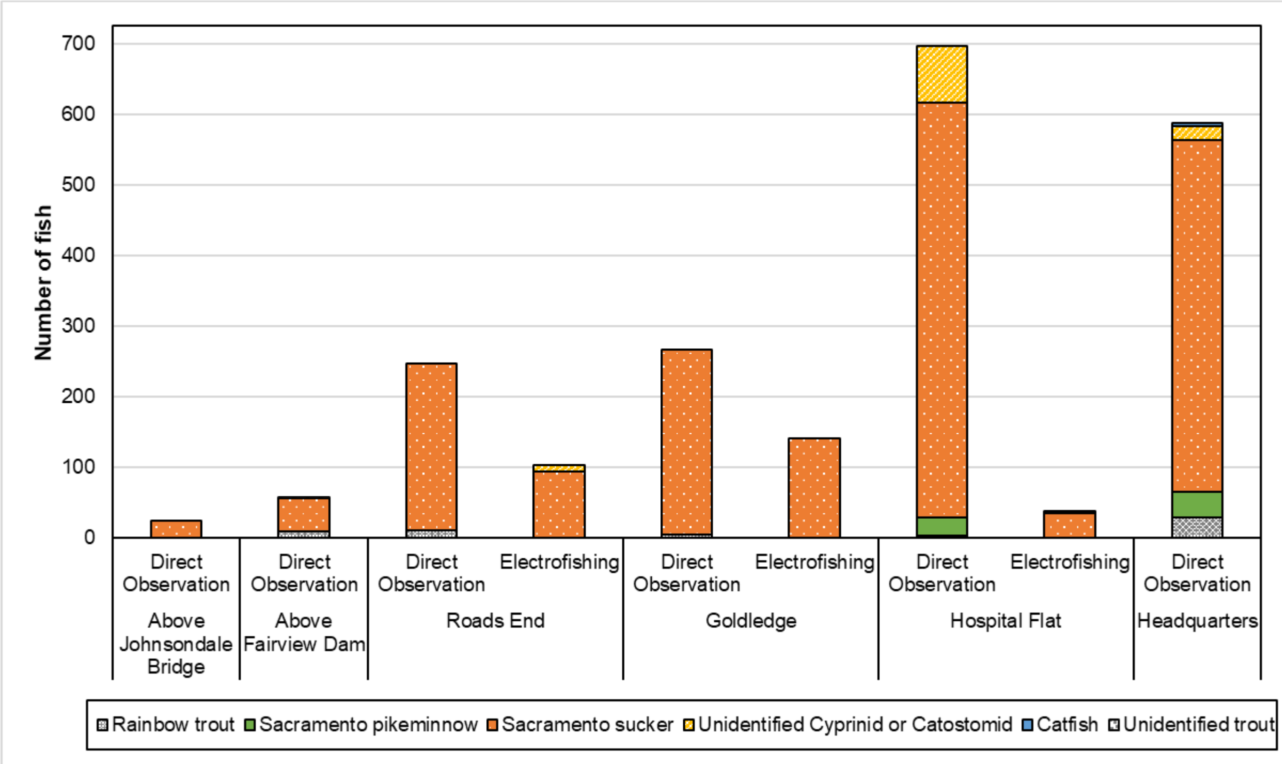


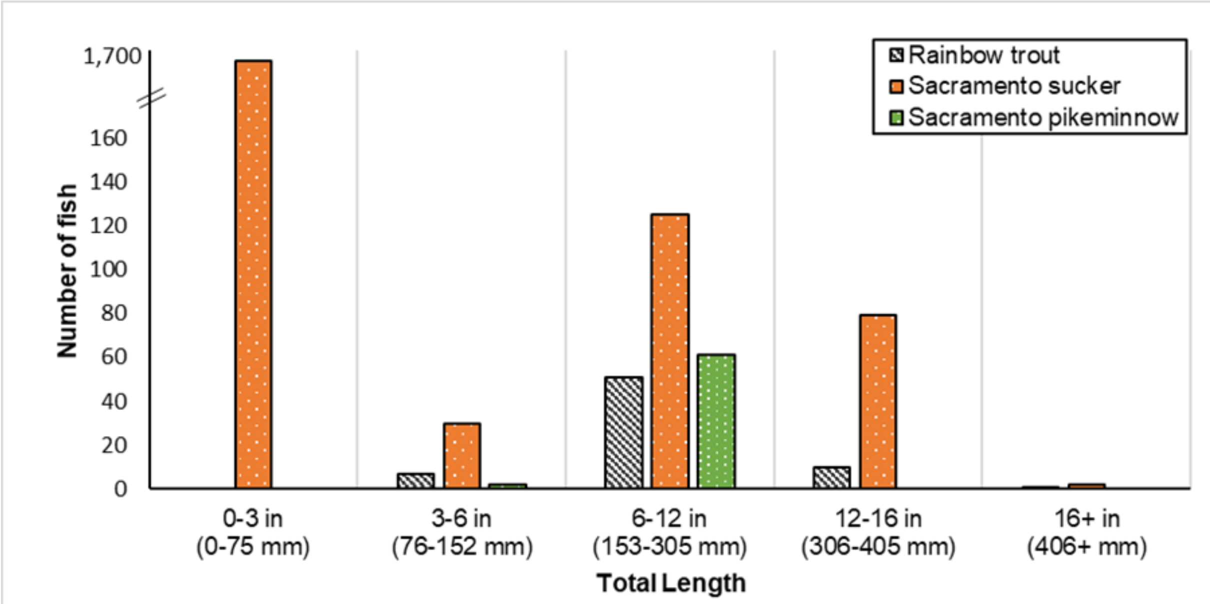
Figure 7.4-2. Number of Fish Observed by Electrofishing and Direct Observation at Fish Population Monitoring Sites, North Fork Kern River, 2023.

Of the most abundant species observed in 2023, Sacramento sucker showed a typical age-class distribution, with a large cohort of young-of-year (YOY) and larval fish, and fewer fish in the larger size classes, suggesting multiple years of successful recruitment (Figure 7.4-3).

The Sacramento pikeminnow observed were all within the 6- to 12-inch (153- to 305-mm) size class (Figure 7.4-3), which would indicate low recruitment in 2023; however, it is possible that a portion of the 100+ unidentified cyprinids (minnows) and/or catostomids (suckers) were larval pikeminnow.

The rainbow trout population upstream and downstream of Fairview Dam showed an atypical age-class distribution in 2023, with most individuals observed within the 6- to 12-inch (153- to 305-mm) size classes and no fish observed under 3 inches (75 mm) (Figure 7.4-3). This distribution indicates low natural recruitment in 2023 and may reflect recent fish stocking activities in the area (see the *Fish Stocking* subsection in Section 7.4.1.2, *Fish Populations*).

The atypical age-class distribution and limited recruitment of rainbow trout and Sacramento pikeminnow observed in 2023 may be a function of available spawning habitat (see *Spawning Gravel* subsection in Section 7.4.1.2, *Fish Populations*), or the high spring flows observed in 2023, although successful recruitment of Sacramento sucker, which also spawn in the spring, was observed (Figure 7.4-3).



in = inches; mm = millimeters

Figure 7.4-3. Length-Frequency Distribution of Fish Observed at Electrofishing and Direct Observation Fish Monitoring Sites, 2023.

<u>Spawning Gravel</u>

Spawning gravel for fish in the NFKR is limited both upstream and downstream of Fairview Dam (SCE, 1991). Gravel availability within the Fairview Dam Bypass Reach is affected by the natural dynamics of the river and the limited amount of gravel produced in the watershed (ENTRIX, 1997). Prior instream flow incremental methodology (IFIM) study results found that little spawning habitat for rainbow or brown trout was available within the Fairview Dam Bypass Reach at any flow between 25 and 1,000 cfs (SCE, 1991; see also the *Aquatic Habitat* subsection in Section 7.4.3.1, *Effects of Project Operation and Maintenance on Fish and Aquatic Resources*); the relatively high gradient and peak winter and spring snowmelt run-off flows result in the rapid transport of gravel through the system with deposition typically limited to overflow channels, pool tails, and small patches behind large boulders (ENTRIX, 1997; SCE, 1991).

Spawning and rearing habitats are also limited in Salmon and Corral Creeks. Both streams contain passage barriers that block access a short distance upstream from the NFKR (see the *Passage Barriers* subsection in Section 7.4.1.2, *Fish Populations*); upstream of these barriers, the intermittent streams provide only a small amount of habitat relative to the Fairview Dam Bypass Reach.

Fine sediment can reduce the value and productivity of gravels available for spawning. Upstream parent material is described as coarse sediment and sandy loam (FERC and Forest Service, 1996), and the main components of sediment delivered to the NFKR are fine-grained sand and decomposed granite (Stephens et al., 1995). The small pool created behind Fairview Dam was reported as “completely filled with flood detritus” following the 1966 flood, indicating limited spawning gravel recruitment from upstream sources (Dean and Scott, 1971). Sediment carried by diverted flows at Fairview Dam settles out within the sandbox, located downstream of the dam prior to entering the flowline. Accumulated sediment in the sandbox is currently returned to the mainstem NFKR in conjunction with high flows (refer to License Article 402). Sandbox flushing procedures are currently initiated at flows that exceed 350 cfs to protect existing spawning gravels for trout because flows in excess of 350 cfs were shown to transport finer sediment downstream and toward the banks without deposition in spawning riffles (FERC and Forest Service, 1996; ENTRIX, 2002). See Section 7.2, *Geologic and Soils Resources*, for additional information on sediment composition and transport within the NFKR.

Both the lack of gravel recruitment and relatively high sediment transport limit trout spawning gravel availability upstream and downstream of Fairview Dam (SCE, 1995). The limited availability of spawning habitat was identified as a physical factor controlling the abundance of trout populations within the NFKR downstream of Fairview Dam (SCE, 1991). However, despite limited spawning habitat, rainbow trout of different age classes have been observed in the NFKR, suggesting successful recruitment in some years.

Passage Barriers

The Kern River terminates near the city of Bakersfield and is not connected to the ocean, preventing access to anadromous fish species.[20]

Fish passage barriers within potentially affected stream reaches include Fairview Dam and several falls in Salmon and Corral Creeks. Adjacent to Fairview Dam are two connected fish ladders: a concrete pool-and-chute ladder and an Alaska steeppass ladder that have remained non-operational (closed) since 1997 (see Exhibit A, Section 1.1.1 *Fairview Dam;* 79 FERC ¶ 62,113, *Order Approving Plan to Close Fish Ladders at Fairview Dam*). The pool-and-chute ladder was built prior to 1964, and the Alaska steeppass fish ladder was built as part of the 1964 FERC licensing process. The fish ladders were closed in 1997 to protect Kern River rainbow trout (*Oncorhynchus mykiss gilberti*) in the upper basin by denying upstream migration to predatory Sacramento pikeminnow and nonnative rainbow and brown trout (Stephens et al., 1995; 79 FERC ¶ 62,113).

In Corral Creek, a 12-foot waterfall prevents upstream passage from the NFKR approximately 100 feet upstream of the confluence. Similarly, an 18-foot waterfall prevents passage into Salmon Creek approximately 175 feet upstream of the NFKR confluence.

[20] Kern River historically emptied into the now dry Buena Vista Lake, which when overflowing, could back up into Kern Lake and then drain into Tulare Lake, which occasionally overflowed into the San Joaquin River during very large flood flows. Currently, water is almost entirely diverted for irrigation and aquifers, with any excess water directed into the California Aqueduct (part of the California State Water Project) or Lake Webb and Lake Evans, two small lakes in a portion of the former Buena Vista Lakebed.

Fish Species Temporal/Life History Information

Most of the fish species in the Project bypass reaches spawn during the spring, corresponding with typical west-slope Sierran snowmelt run-off timing, and YOY and juvenile fish rear over the summer to winter months under lower flow conditions. However, introduced brown trout spawn in the late fall/early winter and YOY rear through the spring, when redds may be exposed to high scouring storm flows and juveniles may be exposed to high peak snowmelt run-off. The timing of life history stages of fish species found within the Fairview Dam Bypass Reach is shown in Table 7.4-4. Additional information on life-history requirements of special-status species is included in the *Special-status Fish Species* subsection in Section 7.4.1.2, *Fish Populations*.

Table 7.4-4. Life History Timing of Fish Species of Special Management Concern and Native Fish Species within the Fairview Dam Bypass Reach

Species/Stage	OCT		NOV		DEC		JAN		FEB		MAR		APR		MAY		JUN		JUL		AUG		SEP	
Rainbow trout																								
Spawning									▒	■	■	■	■	■	■	■	■	■	▒					
Fry/YOY	■	■															▒	■	■	■	■	■	■	■
Juvenile	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■
Adult	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■
Brown trout																								
Spawning	■	■	■	■	■	■																	▒	▒
Fry/YOY	▒	▒	■	■	■	■	■	■	■	■	■	■	■	■	■	■								
Juvenile	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■
Adult	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■
Sacramento sucker																								
Spawning										■	■	■	■	■	■	■	■	■	▒	▒	▒			
Fry/YOY													■	■	■	■	■	■	■	■	■	■	■	■
Juvenile	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■
Adult	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■
Sacramento pikeminnow																								
Spawning											▒	▒	■	■	■	■	▒	▒						
Fry/YOY	■	■													■	■	■	■	■	■	■	■	■	■
Juvenile	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■
Adult	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■
Hardhead																								
Spawning											▒	▒	▒	▒	■	■	■	■	▒	▒	▒	▒		

Species/Stage	OCT		NOV		DEC		JAN		FEB		MAR		APR		MAY		JUN		JUL		AUG		SEP	
Fry/YOY	■	■													■	■	■	■	■	■	■	■	■	■
Juvenile	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■
Adult	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■

■ Peak period ░ Potential use

Source: Loudermilk, 2001; Moyle, 2002

YOY = young-of-year

Special-status Fish Species

This section addresses special-status fish species that are (1) listed, proposed for listing, or candidates for listing as threatened or endangered under the federal ESA; (2) listed, proposed for listing, or under review as rare, threatened, or endangered under the California ESA; (3) designated by CDFW as fully protected or species of special concern; and/or (4) designated by the Forest Service (Region 5) as sensitive or an SQF species of conservation concern.

A list of special-status fish species with the potential to occur in Project bypass reaches was developed by querying the following resources:

- USFWS's Information for Planning and Consultation (IPaC) portal for federally listed and proposed endangered, threatened, and candidate species and their designated critical habitat (USFWS, 2024);
- CDFW California Natural Diversity Database (CNDDB) (CDFW, 2024); and
- SQF Species of Conservation Concern List (Forest Service, 2023).

The USFWS IPaC query was based on the spatial extent of the FERC Project Boundary and the surrounding area. The CNDDB queries were based on a search of the USGS 7.5-minute quadrangles in which the FERC Project Boundary is located (Kernville and Fairview) and the adjacent 10 quadrangles (Durrwood Creek, Bonita Meadows, Sirretta Peak, Cannell Peak, Weldon, Lake Isabella North, Alta Sierra, Tobias Peak, Johnsondale, and Sentinel Peak).

Table 7.4-5 presents the special-status fish species identified by the queries, their status, habitat associations, occurrence in the Project bypass reaches, temporal distribution, and references to any known biological opinion, status report, or recovery plan relevant to the Project. Additional information on special-status fish species with the potential to occur in the vicinity of the Project is included below.

Project bypass reaches do not contain any EFH as defined under the Magnuson-Stevens Fishery Conservation and Management Act, ESA-listed species, or anadromous fish species.

Table 7.4-5. Special-status Fish Species Identified by Queries (in Taxonomic Order)

Common Name (*Scientific Name*)	Status	Query Source	Distribution and Habitat Associations	Occurrences in Project Boundary	Biological Opinion, Status Report, or Recovery Plan Relevant to the Project
California golden trout (*Oncorhynchus aguabonita*)	SCC	CDFW, 2024; Forest Service, 2023	SFKR, Golden Trout Creek, and Volcano Creek. Prefer clear, cool streams with sand, gravel, and some cobble substrate.	No potential to occur. Project-affected reaches are outside the species' known range.	None
Central Valley hitch (*Lavinia exilicauda exilicauda*)	SCC	Forest Service, 2023	Native to the Sacramento and San Joaquin River Drainages. Warm, lowland waters. Prefer temperatures between 27 and 29 °C.	No potential to occur. Project-affected reaches are outside the species known range.	None
Hardhead (*Mylopharadon conocephalus*)	SSC, SCC	Forest Service, 2023	Native to the Sacramento and San Joaquin River drainages. Prefer large, warm streams containing deep, rock-bottomed pools and runs with sand-gravel-boulder substrates.	Moderate potential to occur year-round. Last captured during SCE fish monitoring surveys in 1998.	None
Kern River rainbow trout (*Oncorhynchus mykiss gilberti*)	FCE, SSC, SCC	CDFW, 2024; Forest Service, 2023	High elevation in the Kern River and headwater tributaries (Tulare County). Prefer cool, clear, fast flowing streams where riffles are abundant.	Low potential to occur. Fairview Dam Bypass Reach is within historical range; however, this species has likely been extirpated from the NFKR upstream and downstream of Fairview Dam by the introduction of nonnative rainbow trout that compete and hybridize with Kern River rainbow trout (Stephens et al., 1995).	Upper Kern Basin Fishery Management Plan (Stephens et al., 1995); Status Report (Moyle et al., 2015)

ESA = Endangered Species Act; FCE = candidate for listing as endangered under the federal ESA; NFKR = North Fork Kern River; SCC = designated as a Forest Service species of conservation concern; SCE = Southern California Edison; SFKR = South Fork Kern River; SSC = designated as a California species of special concern

Hardhead

Hardhead (*Mylopharodon conocephalus*) is a California species of special concern and a Forest Service species of conservation concern and sensitive species. Hardhead are large cyprinids native to the Sacramento and San Joaquin River drainages and the upper Kern River downstream of South Creek (Stephens et al., 1995). Hardhead have restrictive microhabitat preferences and prefer large, warm streams containing deep, rock-bottomed pools and runs with sand-gravel-boulder substrates, low turbidity, and low water velocities (0.66 to 1.3 feet per second; Moyle, 2002; Moyle and Daniels, 1982). This species prefers warmer temperatures (greater than 20 °C for growth, 24 °C to 28 °C for optimal physiological performance) and most often occurs in streams with temperatures greater than 20 °C. Hardhead belong to the pikeminnow–hardhead–sucker assemblage and are generally found with Sacramento pikeminnow (Moyle, 2002). They are omnivorous; juveniles feed on aquatic macroinvertebrates and small snails, while adults feed on large invertebrates and plants such as filamentous algae (Moyle, 2002).

Hardhead sexually mature after 3 years and primarily spawn in April and May (Moyle, 2002). Adults located in larger rivers sometimes migrate upstream to spawn, while others move only short distances from their home pool (Moyle, 2002; Grant and Maslin, 1999). Females produce 7,000 to 24,000 eggs per year. Hardhead spawn over gravel and rocky substrate in riffles, runs, or at the heads of pools. Larval and post-larval fish use dense cover along stream margins and move into deeper habitats as they grow (CalFish, 2020). Juveniles feed on plankton, cladocerans, insects, and small snails. In the intermittent pools of the upper San Joaquin River, they also feed on filamentous algae (Wang, 1986).

Within the Fairview Dam Bypass Reach, hardhead have substantially declined in abundance since the relicensing surveys conducted in 1989 and have not been observed since 1998 (Stillwater Sciences and ERM, 2024). Hardhead have not been observed in Salmon or Corral Creeks.

Kern River Rainbow Trout

USFWS classifies the Kern River rainbow trout as a Category Two (candidate) species for federal listing under the ESA. It is also listed as a California species of special concern and a Forest Service species of conservation concern. Kern River rainbow trout is part of the golden trout complex of fishes, along with Little Kern golden trout (*Oncorhynchus aguabonita*) and Volcano Creek golden trout (*Oncorhynchus mykiss aguabonita*). The principal habitat of golden trout within their native range is wide, shallow, exposed streams with clear, cold water, and limited riparian vegetation for cover (Moyle, 2002). They occupy pools and areas associated with undercut banks, aquatic vegetation, and sedges and may also be found in higher-gradient streams in pool-riffle-cascade habitats. The primary characteristic of streams containing established golden trout populations is the absence of other trout species (Moyle, 2002). Golden trout feed on invertebrates, primarily larval and adult aquatic insects, as well as terrestrial insects that fall into their waters (Moyle, 2002).

Golden trout sexually mature in their third to fourth year. Spawning occurs after high spring flows decline and water temperatures reach 10 to 15 °C and takes place in riffles with small substrate, shallow depth, and water velocities of 30 to 70 centimeters per second (Moyle, 2002).

Kern River rainbow trout currently only exist upstream of the Project. Nonnative trout introductions during the 1930s and 1940s are likely responsible for the extirpation of Kern River rainbow trout in the Kern River downstream of Durrwood Creek (RM 33.5) due to hybridization (Stephens et al., 1995).

Fish Stocking

The exact date of the first introductions of rainbow trout to the Upper Kern subbasin is unknown. Rainbow trout were stocked before the turn of the 20th century, and it is believed that introductions of nonnative rainbow trout during the 1930s and 1940s was the principal cause of the threatened status of Little Kern golden trout due to hybridization (Stephens et al., 1995). CDFW manages portions of the NFKR as a put-and-take trout fishery (FERC and Forest Service, 1996; CDFW, 2021). Fish are planted upstream and downstream of Fairview Dam weekly during the summer and on alternate weeks during the winter, and an additional 3,500 pounds were historically stocked in roadside sections of western tributary streams between Fairview Dam and Forks-of-the-Kern. Between 2001 and 2023, an average of 27,100 nonnative rainbow trout were planted in the NFKR annually between Fairview Dam and the KR3 Powerhouse, and an average of 11,600 were planted annually just upstream of Fairview Dam (Table 7.4-6; CDFW, 2021; personal communication, William Branch, Senior Hatchery Supervisor, California Department of Fish and Wildlife, January 30, 2024).

Brown trout stocked in the NFKR during the mid-1900s are currently distributed from Funston Meadow in Sequoia National Park downstream to Isabella Lake. This species maintains a self-sustaining population but does not make up a large proportion of the fish assemblage. Brown trout were reported to have been historically planted in the Little Kern River drainage; however, none were observed during 1995 studies (Stephens et al., 1995).

Table 7.4-6. North Fork Kern River Hatchery Rainbow Trout Stocking Records, 2001 through 2023

Year	Number of Fish	Pounds of Fish
Brush Creek to Fairview Dam		
2001	16,535	9,000
2002	14,275	8,000
2003	14,390	7,950
2004	12,340	6,850
2005	11,910	6,550

Year	Number of Fish	Pounds of Fish
2006	12,780	7,940
2007	21,533	14,077
2008	12,252	8,435
2010	10,927	8,354
2011	6,807	9,708
2012	29,435	12,270
2013	12,395	5,600
2014	13,250	7,600
2015	17,910	4,577
2016	9,814	7,479
2017	2,028	1,475
2018	4,900	3,065
2019	5,640	3,000
2020	7,880	4,400
2021	7,883	3,925
2022	6,350	2,900
2023	4,530	2,600
Fairview Dam to Kern River No. 3 Powerhouse		
2001	38,377	20,955
2002	44,261	24,380
2003	42,421	23,450
2004	40,050	22,250
2005	34,990	19,150
2006	37,510	23,365
2007	39,884	24,480
2008	33,294	23,900
2010	29,210	16,771
2011	37,101	22,040
2012	38,527	21,249
2013	31,089	17,357
2014	17,783	10,112
2015	12,891	6,850
2016	15,883	11,470

Year	Number of Fish	Pounds of Fish
2017	5,713	4,525
2018	13,529	7,752
2019	15,170	8,488
2020	17,070	8,390
2021	21,766	10,675
2022	17,730	8,800
2023	12,160	6,750
Kern River No. 3 Powerhouse to Riverside Park		
2001	36,304	20,205
2002	36,525	19,675
2003	34,425	18,530
2004	33,125	18,150
2005	32,310	17,350
2006	33,185	20,387
2007	28,555	17,283
2008	29,238	22,647
2010	49,039	26,418
2011	35,033	21,658
2012	43,185	24,225
2013	33,931	18,137
2014	21,310	11,550
2015	11,305	6,150
2016	16,607	12,550
2017	6,280	4,925
2018	9,630	6,393
2019	31,370	16,063
2020	21,918	12,720
2021	18,393	9,825
2022	22,280	10,100
2023	11,370	6,700

Source: CDFW, 2021; personal communication, William Branch, Senior Hatchery Supervisor, California Department of Fish and Wildlife, January 30, 2024.

Angling and subsistence fishing is described in the *Angling* subsection in Section 7.7.1.2, *River-Based Recreation*.

7.4.1.3. Benthic Macroinvertebrates

The structure of the benthic macroinvertebrate (BMI) community can be used as an indicator of water quality and aquatic ecosystem health. As such, an assessment of BMI assemblages and habitat within the Fairview Dam Bypass Reach of the NFKR was conducted in 2023. To assess potential effects of the proposed Project operations on water quality and the BMI community, comparisons of BMI assemblages were made from samples collected at four sites within the NFKR: KR-1, downstream of KR3 Powerhouse; KR-2, immediately upstream of KR3 Powerhouse; KR-3, downstream of Gold Ledge Campground; and KR-4, a control site upstream of Fairview Dam. BMI assemblages and habitat, study sites, collection and analytical methods, and results are described in the BIO-4 Technical Memorandum provided in Appendix E.2.

Reach-wide benthos samples were collected at the four survey sites in 2023. BMI assemblages collected from Fairview Dam Bypass Reach and control sites were similar to one another and were all of high quality, indicating unimpaired stream conditions, as described in Section 7.2.1.2, *Channel Geomorphology*, and Section 7.4.1.1, *Aquatic Habitat*. BMI representing 52 distinct taxa were identified in the samples collected from the NFKR (BIO-4 Technical Memorandum, Attachment B, provided in Appendix E.2). Physical habitat and water quality data collected during BMI sampling in 2023 are consistent with the stream channel characteristics and aquatic habitat conditions described in Sections 7.4.1.1, *Aquatic Habitat*; 7.2, *Geologic and Soils Resources*; and 7.3, *Water Resources*.

7.4.1.4. Mollusks

<u>Special-status Mollusks</u>

Special-status mollusks with the potential to occur within the potential FERC Project Boundary and lands surrounding the Project, specifically the Project bypass stream reaches, were identified by querying the following sources:

- USFWS IPaC portal for federally listed and proposed endangered, threatened, and candidate species and their designated critical habitat (USFWS, 2024)
- CDFW CNDDB (CDFW, 2024)
- SQF Species of Conservation Concern List (Forest Service, 2023)

The USFWS IPaC query was based on the spatial extent of the FERC Project Boundary and Project-affected reaches. The CNDDB queries were based on a search of the USGS 7.5-minute quadrangles in which the FERC Project Boundary is located (Kernville and Fairview) and the adjacent 10 quadrangles (Durrwood Creek, Bonita Meadows, Sirretta Peak, Cannell Peak, Weldon, Lake Isabella North, Alta Sierra, Tobias Peak, Johnsondale, and Sentinel Peak).

Western pearlshell (*Margaritifera falcata*) was the only special-status mollusk species with the potential to occur in the Project-affected reaches.

Western Pearlshell

Western pearlshell is a Forest Service species of conservation concern (Forest Service, 2023) and a California species of special concern (CNDDB, 2024). The species was observed within the Fairview Dam Bypass Reach during the 2016 fish population surveys (SCE, 2017), and shells were observed during the 2023 surveys. Observations were also documented upstream of Fairview Dam and Johnsondale Bridge in 2016 (SCE, 2017) and 2023 (Groves and Mertz, 2023), and shells were incidentally observed during the 2023 REC-1 Whitewater Boating studies. Western pearlshell require perennial cool, clear rivers and the presence of trout species to complete their life cycle (Nedeau et al., 2009).

Non-Special-Status Species

Downstream of the Project, western ridge mussel (*Gonidea angulata*) was historically present on the lower Kern River below Isabella Lake, but this species is no longer present (Howard, 2010).

Invasive Asian clam (also known as the basket clam; *Corbicula fluminea*) shells were observed at Headquarters and Hospital Flat sampling sites during the 2023 fish population surveys in the Farview Dam Bypass Reach. No live specimens were observed. Asian clams have been documented downstream of the Project within Isabella Lake and in the lower Kern River downstream of Isabella Lake (USGS, 2024; Puzo, 1992).

No invasive dreissenid mussels (including quagga [*Dreissena bugensis*] and zebra [*Dreissena polymorpha*] mussels) were observed within the Fairview Dam Bypass Reach upstream of the Project or downstream of the KR3 Powerhouse during aquatic surveys between 2022 and 2023. Water quality data indicate that conditions within the Fairview Dam Bypass Reach have low suitability for the development or growth of dreissenid mussels. Quagga and zebra mussels require calcium levels greater than 15 mg/L and pH greater than 7.8 for survival (Ramcharan et al., 1992; Hincks and Mackie, 1997; McMahon, 1996; Karatayev, 1995; Karatayev et al., 2015; Prescott et al., 2014). Waterbodies with calcium levels generally less than 12 to 15 mg/L have a very low risk of infestation (Claudi and Prescott, 2011; Claudi et al., 2012; Cohen, 2008; Whittier et al., 2008). Calcium concentrations and pH measurements collected between 1974 and 1993 (3.6 to 18 [mean 10.32] mg/L and 5.8 to 8.6 [mean 7.7] standard units, respectively) indicate that the impoundment behind Fairview Dam and the Fairview Dam Bypass Reach are unlikely to support dreissenid mussel development (Section 7.3, *Water Resources*).

7.4.1.5. Amphibian and Aquatic Reptiles

All amphibians and aquatic reptiles described in this section are partly to highly aquatic. For example, northwestern pond turtle (*Actinemys marmorata*[21]) is included here despite nesting in terrestrial uplands because it is generally considered to be a “thoroughly

[21] Species is also identified as *Emys marmorata* (e.g., CDFW, 2024; SCE, 2012b).

aquatic turtle" (Stebbins, 2003); Sierra garter snake (*Thamnophis couchii*), a highly aquatic snake, is also included. Descriptions of amphibian and reptile species that are associated with terrestrial habitats and do not need flowing or large ponded surface waters for any part of their life cycles are included in Section 7.5, *Wildlife Resources* (e.g., the Kern Plateau salamander [*Batrachoseps robustus*], relictual slender salamander [*Batrachoseps relictus*], yellow-blotched salamander [*Ensatina eschscholtzii croceater*], and Kern Canyon slender salamander [*Batrachoseps simatus*]).

Special-status Species

A list of special-status amphibian and aquatic reptile species with the potential to occur within the FERC Project Boundary and near the Project, specifically the Project-affected reaches, was identified by querying the following sources:

- USFWS IPaC portal for federally listed and proposed endangered, threatened, and candidate species and their designated critical habitat (USFWS, 2024)
- CDFW CNDDB (CDFW, 2024)
- SQF Species of Conservation Concern List (Forest Service, 2023)

The USFWS IPaC query was based on the spatial extent of the FERC Project Boundary and includes Project bypass stream reaches. The CNDDB queries were based on a search of the USGS 7.5-minute quadrangles in which the FERC Project Boundary is located (Kernville and Fairview) and the adjacent 10 quadrangles (Durrwood Creek, Bonita Meadows, Sirretta Peak, Cannell Peak, Weldon, Lake Isabella North, Alta Sierra, Tobias Peak, Johnsondale, and Sentinel Peak).

Table 7.4-7 presents the special-status amphibian and aquatic reptile species identified by the queries, their status, habitat associations, and occurrence within the FERC Project Boundary. Additional information on special-status amphibian and aquatic reptile species with the potential to occur within the FERC Project Boundary is provided below.

Table 7.4-7. Special-status Amphibian and Aquatic Reptile Species Identified by Queries

Common Name (*Scientific Name*)	**Status**	**Query Source**	**Habitat Associations**	**Occurrences in Project Boundary**
California red-legged frog (*Rana draytonii*)	FT, SSC	USFWS, 2024	Still or slow-moving water with emergent and overhanging vegetation, including wetlands, wet meadows, ponds, lakes, and low gradient, slow-moving stream reaches with permanent pools for breeding; adjacent uplands for dispersal and summer retreat.	No potential to occur. The Project is outside species' known range and is also outside of designated critical habitat (USFWS, 2024).
Foothill yellow-legged frog (*Rana boylii*)	FE, SE	USFWS, 2024; CDFW, 2024	Shallow tributaries and mainstems of perennial streams and rivers. Typically associated with cobble or boulder substrate.	Low potential to occur. This species was not observed during the 2023 targeted surveys (see the BIO-1 Technical Memorandum in Appendix E.2). Records within the FERC Project Boundary are prior to 1971 (CDFW, 2024), and CDFW has presumed the species is extirpated within the FERC Project Boundary (CDFW, 2024). There are several recent (2010–2022) records approximately 5 miles upstream of the FERC Project Boundary (CDFW, 2024). Suitable aquatic habitat is present within the FERC Project Boundary in the NFKR and in wetted portions of the Project bypass reaches.
Mountain yellow-legged frog (*Rana muscosa*)	FE, SE	USFWS, 2024; CDFW, 2024	Lakes, ponds, isolated pools, and streams that range from rocky, steep drainages to those with a gentle gradient, marshy margins, and sod banks at typical elevations from 4,500 to 12,000 feet. This species seems to be most successful where predatory fish are absent. Tadpoles take 2 to 4 years to reach metamorphosis and thus require water that does not dry up seasonally.	No potential to occur. The FERC Project Boundary is below the species' elevational range. Habitat within the FERC Project Boundary is marginally suitable, and the species has undergone steep declines in the Sierra Nevada (Brown et al., 2014). The closest recorded sighting to the Project is in Dunlap Meadow in the SQF, approximately 5.1 miles east of the Project (CDFW, 2024). Project bypass reaches are outside designated critical habitat (USFWS, 2024).

Common Name (*Scientific Name*)	**Status**	**Query Source**	**Habitat Associations**	**Occurrences in Project Boundary**
Northwestern pond turtle (*Actinemys marmorata*)	PFT, SSC	USFWS, 2024; CDFW, 2024	Permanent or semi-permanent, slow-moving fresh or brackish water (including ponds, streams, rivers, lakes, marshes, sloughs, and agricultural canals) below elevation 6,000 feet. This species requires available basking sites and adjacent open habitats or forest for nesting.	Present. Documented to occur in the NFKR and Cannell Creek (Psomas, 2013d; see the BIO-1 Technical Memorandum and the BIO-5 Technical Memorandum in Appendix E.2). There is suitable upland nesting habitat along project-affected stream reaches and along Cannell Creek upstream of the Project.

ESA = Endangered Species Act; FE = listed as endangered under the federal ESA; FERC = Federal Energy Regulatory Commission; FT = listed as threatened under the federal ESA; NFKR = North Fork Kern River; PFT = proposed as threatened under the federal ESA; SE = listed as endangered under the California ESA; SSC = designated as a California species of special concern

Foothill Yellow-Legged Frog

The Eastern/Southern Sierra clade of foothill yellow-legged frog (*Rana boylii*) was listed as endangered by the California Fish and Game Commission on February 21, 2020 (California Fish and Game Commission, 2020), and as endangered under the federal ESA by USFWS on September 28, 2023 (USFWS, 2023a; 88 *Federal Register* 166). Suitable stream habitat is present along the NFKR and its tributaries. However, no foothill yellow-legged frogs have been observed in the Project-affect reaches during prior field surveys or habitat assessments conducted as part of biological resource evaluations of Project O&M (Psomas, 2004, 2013a, 2013b, 2013c; SCE, 2012b). Likewise, no foothill yellow-legged frogs were observed during relicensing surveys or detected in environmental DNA samples collected during relicensing surveys (see the BIO-1 Technical Memorandum in Appendix E.2).

Historically, foothill yellow-legged frogs were observed within the FERC Project Boundary, including along the NFKR downstream of Fairview Dam at the confluence of Salmon Creek and near Riverkern, but these observations were recorded prior to 1972, and the population is currently presumed extirpated (CDFW, 2024). Documented occurrences are limited in numbers and distribution, and foothill yellow-legged frogs are presumed to be “near extirpation” in the region (CDFW, 2024; Hayes et al., 2016). The recorded observations nearest to the Project are in SQF, approximately 5 miles northeast from Fairview Dam, where two small, isolated populations have been observed in two unnamed tributaries to the NFKR (locally referred to as Jywood Creek and Ash Creek) during multiple surveys between 1998 and 2022 (CDFW, 2024; personal communication, Dr. Norman Leonard, NEPA Planner, SQF Kern River Ranger District, 2022; Hayes et al., 2016).

Mountain Yellow-Legged Frog

USFWS listed the mountain yellow-legged frog (*Rana muscosa*) as endangered under the federal ESA on April 29, 2014 (79 *Federal Register* 82) and designated critical habitat on August 26, 2016 (USFWS, 2016; 81 *Federal Register* 166). Critical habitat is located outside the FERC Project Boundary, and no mountain yellow-legged frogs have been detected in the vicinity of the Project (CDFW, 2024) during field surveys and habitat assessments conducted as part of biological resource evaluations of Project O&M (Psomas, 2004, 2013a, 2013b, 2013c; SCE, 2012b) or relicensing surveys in 2023 (see the BIO-1 Technical Memorandum in Appendix E.2). Suitable habitat is not present within the FERC Project Boundary because the elevation of the FERC Project Boundary is generally lower than the elevation range for mountain yellow-legged frog. The closest recorded sighting to the Project is in Dunlap Meadow in the SQF, approximately 5.1 miles east of the Project; this sighting was recorded in 1971, and the population is presumed extant at this location (CDFW, 2024).

Northwestern Pond Turtle

The northwestern pond turtle is a California species of special concern and a Forest Service sensitive species. In 2012, the Center for Biological Diversity petitioned USFWS to list the northwestern pond turtle under the federal ESA. In 2015, USFWS published a finding that the listing of this species may be warranted and requested that information on this species be submitted to USFWS for review (USFWS, 2015; 80 Federal Register 69 [April 10, 2015]). On October 3, 2023, USFWS proposed to list the northwestern pond turtle as threatened under the ESA (USFWS, 2023b; 88 Federal Register 190). The northwestern pond turtle is the only native turtle species in the southern Sierra Nevada. It is found in ponds, lakes, marshes, reservoirs, seasonal standing or slow-moving streams, canals, sloughs, vernal pools, and occasionally in brackish water (Germano and Bury, 2001). Sufficient cover (e.g., vegetation, undercut banks) and basking sites are important components of suitable habitat (Spinks et al. 2003). Suitable habitat is present in Cannell Creek upstream and downstream of the Cannell Creek Siphon and Spillway and in the NFKR. Northwestern pond turtles were first documented in Cannell Creek in 2013, and their continued presence at that same location was confirmed during focused surveys in 2023 (see the BIO-1 Technical Memorandum and the BIO-5 Technical Memorandum provided in Appendix E.2). In addition, biologists noted an incidental sighting in the mainstem of the NFKR during the 2023 fish population assessments, and sightings downstream of the KR3 Powerhouse have also been documented (iNaturalist, 2024).

Critical Habitat

No critical habitat or proposed critical habitat exists within the FERC Project Boundary or in the Project-affected reaches.

<u>Non-Special-status Species</u>

Several non-special-status amphibians and aquatic reptile species occur or potentially occur within the Project-affected reaches. Species observed within the FERC Project Boundary during the 2023 relicensing herpetofauna surveys include Sierran treefrog (*Pseudacris sierra*) and Sierra garter snake. Sierran treefrogs use streams, river backwaters, ponds, and/or other waterbodies for breeding, and adults also spend time in upland habitats. Sierra garter snakes forage in a wide variety of aquatic habitats. California toad (*Anaxyrus boreas halophilus*) has the potential to occur within the FERC Project Boundary because it has been observed south of the FERC Project Boundary in Kernville (iNaturalist, 2024). With a documented occurrence near Headquarters Campground, American bullfrog (*Lithobates catesbeianus*) is the only nonnative amphibian with the potential to occur within the FERC Project Boundary (Scheinberg and Fong, 2024). The FERC Project Boundary has suitable habitat and is within the range of California newt (*Taricha torosa*). However, the occurrence of California newt is unknown, and the nearest documented observation is more than 9 miles east of the FERC Project Boundary in Tyler Creek (Scheinberg and Fong, 2024).

7.4.2. Proposed Environmental Measures

SCE proposes to implement the following environmental measures related to fish and aquatic resources:

- Measure WR-1, *Minimum Instream Flows*
- Measure WR-2, *Ramping Rates*
- Measure WR-4, *Sediment Management Plan*
- Measure WR-5, *Recreational Boating Flows*
- Measure TB-2, *Wildlife Resources Management Plan*
- Measure LU-1, *Project Roads and Facilities Management Plan*
- Measure LU-4, *Oil and Hazardous Waste Storage and Spill Prevention and Cleanup Plan*

The proposed measures and their key features are described in more detail in the sections below. Refer to Appendix E.1 for the complete description of measures SCE proposes to include in any new license issued for the Project.

7.4.3. Potential Project Effects

Under the No-Action Alternative, the Project would continue to operate under the terms and conditions of the current license, as described in Section 5.1. The No-Action Alternative is considered the environmental baseline for this analysis of potential effects. Potential effects on fish and aquatic resources were identified in FERC's SD2 (FERC, 2022) and were based on an evaluation of continued O&M activities described as part of the proposed Project (Section 5.2, *Proposed Action Alternative*). Potential effects identified in FERC's SD2 include the following:

- Continued Project operation on fish habitat and fish resources in the Project impoundment, bypass reaches, and downstream of the powerhouse and on subsistence fishing in the Project-affected area.
- Proposed Project water diversions and instream flow on fish, macroinvertebrates, and aquatic habitat in the Project bypass reaches.
- Proposed Project flow fluctuations on fish resources below Fairview Dam and the powerhouse during Project start-up and shut-down.
- Fairview Dam sandbox flushing on aquatic habitat and aquatic resources within the NFKR Fairview Dam Bypass Reach.
- Fish entrainment at Fairview Dam, Salmon Creek Diversion, and Corral Creek Diversion on fish resources within the FERC Project Boundary.

- Fairview Dam, Salmon Creek Diversion, and Corral Creek Diversion on upstream and downstream fish passage.

- Continued Project operations on western pearlshell mussels within the FERC Project Boundary and Project-affected reaches.

- Continued Project operations on aquatic amphibians and reptiles within the FERC Project Boundary and Project-affected reaches on aquatic and semi-aquatic amphibians and reptiles, including the Fairview slender salamander (*Batrachoseps bramei*), Greenhorn Mountains slender salamander (*Batrachoseps altasierrae*), foothill yellow-legged frog (*Rana boylii*), and western pond turtle.

- Continued and proposed Project O&M on the federally endangered Northern California Distinct Population Segment (DPS) of mountain yellow-legged frog, the federally threatened California red-legged frog (*Rana draytonii*), and the proposed endangered South Sierra DPS of the foothill yellow-legged frog.

The following sections describe the potential effects of the proposed Project on fish and aquatic resources, including the proposed environmental measures. Potential effects on angling and subsistence fishing are described in the *Angling* subsection in Section 7.7.3.2, *Effects of Project Operations on River-Based Recreation Opportunities*, and potential effects on the Fairview slender salamander and Greenhorn Mountains slender salamander are described in Section *7.5.3.1, Terrestrial Amphibians and Reptiles*. Unavoidable adverse effects are discussed at the end of this section and summarized in Section 10.0, *Conclusions and Recommendations*.

7.4.3.1. Effects of Project Operation and Maintenance on Fish and Aquatic Resources

SCE's proposed Project, as described in Section 5.2, *Proposed Action Alternative*, would have minor and/or beneficial effects on aquatic habitat, fish populations, BMI, mollusks, and aquatic amphibians and reptiles. Additionally, the proposed Project may affect, but is unlikely to adversely affect, ESA species present within the FERC Project Boundary and potentially affected stream reaches (Section 7.4.3.2, *Threatened and Endangered Species*). SCE proposes to continue to operate the Project as it is currently operated, with the exception of the proposed measures listed in Section 7.4.2, *Proposed Environmental Measures*, and does not propose to modify any Project facilities (Exhibit C, Section 2.0, *Proposed Construction Schedule*). The potential effects on fish and aquatic resources from ongoing and proposed changes in Project O&M and the proposed environmental measures incorporated as part of the proposed Project are described below.

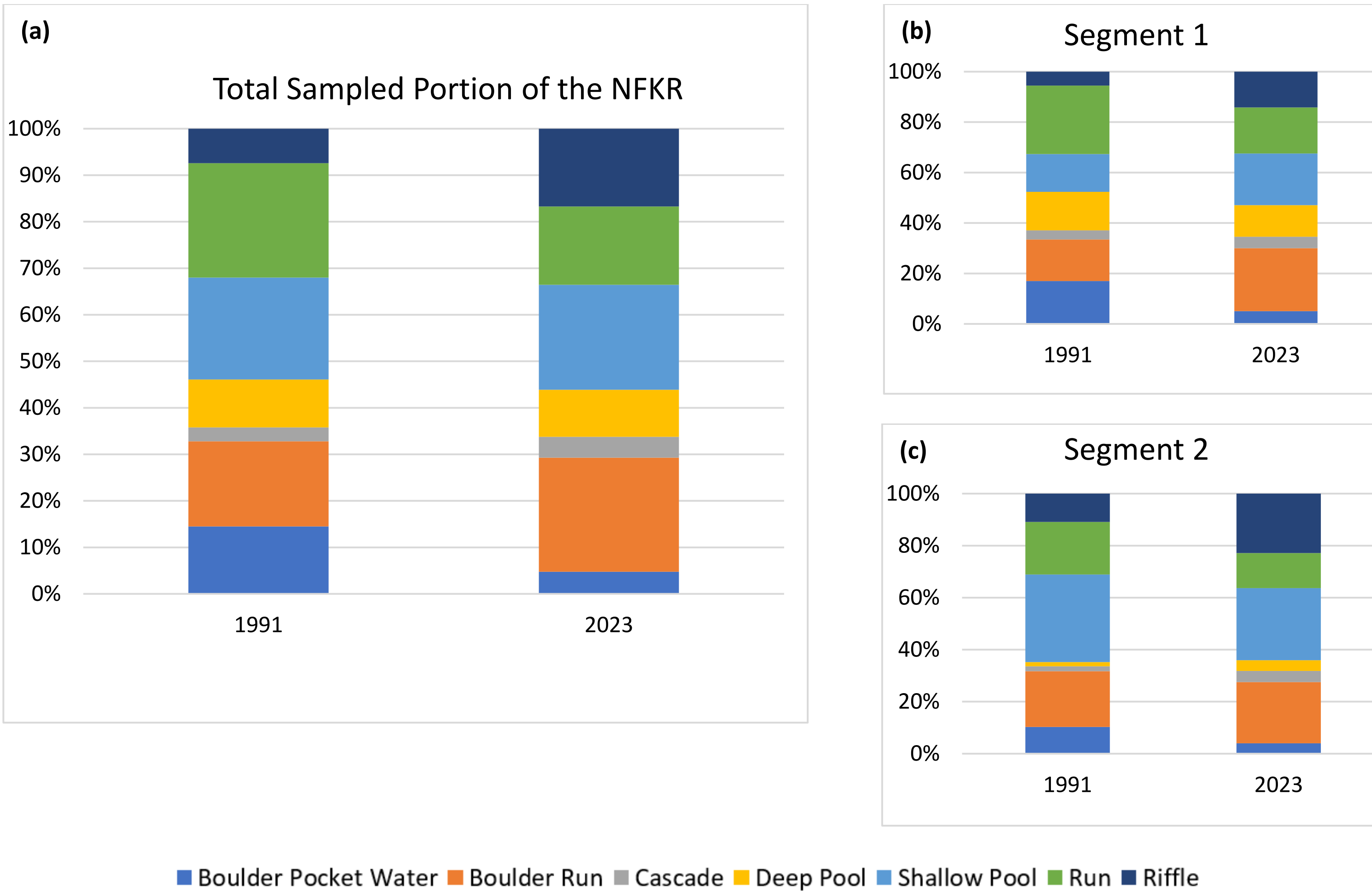
<u>Aquatic Habitat</u>

With implementation of the proposed measures listed in Section 7.4.2, *Proposed Environmental Measures*, proposed Project O&M activities (described in Section 5.2, *Proposed Action Alternative*) would have at most, minor, local, and short-term adverse effects, and are expected to benefit aquatic habitats within Project-affected stream reaches. Specifically, aquatic habitats within Project-affected reaches would be further protected or enhanced by implementation of SCE's proposed measures. Detailed assessments of potential effects on stream habitat, instream flows, and sediment management are described below.

Stream Habitat

Stream habitat within the Fairview Dam Bypass Reach has remained relatively unchanged over the period of the current license, and only minor changes to Project O&M are proposed related to sediment management; these changes are not expected to adversely affect stream habitat conditions at greater than minor, local, and short-term levels.

Habitat typing of the NFKR in 2023 indicated that habitat conditions within Segment 1 and Segment 2 (see Section 7.4.1.1, *Aquatic Habitat*, for a complete description of the segments) were generally consistent with the habitat conditions described by SCE (1991) with few minor differences; the 2023 typing show a higher percentage of boulder run versus boulder pocket water, and a higher percentage of riffles versus runs (Figure 7.4-4). These trends are consistent over the entire sampled portion of the NFKR (Figure 7.4-4) and may reflect tighter delineation (i.e., splitting) of defined units (e.g., short riffles between longer runs). Given that the bypass reaches appear relatively unchanged over the course of the current license, no adverse effects of continued Project O&M activities on stream habitat are expected.



Sources: SCE, 1991; BIO-6 Technical Memorandum, provided in Appendix E.2

NFKR = North Fork Kern River

Figure 7.4-4. Habitat Composition in the North Fork Kern River (a) in the Total Sampled Portion of the North Fork Kern River, (b) between Fairview Dam and Hospital Flat (Segment 1), and (c) between Hospital Flat and the KR3 Powerhouse (Segment 2).

SCE's proposed Measure WR-4 outlines sandbox flushing procedures to pass sediment diverted at Fairview Dam into the flowline back into the Fairview Dam Bypass Reach. Under Measure WR-4, SCE would continue to implement sandbox flushing approximately every 2 weeks when river flows downstream of Fairview Dam exceed 350 cfs. Additionally, to decrease the period between flushing, SCE proposes to routinely inspect the sandbox when flows are below 350 cfs, and if necessary, SCE would drain one or both sides of the sandbox to remove accumulated sediment between July 1 and February 15, or outside the rainbow trout spawning season. Additionally, Measure WR-4 describes sediment management activities at the two smaller diversions—Salmon Creek Diversion and Corral Creek Diversion—when there is a need to periodically remove accumulated sediment from behind the diversions to maintain flows into the diversion infrastructure and MIF release valves.

SCE performed a 5-year *Fairview Dam Sediment Flushing Assessment* in 1997–2001 that measured sediment volumes and characteristics in pools and riffles downstream of Fairview Dam under a regime of weekly flushing when flows were at or above 350 cfs (ENTRIX, 2002). No significant effects on pool habitat conditions, the particle size of sediments in pools, or the quantity of fine sediments deposited in pools as a result of sandbox flushing were observed. SCE subsequently modified the procedure to flush every other week when instream flows were above 350 cfs and conducted an additional 2 years of monitoring with no significant changes in pool depth or bankfull cross-sectional areas observed. Additionally, the spatial distribution of gravel was stable across the monitoring years with no trend toward either coarsening or fining of particle sizes despite year-to-year variability. In addition to the *Fairview Dam Sediment Flushing Assessment* (ENTRIX, 2002), a 2009 study of the sandbox flushing regime found no definitive trend in the proportion of fine sediment (less than 1.0 mm) from the effects of the McNally Fire (2002) and subsequent depositional events (ENTRIX, 2009).

As a result of the increased flushing activities at the sandbox, proposed Measure WR-4 may have a minor, short-term, and local effect on aquatic habitat due to increased turbidity associated with flushing activities. Although small amounts of sand and finer material may be deposited at the outlet of the sandbox at flows less than 350 cfs, these sediment deposits would be localized and would occur outside the typical spawning window for rainbow trout and other fish species known to occur in the Fairview Dam Bypass Reach (Section 7.4.1.2, *Fish Populations*). Sandbox flushing at flows less than 350 cfs would likely be concentrated in late summer or fall based on the flow patterns, and deposited sediment would be distributed by higher naturally occurring flows in the winter and spring, prior to the onset of spawning. See Figure 7.2-4 in Section 7.2.1.2, *Channel Geomorphology*, for the timing and reoccurrence interval of flows greater than 350 cfs. Therefore, any effects of the modified sediment management activities on stream habitat and other aquatic resources would be minor, local, and short-term.

SCE's proposed Measure LU-1 calls for the implementation of required road maintenance activities to reduce erosion and sedimentation into waterways. Implementation of the plan is expected to benefit aquatic habitat by reducing erosion and the delivery of fine sediment to water courses. Proposed Measure LU-1 is a modification of the existing *Erosion and*

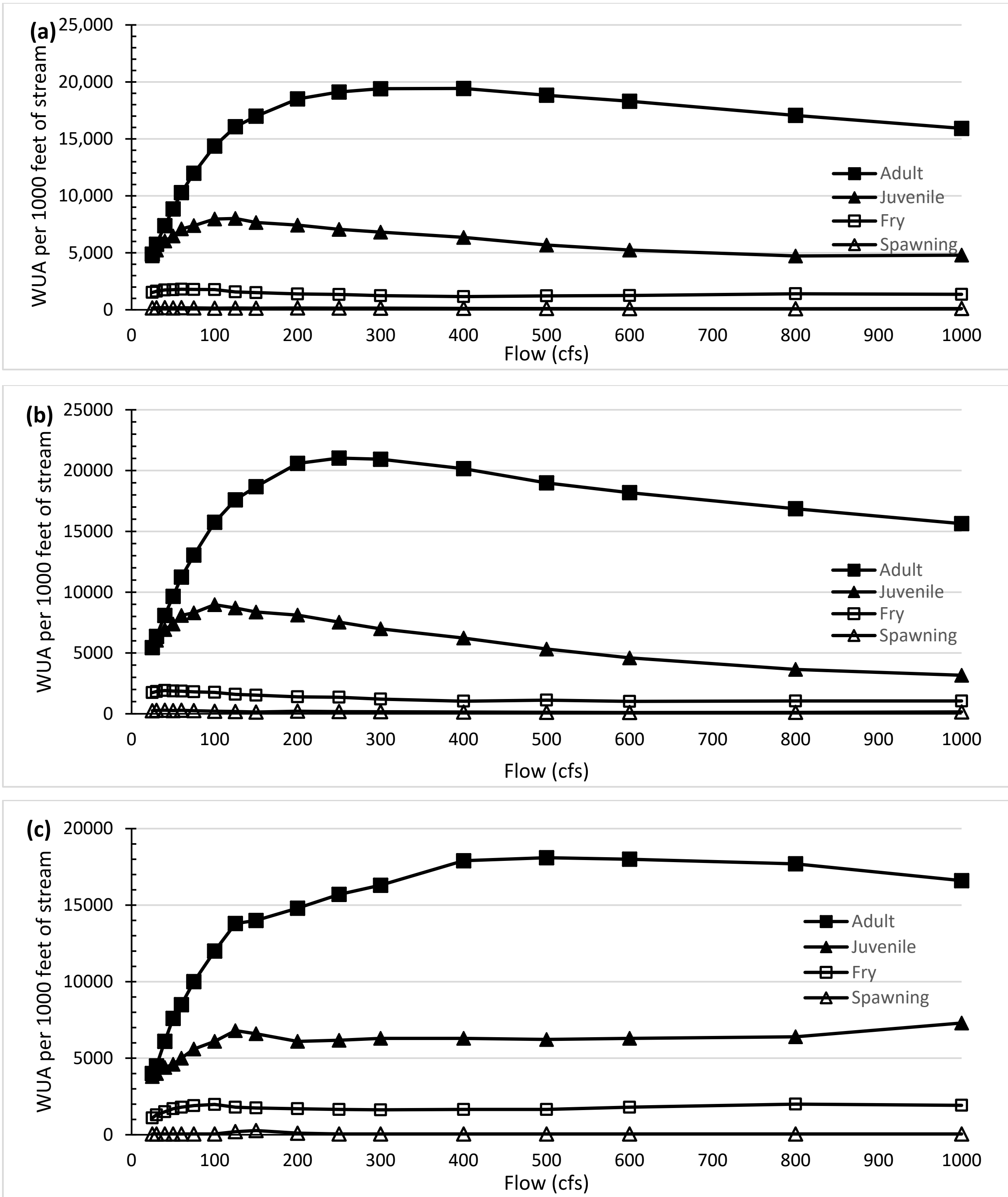
Sediment Management Plan that currently guides O&M activities related to erosion at Project facilities and sedimentation into the Fairview Dam Bypass Reach.

SCE's proposed Measure LU-4 would provide a benefit to aquatic habitat through the inclusion of measures to prevent, control, and clean up spills, and to prevent hazardous leaks into stream channels in the NFKR, Salmon Creek, and Corral Creek.

Instream flows

The proposed Project would benefit streamflow conditions within the Fairview Dam Bypass Reach and would have no effect on stream habitat within the Corral and Salmon Creek Bypass Reaches.

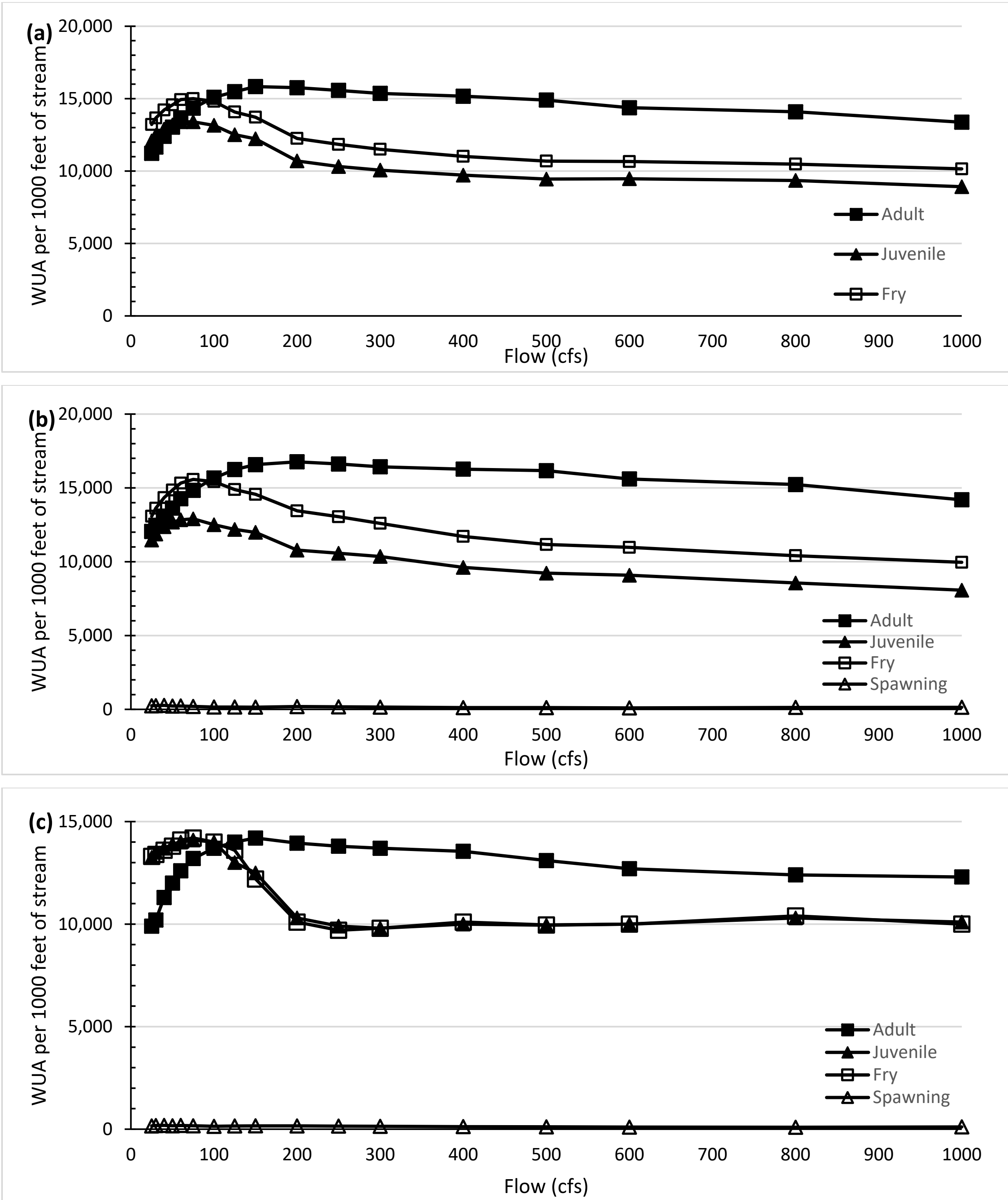
The existing instream flow release requirements were developed to balance the needs of trout and native hardhead and considered results of a prior IFIM study and water temperature modeling completed for the Fairview Dam Bypass Reach (SCE, 1991). The IFIM study found that habitat values for rainbow trout are maximized (greater than 80 percent weighted usable area) at flows greater than 125 cfs for adults, between 50 and 400 cfs for juveniles, and approximately 60 cfs for fry. Relatively little fry or spawning habitat is available at any flow (Figure 7.4-5). Brown trout habitat values are maximized at flows greater than 40 cfs for adults and between 25 and 200 cfs for fry and juveniles (Figure 7.4-6); relatively little spawning habitat is available at any flow.



Source: SCE, 1991

cfs = cubic feet per second; WUA = weighted usable area

Figure 7.4-5. Weighted Usable Area Predicted for Rainbow Trout in the North Fork Kern River from (a) Fairview Dam to the KR3 Powerhouse (Full Reach), (b) Fairview Dam to Hospital Flat (Segment 1), and (c) Hospital Flat to the KR3 Powerhouse (Segment 2)—25 to 1,000 cfs.



Source: SCE, 1991

cfs = cubic feet per second; WUA = weighted usable area

Figure 7.4-6. Weighted Usable Area Predicted for Brown Trout in the North Fork Kern River from (a) Fairview Dam to the KR3 Powerhouse (Full Reach), (b) Fairview Dam to Hospital Flat (Segment 1), and (c) Hospital Flat to the KR3 Powerhouse (Segment 2)—25 to 1,000 cfs.

An additional analysis of the Fairview Dam Bypass Reach was conducted using the California Environmental Flow Framework (CEFF), a framework that provides technical guidance to aid in the development of science-based, ecologically protective environmental flow recommendations for California stream types (see the WR-2 Technical Memorandum in Appendix E.2). The CEFF framework provides information on the expected natural functional flow ranges needed to support ecological functions in rivers. The CEFF natural functional flow metrics do not represent effects or flow recommendations.

SCE identified the following seven overarching ecological management goals from a review of federal, state, and local policies, programs, and plans that are applicable to the NFKR between Fairview Dam and the KR3 Powerhouse (described in the WR-2 Technical Memorandum provided in Appendix E.2):

- Restore the structure and composition of riparian areas.
- Maintain and increase ecosystem and native species distributions in California, while sustaining and enhancing species abundance and richness.
- Maintain and improve ecological conditions vital for sustaining ecosystems in California.
- Maintain and improve ecosystem functions and processes vital for sustaining ecosystems in California.
- Protect and restore cold-water ecosystems.
- Protect and enhance native fish populations and their habitats.
- Identify trout fisheries impaired by dams that could benefit from revised flow regimes and more natural flow regimes.

The CEFF analysis quantifies “natural flows” in streams using the natural functional flow metrics available from the California Natural Flows Database, where natural flows are defined as the expected instream flow in the absence of human modification. The California Natural Flows Database contains the natural functional flow metrics predicted for all stream reaches in California based on data from 1950 to approximately 2014. In the California Natural Flows Database, predicted natural functional flow metrics were calculated using (1) the functional flow metrics from USGS reference gages on California streams with minimal disturbance to natural hydrology and land cover (Falcone et al., 2010), and (2) algorithms described by Patterson et al. (2020) based on the natural stream flow classification for California (Lane et al., 2018). Separate statistical models were then developed to predict the natural functional flow metrics at other stream reaches throughout California. Functional flow metric values were related to watersheds by modeling climactic characteristics following the approach described by Zimmerman et al. (2018). Natural functional flow metrics are used as ecological flow criteria in the CEFF based on the assumption that the range of natural functional flows would maintain the physical, chemical, and biological functions needed by native freshwater species

(Escobar-Arias and Pasternack, 2010; Yarnell et al., 2015), and these functions would be broadly protective of ecosystem needs and achieve ecological management goals (Grantham et al., 2022; CEFWG, 2021a).

Five functional flow components are applicable to California streams, and all were found to be relevant to the NFKR in meeting the seven ecological management goals:

- *Fall-pulse flow* reflects the first major storm event at the end of dry season.
- *Wet-season baseflow* is sustained by overland and shallow subsurface flow in the period between winter storms.
- *Wet-season peak flow* coincides with the largest storms in winter.
- *Spring recession flow* represents the transition from the wet to dry season and is characterized by a steady decline of flows over a period of weeks to months.
- *Dry-season baseflow* is sustained by groundwater inputs to rivers.

Within the CEFF, the range (10th percentile, median, and 90th percentile) of natural functional flows for each metric characterizes the predicted (modeled) flow metrics for the study location of interest. The modeled and observed functional flow metrics were obtained from the California Natural Flows Database Application Programming Interface (CEFWG, 2021b). Although the focus of CEFF is to assess observed functional flow metrics within the reach of interest (e.g., the bypass reach), unimpaired flows were also assessed for comparison. The modeled natural flow (as predicted using the CEFF modeling approach described above) was first compared with the observed unimpaired flows in the Kern River (the flow rate or volume expected to occur in the river system in the absence of diversion) for the period from 1980 through 2020. Then as part of the CEFF, the modeled natural flow was compared with the observed flow within the bypass reach for the same period.[22] Following the CEFF methodologies (CEFWG, 2021a) when comparing observed flows with the modeled natural flows:

- The metric is considered *likely unaltered* if the median observed flow metric is within the 10th and 90th percentile range of the modeled natural flow, and greater than 50 percent of the observations fall inside the 10th to 90th modeled percentile range.
- The observed flow metric is considered *likely altered* if the median observed value falls outside the 10th to 90th modeled percentile range.
- The observed flow metric is considered *indeterminate* if the median observed value falls within the 10th to 90th percentile range, but less than 50 percent of the observed values fall within the 10th to 90th percentile range.

[22] Measured unimpaired flow (USGS gage 11186001) is represented by the sum of flows within the Fairview Dam Bypass Reach (USGS gage 11186000, SCE gage 401) and the diverted flow within the water conveyance system (USGS gage 11185500, SCE gage 402).

No non-flow limiting factors of ecosystem function (i.e. physical, biogeochemical, or biological modifications) were identified for the Fairview Dam Bypass Reach, and the range of natural functional flow metrics is expected to support the ecosystem functions required to achieve the established environmental management goals of the NFKR (see WR-2 Technical Memorandum provided in Appendix E.2).

Natural functional flow metrics predicted by the modeling have the potential to be biased or inaccurate based on the available reference gages used for the model. Therefore, prior to the CEFF assessment of observed bypass flows, the observed unimpaired flows were compared with the modeled flows and were found to be similar (would be considered likely unaltered) (Figures 7.4-7 through 7.4-13) except that the spring recession rate of change is lower (i.e., has a slower downramp of flows) than modeled natural flows (Figure 7.4-12[d]).[23]

Consistent with the CEFF assessment methodology, the observed bypass flows were compared with the modeled flows and also found to be similar across several metrics. Generally, this is because of (1) the limited storage capacity of Fairview Dam impoundment (less than 2 AF) and (2) the limited diversion capacity (600 cfs) relative to peak natural flows in the stream (see Figure 7.3-4 in Section 7.3.1.1, *Water Use and Hydrology*). However, the diversion at Fairview Dam reduces the summer and winter base flows relative to modeled flows, as well as the magnitude of some smaller fall-pulse flows (described in more detail below).

The duration and timing of the fall-pulse flow in the Fairview Dam Bypass Reach are similar to modeled flows and likely unaltered, but the magnitude of the fall-pulse flow is lower than modeled natural flows (Figure 7.4-7). Periods of intense rainfall and large debris flows occur occasionally in the NFKR and fall-pulse flow events carry heavy debris and sediment loads, which can damage infrastructure. Consequently, late summer and early fall storm run-off is not initially diverted under current Project operations in order to protect Project infrastructure (see Section 7.2, *Geologic and Soils Resources*). However, diversion of some of these events reduces the magnitude of these flows downstream of Fairview Dam.

When the Project is diverting water during peak flows or during the spring recession flow, the 600 cfs diversion capacity has a limited effect on flows in the bypass reach. Consequently, wet-season peak flow is likely unaltered; the magnitude, duration, and frequency of 2-, 5-, and 10-year flood events are also similar to modeled natural flows and likely unaltered (Figures 7.4-9 through 7.4-11); and the spring recession magnitude,

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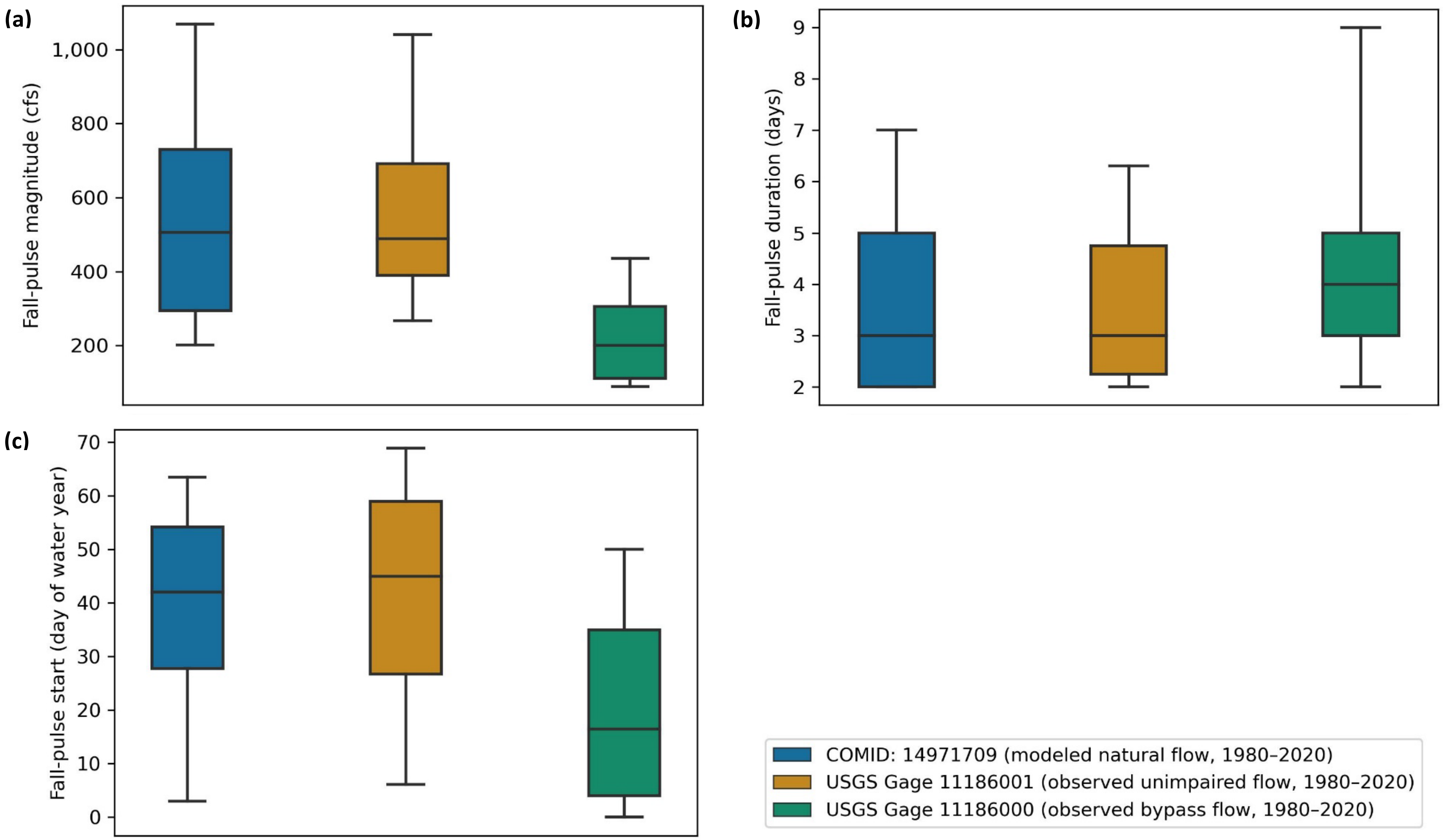
[23] Observed unimpaired wet-season peak flow events (i.e., 2-, 5-, and 10-year flood events) are similar to modeled flows. However, the CEFF model is unable to calculate ranges of magnitudes with the singular observed flows dataset, resulting in one flood recurrence interval, shown as a black line on Figures 7.4-9(a), 7.4-10(a), and 7.4-11(a), whereas the modeled natural flows are derived from an ensemble of models that provide a distribution of flood recurrence intervals (CEFWG, 2021a). Additionally, the lower distribution of flood frequency plots cannot be lower than one, and consequently, some box and whisker plots are missing lower whiskers (e.g., Figures 7.4-9[c], 7.4-10[c], and 7.4-11[c]). Similarly, some plots have identical values for the median, 10^{th}, 25^{th}, 75^{th}, or 90^{th} percentiles and are missing whiskers as a result (Figures 7.4-7[b], 7.4-10[b,c], and 7.4-11[b,c]).

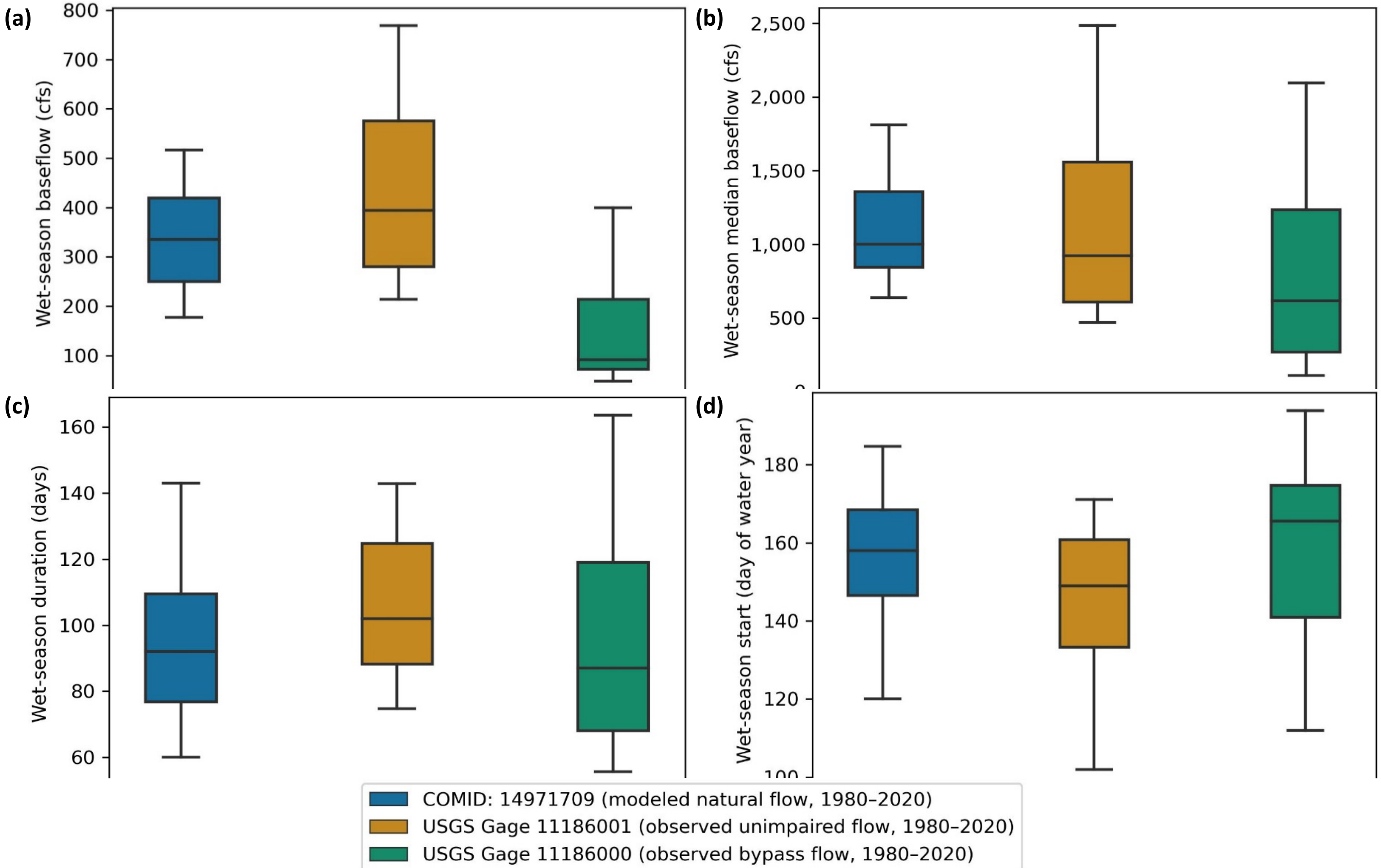
duration, start day, and rate of change are similar to modeled natural flows and likely unaltered (Figure 7.4-12).

The Project does not affect the timing and magnitude of floodplain inundation, which is typically a 5- or 10-year occurrence that occurs at higher flows than the Project is capable of altering (Section 7.2.1.2, *Channel Geomorphology*). While floodplain inundation is likely unaltered, the Fairview Dam Bypass Reach has limited floodplain available in the canyon; the upper section of the reach is characterized by a single narrow canyon and shifts to a split channel farther downstream (Section 7.4.1.1, *Aquatic Habitat*). Current Project operations affect the magnitude of flow in the Fairview Dam Bypass Reach, and consequently likely alter baseflows during the wet and dry seasons and the timing of the dry season. Although the duration and timing of the wet season were identified as likely unaltered compared with modeled natural flows (Figure 7.4-8[c,d]), the wet-season baseflow and median baseflow in the Fairview Dam Bypass Reach (characterized as the 10th and 50th percentiles of daily flows during the wet season, respectively) are lower than modeled natural flows (Figure 7.4-8[a,b]; CEFWG, 2021a). Similarly, dry-season baseflow and high baseflow, characterized as the 50th and 90th percentiles of daily flows during the dry season, respectively, are also lower than modeled natural flows (CEFW, 2021; Figure 7.4-13[a,b]). The duration and start of the dry season were identified as likely unaltered from modeled natural conditions (Figure 7.4-13[c, d]).



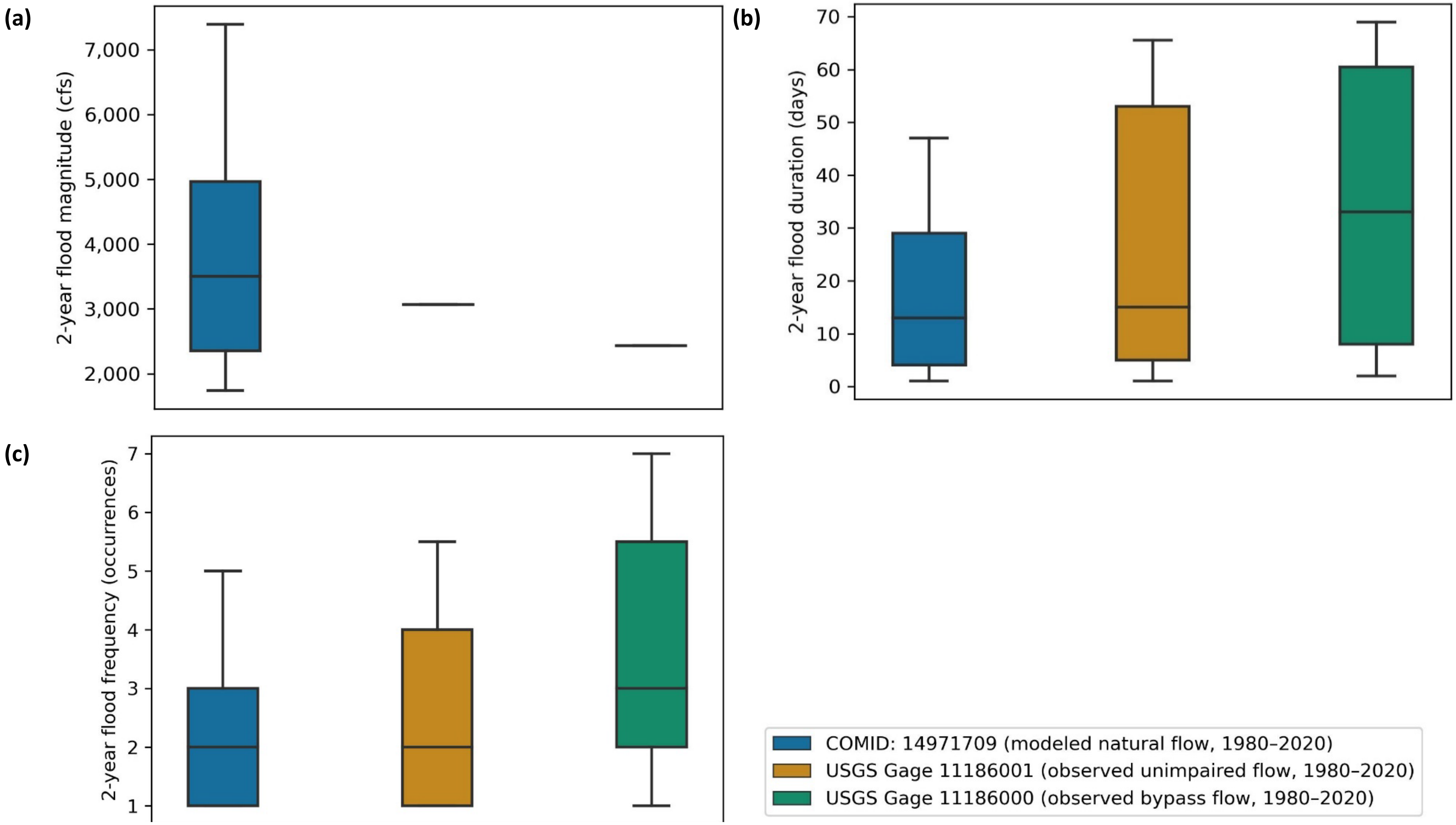
cfs = cubic feet per second

Figure 7.4-7. Fall-pulse Flow (a) Magnitude (cfs), (b) Duration (days), and (c) Start (day of water year) for Modeled Natural Flow Just Downstream of Fairview Dam, Observed Unimpaired Flow, and Observed Flow in the Fairview Dam Bypass Reach (the range of the 25th percentile, median, and 75th percentile are shown in colored boxes; the 10th and 90th percentiles are shown in the black lines).



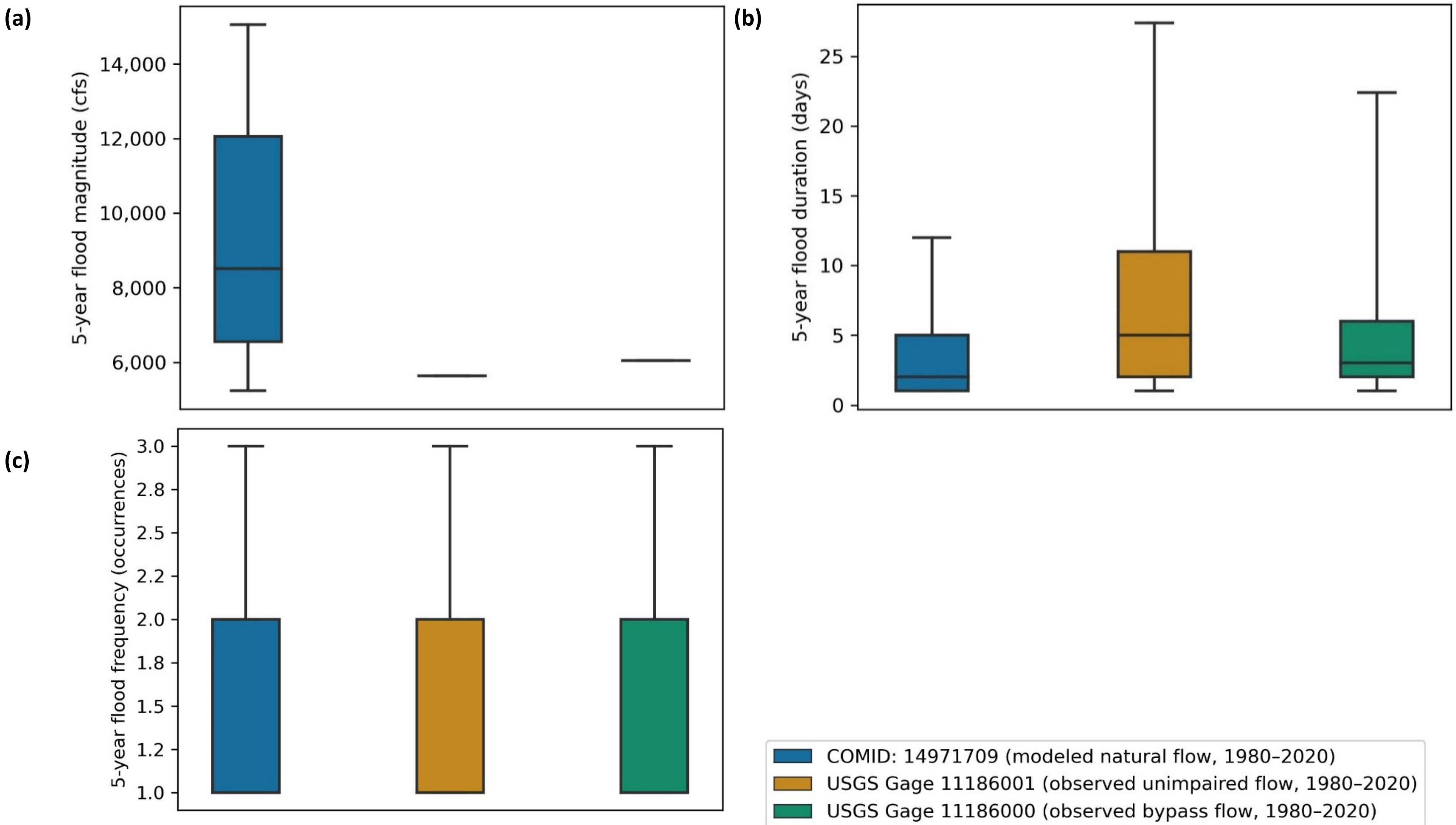
cfs = cubic feet per second

Figure 7.4-8. Wet-season (a) Baseflow (cfs), (b) Median Baseflow (cfs), (c) Duration (days), and (d) Start (day of water year) for Modeled Natural Flow Just Downstream of Fairview Dam, Observed Unimpaired Flow, and Observed Flow in the Fairview Dam Bypass Reach (the range of the 25th percentile, median, and 75th percentile are shown in colored boxes; the10th and 90th percentiles are shown in the black lines).



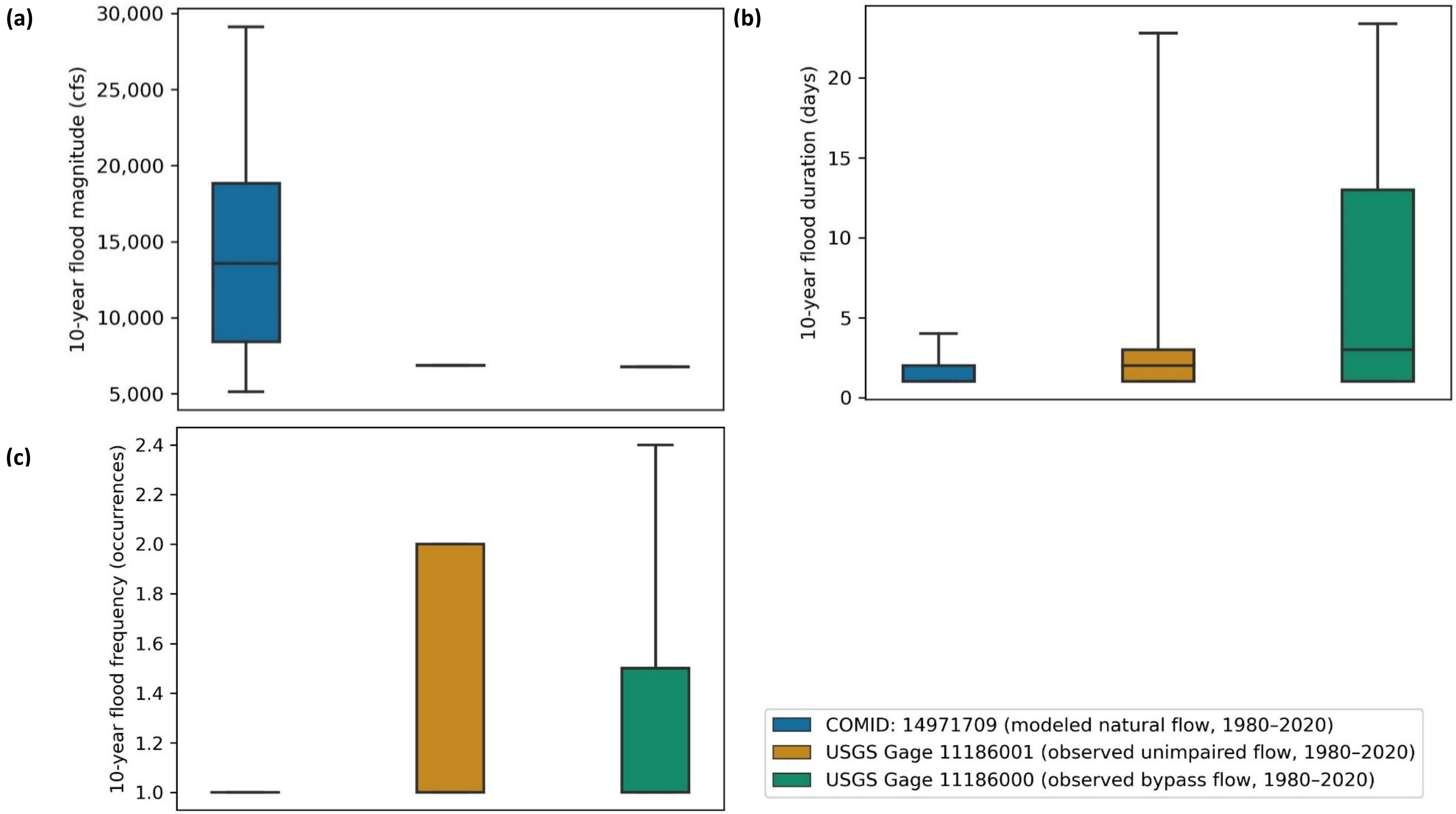
cfs = cubic feet per second

Figure 7.4-9. Two-year Flood (a) Magnitude (cfs), (b) Duration (days), and (c) Frequency (number of occurrences) for Modeled Natural Flow Just Downstream of Fairview Dam, Observed Unimpaired Flow, and Observed Flow in the Fairview Dam Bypass Reach (the range of the 25th percentile, median, and 75th percentile are shown in colored boxes; the10th and 90th percentiles are shown in the black lines).



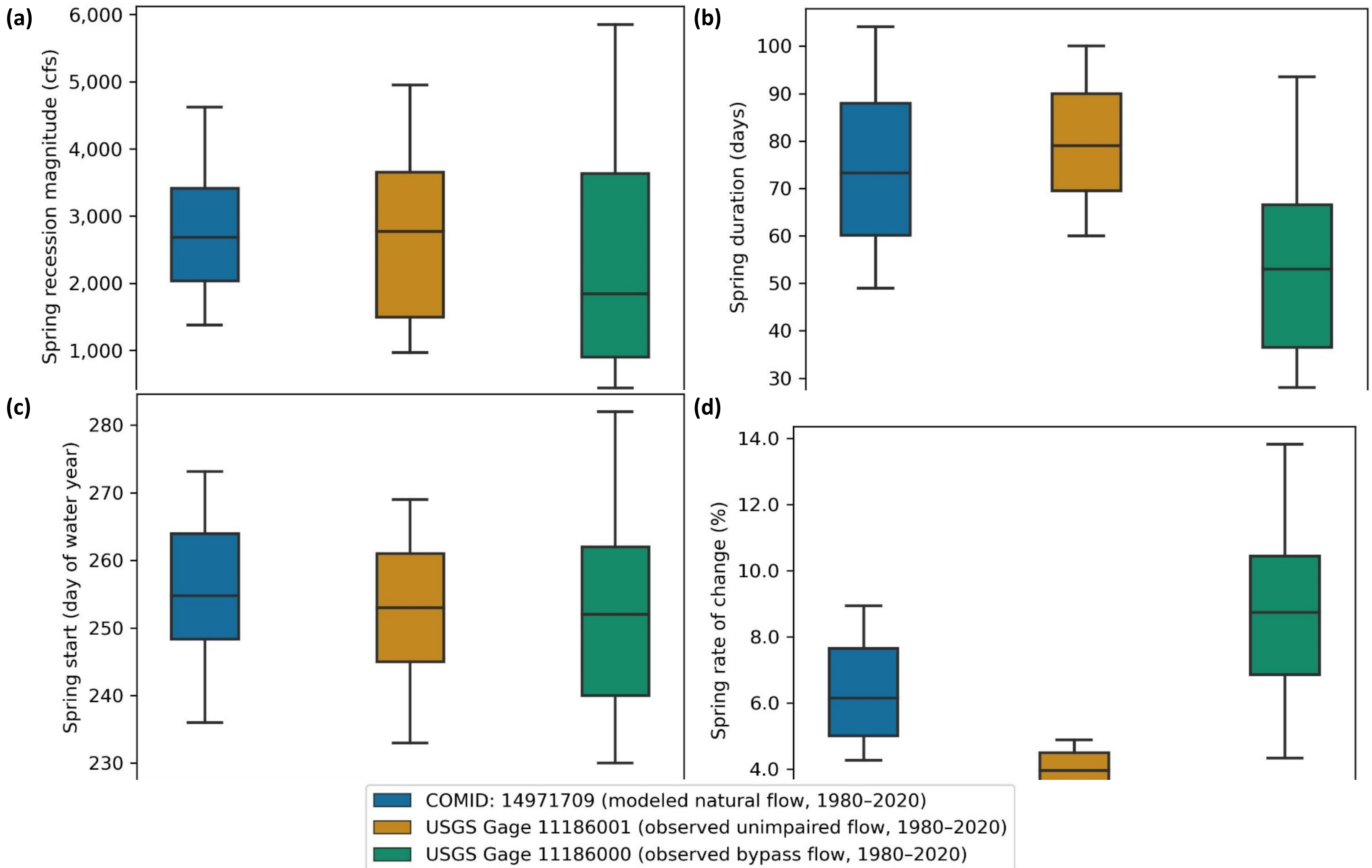
cfs = cubic feet per second

Figure 7.4-10. Five-year Flood (a) Magnitude (cfs), (b) Duration (days), and (c) Frequency (number of occurrences) for Modeled Natural Flow Just Downstream of Fairview Dam, Observed Unimpaired Flow Measured Upstream of Fairview Dam, and Observed Flow in the Fairview Dam Bypass Reach (the range of the 25th percentile, median, and 75th percentile are shown in colored boxes; the10th and 90th percentiles are shown in the black lines).



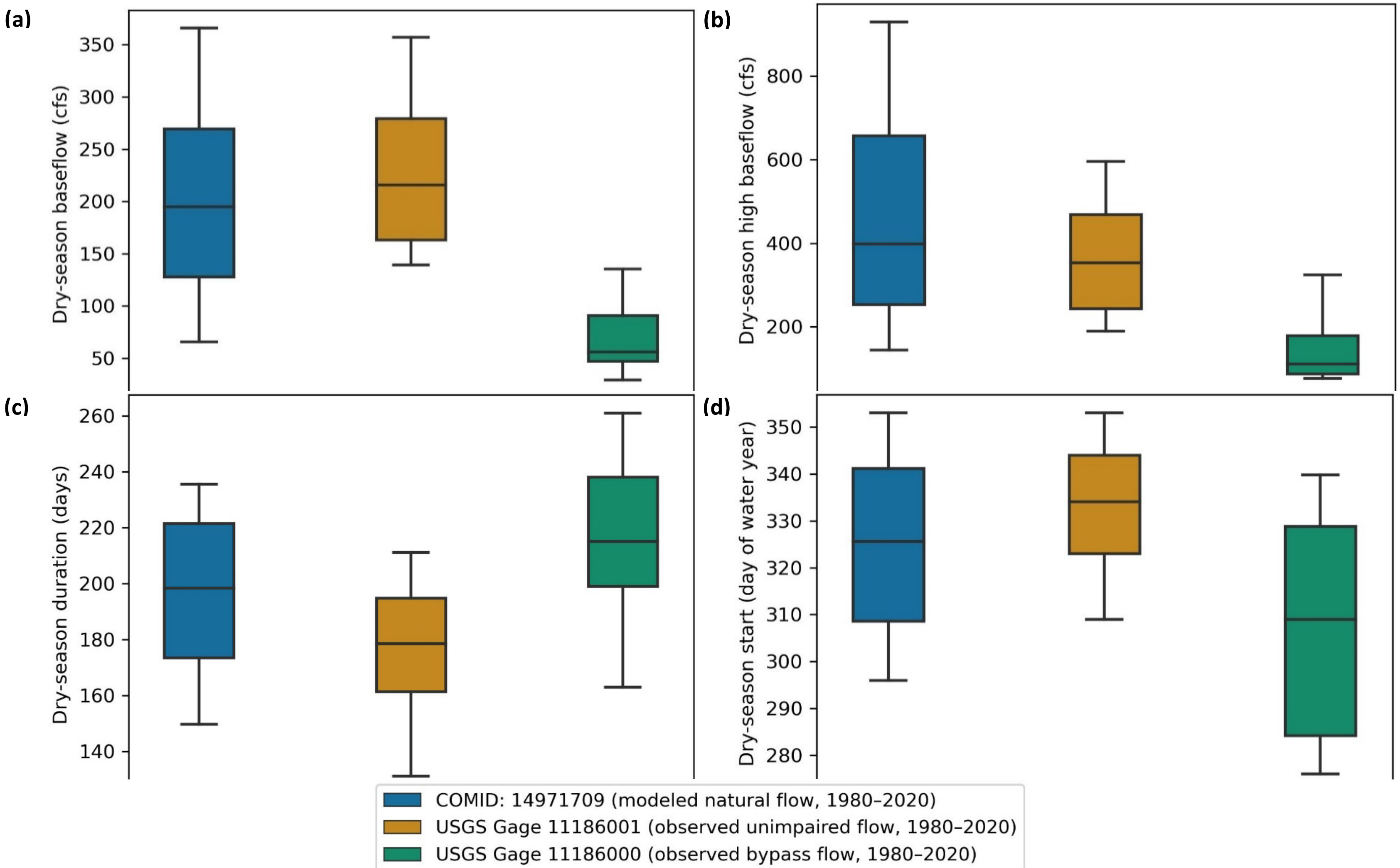
cfs = cubic feet per second

Figure 7.4-11. Ten-year Flood (a) Magnitude (cfs), (b) Duration (days), and (c) Frequency (number of occurrences) for Modeled Natural Flow Just Downstream of Fairview Dam, Observed Unimpaired Flow, and Observed Flow in the Fairview Dam Bypass Reach (the range of the 25th percentile, median, and 75th percentile are shown in colored boxes; the10th and 90th percentiles are shown in the black lines).



cfs = cubic feet per second

Figure 7.4-12. Spring Recession (a) Flow Magnitude (cfs), (b) Duration (days), (c) Start (day of water year), and (d) Rate of Change (%) for Modeled Natural Flow Just Downstream of Fairview Dam, Observed Unimpaired Flow, and Observed Flow in the Fairview Dam Bypass Reach (the range of the 25th percentile, median, and 75th percentile are shown in colored boxes; the10th and 90th percentiles are shown in the black lines).



cfs = cubic feet per second

Figure 7.4-13. Dry-season (a) Baseflow (cfs), (b) High Baseflow (cfs), (c) Duration (days), and (d) Start (day of water year) for Modeled Natural Flow Just Downstream of Fairview Dam, Observed Unimpaired Flow, and Observed Flow in the Fairview Dam Bypass Reach (the range of the 25th percentile, median, and 75th percentile are shown in colored boxes; the10th and 90th percentiles are shown in the black lines).

Even with some differences between regulated flows and modeled natural flows under CEFF, the proposed Project would continue to allow for all five functional flows, such as the fall-pulse flow events, which mobilize and sort fine sediment and organic material; wet and dry seasons baseflows, which maintain longitudinal connectivity and habitat availability for trout and native species during the dryer months; and wet season peak and spring recession flows, which allow for scouring and deposition of sediment and large wood in the channel and floodplains, and support fish spawning and rearing.

Additionally, with the implementation of environmental measures described in Section 7.4.2, *Proposed Environmental Measures*, the proposed Project would benefit stream habitat for aquatic species by altering the spring and summer MIFs to be more aligned with the shape of the natural hydrograph, shifting water temperatures to be more suitable for native fish species, and continuing to regulate flow fluctuations as a result of Project O&M, as described in more detail below.

Measure WR-1 would maintain MIF releases in Salmon Creek and Corral Creek Bypass Reaches. Proposed Measure WR-1 would also modify current flow conditions downstream of Fairview Dam to enhance conditions for native species by shifting the timing of greater MIFs from the summer months of July and August to the spring months of May and June to align with the spring snowmelt and the natural hydrograph (Figure 7.3-10 in Section 7.3.3.1, *Water Use and Hydrology*). Because riverine ecological processes are driven by the annual hydrograph, this measure's shift in flow timing would benefit aquatic resources by providing flows that mimic the natural conditions to which native species are adapted. Therefore, implementation of Measure WR-1 is expected to benefit native species and their habitats within the Fairview Dam Bypass Reach.

SCE's proposed Measure WR-2 would continue to protect aquatic species in the NFKR by continuing the current ramping requirement at Fairview Dam when making changes to flows diverted into the Project water conveyance system. Measure WR-2 would continue to restrict the rate of change (i.e., ramping) when increasing diversions into the Project water conveyance system, which effectively restricts the rate of change when decreasing flows within the Fairview Dam Bypass Reach. The proposed Project would include a maximum of 30 percent change of the existing flow per half-hour when decreasing flows downstream of Fairview Dam.

Project operations and current whitewater boating flow releases, as described in Section 5.1, *No-Action Alternative*, also influence the magnitude of flow variability downstream of KR3 Powerhouse during changes to diversion rates. Because water travels more rapidly through the 13-mile flowline than through the 16-mile bypass reach, an increase in the flow downstream of Fairview Dam may result in a minor, localized, short-term decrease in flow downstream of the KR3 Powerhouse a few hours following the change. This travel-time effect may have a duration of a few hours until the increase in flow at Fairview Dam reaches the KR3 Powerhouse. Conversely, a decrease in flow at the Fairview Dam Bypass Reach may result in a minor, localized, short-term increase in flow downstream of the KR3 Powerhouse a few hours later. Although the travel-time effect is often masked by natural fluctuations in flow, such as daily flow fluctuations during the snowmelt period, continuing the ramping rate requirements would also reduce any adverse effects due to flow fluctuations on aquatic beneficial uses downstream of KR3 Powerhouse. The streamflow travel-time assessment is ongoing and will be completed prior to the FLA.

Additionally, SCE's proposed Measure WR-5 would enhance current flow conditions by including a spring-pulse flow on the ascending limb of the natural hydrograph. Although the Project has no significant storage capacity and spills regularly in the spring, the addition of full natural flows in spring would enhance flow conditions for native species downstream of Fairview Dam and would reduce the daily fluctuations resulting from the current whitewater boating flows condition, which would also benefit native species in the reach. Proposed Measure WR-5 would result in benefits for aquatic communities through a more consistent water temperature and fewer disruptions in the natural cues for invertebrate life cycles and for fish migration, spawning, and egg hatching. Therefore, implementation of Measure WR-5 is expected to benefit native species and their habitat within the Fairview Dam Bypass Reach.

Therefore, given there are no proposed changes to instream flow releases within the Salmon Creek and Corral Creek Bypass Reaches, and with implementation of the environmental measures, the proposed Project would result in beneficial streamflow conditions within the Fairview Dam Bypass Reach and no adverse effect on stream habitat within the Corral and Salmon Creek Bypass Reaches and downstream of KR3 Powerhouse.

Fish Populations

With implementation of the environmental measures listed in Section 7.4.2, *Proposed Environmental Measures*, proposed Project O&M activities (described in Section 5.2, *Proposed Action Alternative*) would benefit fish populations. Detailed assessments of potential effects on fish populations and their habitats are described below.

Water Temperature

The proposed Project is expected to benefit native transitional zone fish species such as hardhead within the lower portions of the Fairview Dam Bypass Reach and maintain habitat for recreational trout species within the upper portions of the Fairview Dam Bypass Reach.

Water temperature and water quality affect the distribution of fish species in the NFKR. Stream temperatures are generally cold upstream of Fairview Dam and increase downstream (Section 7.3.3.2, *Water Quality*). The Project supports coldwater (i.e., trout) and transitional zone (i.e., pikeminnow–hardhead–sucker) fish assemblages both upstream and downstream of Fairview Dam, with a shift to more of a transitional zone assemblage farther downstream (Stillwater Sciences and ERM, 2024; see Table 7.4-2). The Fairview Dam Bypass Reach also contains highly oxygenated water levels that support both coldwater and transitional zone fish species (Section 7.3.1.2, *Water Quality*).

SCE's proposed Measure WR-1 would enhance current habitat conditions downstream of Fairview Dam for native fishes by shifting the timing of greater MIFs from the summer months of July and August to the spring months of May and June to align with the spring snowmelt and the natural hydrograph (Figure 7.3-10 in Section 7.3.3.1, *Water Use and Hydrology*). This modified release schedule would enhance water temperatures for native cyprinids, including hardhead, by slightly increasing water temperatures into more suitable ranges in the lower portions of the Fairview Dam Bypass Reach during the summer months. Hardhead prefer water temperatures ranging from 24 to 28 °C and persist in streams where summer mean water temperatures exceed 18 °C (Knight, 1985, as cited in Moyle, 2002; Stillwater Sciences, 2008).

Higher instream flows moderate temperatures by increasing the time it takes the water volume in the channel to heat. Shifting the peak base flows from summer to spring, in alignment with the natural snowmelt period, is expected to result in warmer summer water temperatures within the lower portions of the Fairview Dam Bypass Reach. Modeling results from the ENTRIX temperature study found that the daily mean water temperatures upstream of Fairview Dam was frequently above 20 °C in the summer, and when upstream water was slightly below 20 °C, water temperatures would exceed 20 °C several miles downstream of Fairview Dam (ENTRIX, 2003). The water temperature model results indicate that water temperatures in August would increase up to 1 °C under proposed Measure WR-1, and warmer water temperatures would also likely be observed farther upstream than if flows remained at 130 cfs (Figures 7.3-11 through 7.3-13 in the *Temperature* subsection of Section 7.3.3.2, *Water Quality*; ENTRIX, 2003). These slightly warmer water temperatures would follow patterns that are associated with the natural hydrograph and are expected to benefit native transitional zone fish species, particularly hardhead.

Upstream Passage

The proposed Project would have no effect on passage conditions in the Fairview Dam, Corral Creek, or Salmon Creek Bypass Reaches (see the *Passage Barriers* subsection in Section 7.4.1.2, *Fish Populations,* for a description of passage barriers).

The existing fish ladders adjacent to Fairview Dam were intentionally closed in 1997 to protect native Kern River rainbow trout in the upper basin by denying upstream migration to predatory Sacramento pikeminnow and nonnative rainbow and brown trout (Stephens et al., 1995; FERC Order 79 FERC ¶ 62,113 [1997], *Order Approving Plan to Close Fish Ladders at Fairview Dam*; Exhibit A, Section 1.1.1, *Fairview Dam*). These ladders would remain closed to fish traveling upstream in the NFKR.

Naturally occurring low-flow barriers are present in Salmon and Corral Creeks just upstream of their confluences with the NFKR, and these intermittent tributaries are primarily fishless upstream of the downstream-most barrier (see the *Passage Barriers* subsection in Section 7.4.1.2, *Fish Populations*).

Downstream Passage and Entrainment Potential

With implementation of the environmental measures listed in Section 7.4.2, *Proposed Environmental Measures*, the proposed Project would have no effect on, and may benefit, fish movement downstream of Fairview Dam.

Under the No-Action Alternative, there is potential for downstream movement of fish at Fairview Dam (e.g., migratory or dispersion) to the NFKR downstream of Fairview Dam, and some potential for movement into the water conveyance system. Water is diverted from the NFKR on the east abutment of Fairview Dam. Prior to entering the water conveyance system, fish would first encounter the intake structure, which is a concrete wall composed of eight square openings along the bottom of the riverbed. Within the intake structure, fish can either (1) continue through one of two slide gates that provide the MIFs downstream of Fairview Dam or (2) navigate through the trash rack.

The trash racks provide a 2-inch porous barrier that would restrict or deter passage by some fish. Given the maximum intake volumes, riverine/run-of-river system, and size of the intake at the trash racks, it is unlikely that fish would be involuntarily entrained into the flowline intake based on intake velocities; however, fish that do move through the trash rack would travel along a 420-foot-long flume before entering the sandbox. The slope of this flume results in velocities that exceed juvenile to most adult fish swim speeds, thus preventing most fish from returning upstream to the intake. Within the sandbox, low water velocities (less than 1 foot per second[24]) would allow fish to swim about freely.

The sandbox includes fish screens at the downstream end to restrict entrainment into the flowline. Eight fixed barrier vertical screens (approximately 12.1 feet by 6.7 feet and consisting of steel vertical slats spaced 5/8 inches apart) cover the entrance to the Project flowline from the sandbox.[25]

The screens were found to effectively exclude fish greater than 4 inches (102 mm) in length from entering the flowline; however, smaller fish may be able to fit through the 5/8-inch spacing between the screens before continuing along the 13-mile flowline toward the KR3 Powerhouse. The effectiveness of the fish screens was evaluated twice in 1965 following installation. The screens were found to effectively exclude the majority of juvenile and adult fish (greater than 4 inches) from passing into the flowline (84.5 percent effective to 99.5 percent effective) but were less effective with smaller fish (6 percent to 78 percent effective) (SCE, 1991; FERC and Forest Service, 1996). Fish within the sandbox would be returned to the NFKR via the sandbox slide gate during flushing activities.

Fish historically observed in the vicinity of Fairview Dam include Sacramento sucker, rainbow trout, and Sacramento pikeminnow. Sacramento sucker and Sacramento pikeminnow are native to the Kern River, whereas rainbow trout include nonnative hatchery-released fish, or naturalized fish. CDFW currently stocks rainbow trout upstream of Fairview Dam weekly during the summer and on alternate weeks during the winter. Between 2001 and 2020, an average of 12,500 rainbow trout were released in the NFKR annually just upstream of Fairview Dam; stocked fish upstream of Fairview Dam have averaged over 10 inches in length.

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[24] Under maximum capacity (i.e., 600 cfs), calculated approach velocity at the fish screen is 0.9 foot per second.

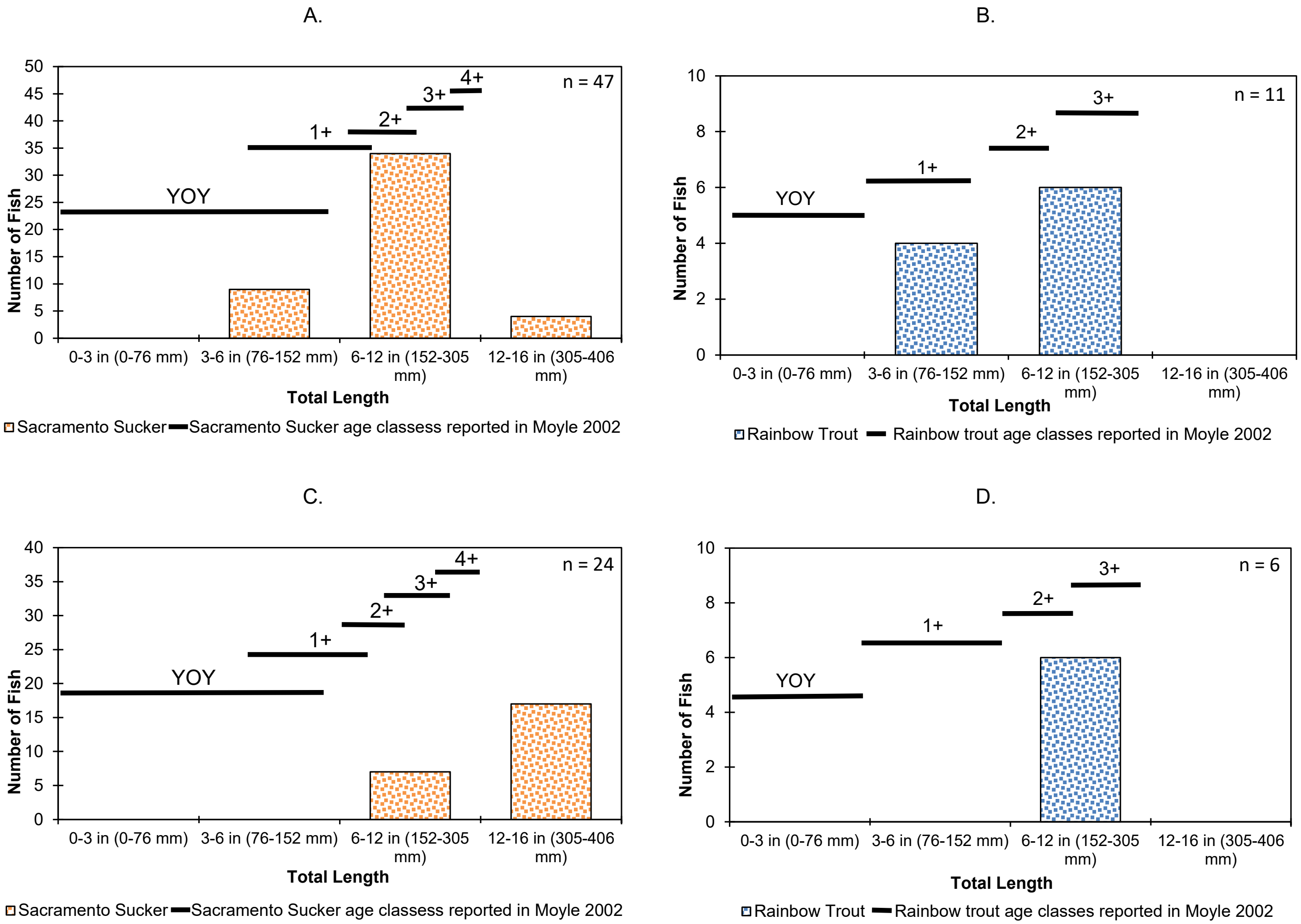
[25] Detailed configurations of Fairview Dam and sandbox will be included in Exhibit F of the FLA.

Of the two species observed upstream of Fairview Dam in 2023, juvenile rainbow trout less than 4 inches in length are believed to be most susceptible to entrainment into the flowline. This is due to Sacramento suckers' preference for benthic zones compared with rainbow trout's tendency to swim more freely throughout the water column and to use structures for cover. Juvenile suckers, if entrained at the diversion trash racks, would likely seek cover along the bottom sediments within the sandbox. Juvenile rainbow trout may seek refuge from larger predatory fish behind the screen structures, if their smaller size allows for passage, which could result in entrainment into the flowline.

Sacramento suckers and rainbow trout were identified during direct observation surveys conducted in October 2023 approximately 1.5 miles and 3.5 miles upstream of Fairview Dam. Although CDFW planted this reach with rainbow trout on two occasions in September 2023, Sacramento suckers were the most abundant species observed at both sites during the October 2023 surveys. No YOY rainbow trout and no Sacramento pikeminnow were observed at either site in 2023. Prior stream surveys had also observed Sacramento pikeminnow, which were the most abundant species observed in 2016 at the Above Fairview Dam monitoring site.

Forty-seven suckers were observed at the site 1.5 miles upstream of Fairview Dam, ranging from 3 to 16 inches (76 to 406 mm) in total length, likely representing age classes from YOY through age 4+. Rainbow trout observed at this site (n=11) included juveniles/adults (age 1 to 3+) with total lengths ranging from 3 to 12 inches (76 to 305 mm). Above Johnsondale Bridge (3.5 miles upstream of Fairview Dam), 24 Sacramento suckers were observed, ages 1 to 4+ ranging from 6 to 16 in (152 to 406 mm) in total length. No YOY were observed. The six rainbow trout observed fell within the 6- to 12-inch (152 to 305 mm) size bin and were likely age 2 to 3+. Fish size distribution at two sites upstream of Fairview Dam is shown in Figure 7.4-14.

Additional preliminary observations from Stillwater Sciences in 2021 within the Fairview Dam impoundment pool included 33 Sacramento suckers ranging from 11.4 to 19.3 inches (290 to 490 mm) and 8 rainbow trout ranging from 8.9 to 15.2 inches (225 to 387 mm), which is generally consistent with 2023 survey observations at the nearby stream sites above the pool. Although considered possible, there are no known observations of fish within the sandbox during routine facility inspections by SCE staff or during other incidental surveys (including a visual survey by fish biologists during the 2023 fish monitoring effort).



mm = millimeters; YOY = young-of-year

Figure 7.4-14. Age-class Distribution of (a) Sacramento Sucker Above Fairview Dam (1.5 miles upstream of Fairview Dam), (b) Rainbow Trout Above Fairview Dam (1.5 miles upstream of Fairview Dam), (c) Sacramento Sucker Above Johnsondale Bridge (3.5 miles upstream of Fairview Dam), (d) Rainbow Trout Above Johnsondale Bridge (3.5 miles upstream of Fairview Dam).

SCE's proposed Measure WR-4 outlines sandbox flushing procedures to pass sediment diverted at Fairview Dam into the flowline back into the Fairview Dam Bypass Reach. SCE currently flushes the sandbox every 2 weeks when river flows downstream of Fairview Dam exceed 350 cfs. The Project operates in a run-of-river mode, with essentially no storage, and flows in the Fairview Dam Bypass Reach are subject to inflows from the NFKR upstream of the Project and SCE's diversion for power generation. Mean daily flows are typically above 350 cfs between March and July (WR-2 Technical Memorandum provided in Appendix E.2). Under Measure WR-4, SCE would continue to implement sandbox flushing approximately every 2 weeks when river flows downstream of Fairview Dam exceed 350 cfs. Additionally, to decrease the period between flushing, SCE proposes to routinely inspect the sandbox when flows are below 350 cfs, and if necessary, SCE would drain one or both sides of the sandbox to remove accumulated sediment between July 1 and February 15, or outside the rainbow trout spawning season. The increased flushing frequency would decrease any holding time for fish within the sandbox.

Entrainment Survival

With the exception of potential predation of smaller fish by larger fish within the sandbox, there are no features identified along the 13-mile flowline that would result in fish mortality. Fish that move into the water conveyance system and return to the NFKR downstream of Fairview Dam during sandbox flushing activities are expected to survive.

Several factors can induce injury or mortality to fish that pass through hydroelectric turbines, including (1) pressure changes within the turbine that may be several times greater than atmospheric pressure and then drop suddenly to below atmospheric pressure; (2) cavitation, or the formation of vapor bubbles that collapse violently; (3) shear stress, a force parallel to the fish's body that is generated at the point where two bodies of water with different velocities meet; (4) turbulence or irregular water movement that can induce injury or disorientation; (5) strikes with runner blades, stay vanes, and other hard structures; and (6) grinding that results from squeezing through narrow gaps between fixed and moving structures (Cada, 2001). However, studies indicate that most injury and mortality occur in the immediate vicinity of the turbine runner; injury and mortality may result from direct contact with the runner blades or exposure to the hydraulic conditions in close proximity to the blades (Ploskey and Carlson, 2004).

Fish survival and turbine strike rates at Francis turbines are most strongly determined by the peripheral velocity of the turbine (Eicher et al., 1987). USACE (1991, as cited in Cook et al., 1997) developed an equation to estimate the probability of a Francis turbine striking a fish:

$$P = (N*n*L*\cos\alpha) / (60*Vr)$$

where:

P =	Probability of a strike (%)	
N =	Unit speed (rotations per minute)	600
n =	Number of blades	13
L =	Fish length (feet)	0.25 to 1.61 feet (3 to 19 inches [76 to 490 mm])
α =	Angle between entrance velocity and a line tangent to the turbine runner	28 degrees (0.4887radians)
Vr =	Radial water velocity (feet per second) = Q/A_{Tip}	179.90
	and where:	
	Q = flow	300 cfs
	A_{Tip} = swept area of runners	19 square feet
	and where:	
	$A_{Tip} = \prod(R^2-r^2)$	
	and where:	
	R = Turbine radius (outer)	2.86 feet
	r = Turbine radius (inner)	1.15 feet

Using this equation and given that the existing fish screens preclude fish over approximately 4 inches (102 mm) from entering the flowline, survival of fish smaller than 4 inches through the KR3 Francis turbines would be 97.6 percent or better (Table 7.4-8). Fish that survive passage through the turbine would be released into the NFKR through the KR3 Powerhouse tailrace.

If the existing screens within the sandbox were removed, or larger fish somehow got past the screens, fish found in the vicinity of the intake structure at Fairview Dam (lengths ranging from 3 to 19.3 inches [77 to 490 mm]) would still have relatively high survival rates (88.5 to 98.2 percent).

Table 7.4-8. Kern River No. 3 Hydroelectric Project Powerhouse Turbines Probability of Fish Strike and Survival Rates

Fish Size (inches)	Probability of Strike (P)	Probability of Survival (S)
≤4	≤2.38%	≥97.6%
3	1.80%	98.2%
19.3	11.47%	88.5%

Because entrainment of fish is expected to be low, and because survival of entrained fish is expected to be high, the continuation of Project O&M would have no effect on fish populations upstream of Fairview Dam, and the increased flushing activities would benefit any fish that had moved into the sandbox. Therefore, the proposed Project would have no adverse effect on, and may benefit, fish populations at Fairview Dam.

Spawning and Recruitment

With implementation of the environmental measures listed in Section 7.4.2, *Proposed Environmental Measures*, the proposed Project would have no adverse effect on and would benefit spawning success and recruitment for trout and native fish species within bypass reaches.

Because the Salmon Creek and Corral Creek Bypass Reaches are intermittent and fishless (Section 7.4.1.1, *Aquatic Habitat*), the proposed Project would have no effect on fish or fish habitat. CDFW manages the NFKR upstream and downstream of Fairview Dam as a put-and-take trout fishery and annually stocks an average of 65,800 catchable-sized trout between Brush Creek and Riverside Campground. Given the large number of stocked fish, composition upstream and downstream of Fairview Dam is influenced by the CDFW stocking (see the *Fish Stocking* subsection in Section 7.4.1.2, *Fish Populations*), but there are also signs of natural spawning by naturalized trout populations (historically stocked, non-sterile trout).

There are several environmental factors that affect the spawning success of trout, including stream flows, spawnable gravel deposits, water temperature, and dissolved oxygen. The NFKR has suitable water quality conditions for spawning and rearing (see the *Aquatic Habitats* subsection in Section 7.4.3.1, *Effects of Project Operation and Maintenance on Fish and Aquatic Resources*); however, the natural dynamics of the NFKR limit spawning gravel deposits for trout both upstream and downstream of Fairview Dam.

The naturalized population densities of brown trout remain consistently low (Figure 7.4-15). Although fall-spawning brown trout were historically stocked, late summer and fall peak flow events may suppress the population both upstream and downstream of Fairview Dam, and the Project's limited ability to buffer peak flow events likewise may suppress the population in the Fairview Dam Bypass Reach. Population densities of native Sacramento pikeminnow were generally low with some variation between 1998 and 2023, and native Sacramento sucker densities were generally high across monitoring years (Figure 7.4-16). Low trout biomass levels in 2023 generally reflect the few fish captured at electrofishing sites (Figure 7.4-17).

Although the NFKR is currently stocked with hatchery rainbow trout, the observed rainbow trout densities in the river were relatively low in 2023 compared with prior survey years, and densities appear to consistently decrease from 1998 to 2023, indicating an annual decrease in spawning success (Figure 7.4-15). The limited recruitment of rainbow trout in 2023 could reflect poor spawning conditions during the preceding 5 years of drought (which includes the second driest year on record in 2022) and/or flood-level flows in 2023.

However, both rainbow trout and Sacramento suckers spawn in the spring and early summer, on the descending limb of the snowmelt run-off, and suckers showed a strong recruitment of YOY fish in 2023, although their spawning timing appears to have been delayed (Figure 7.4-3).

Most rainbow trout observed in 2023 were within the catchable size group (e.g., 6 to 12 inches [152 to 305 mm]), likely reflecting the recent stocking upstream and downstream of Fairview Dam. Naturalized rainbow trout from historically stocked populations may be affected by the stocking of larger trout, which compete for resources and may prey on smaller trout (Vincent, 1987). Additionally, the stocking amounts, timing, and distribution of sterile versus non-sterile rainbow trout in the NFKR is uncertain (personal communication, William Branch, Senior Hatchery Supervisor, CDFW, January 30, 2024). The stocking of sterile rainbow trout may decrease the overall fecundity of the remnant naturalized population because the stocked sterile trout may unsuccessfully attempt to reproduce with naturalized non-sterile trout, thereby decreasing the overall reproductive success of the local population (Knipling, 1955). If sterile fish are released in sufficient numbers over a sufficient period of time, these fish would suppress the natural recruitment within the reach (Alphey et al., 2010).

Proposed Measure WR-1 would enhance current flow conditions for native fish species downstream of Fairview Dam by shifting the timing of greater MIFs from the summer months of July and August to the spring months of May and June to align with the spring snowmelt and the natural hydrograph (Figure 7.3-10 in Section 7.3.3.1, *Water Use and Hydrology*). Because the timing of native fish spawning is partially driven by the annual hydrograph, this measure's shift in flow timing would benefit aquatic resources by providing flows that mimic the natural conditions to which native species are adapted. Therefore, implementation of Measure WR-1 is expected to benefit native species and their habitats within the Fairview Dam Bypass Reach.

Similarly, proposed Measure WR-5 would enhance current flow conditions by including a 10-day spring-pulse flow on the ascending limb of the natural hydrograph. Although the Project has no significant storage capacity and spills regularly in the spring, the addition of full natural flows in spring would enhance flow conditions for native species by providing flows that mimic the natural conditions to which native species are adapted. Therefore, implementation of Measure WR-1 is expected to benefit native species and their habitats within the Fairview Dam Bypass Reach.

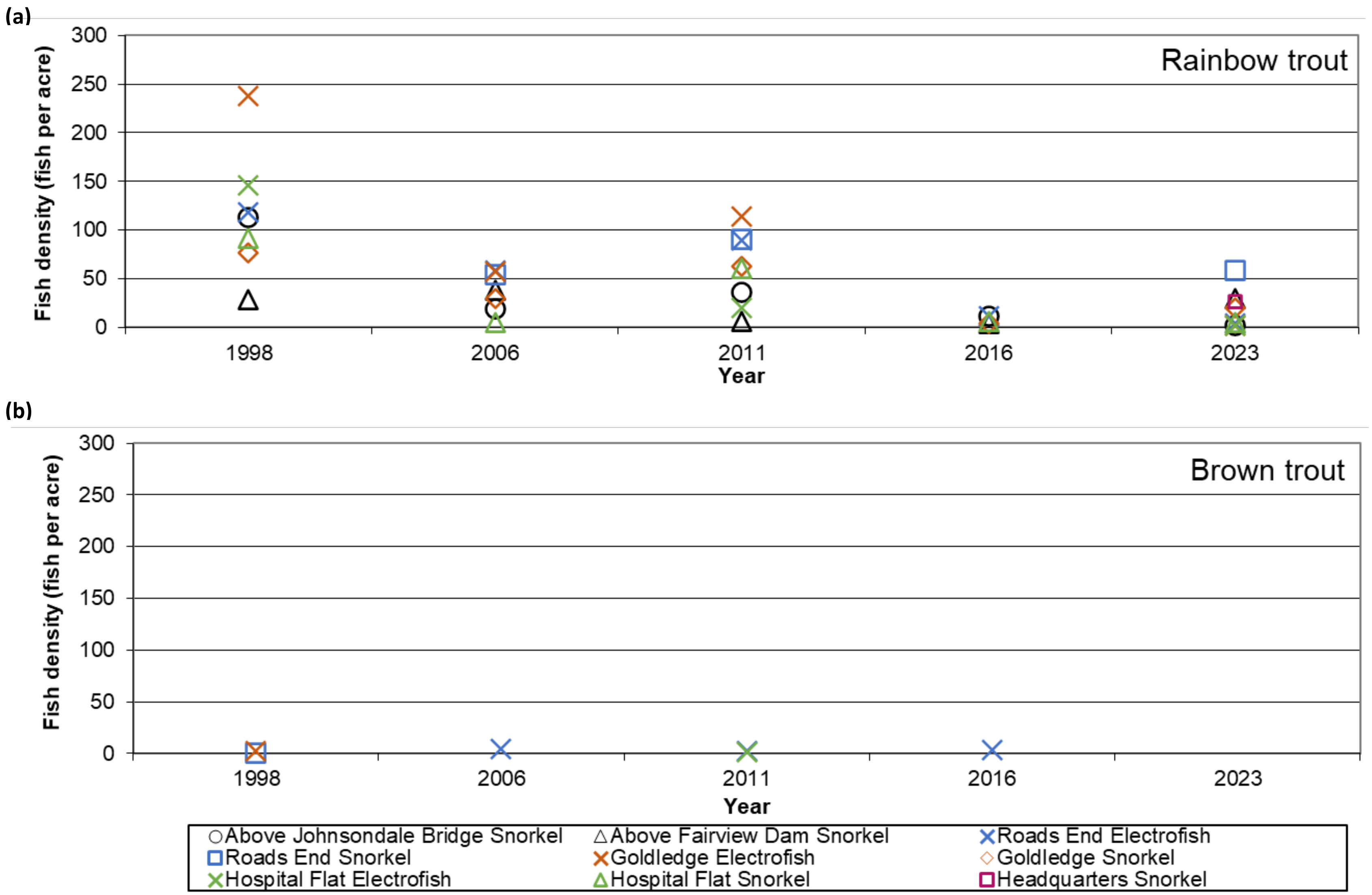


Figure 7.4-15. Densities of (a) Rainbow Trout and (b) Brown Trout at Fish Monitoring Sites, 1998–2023.

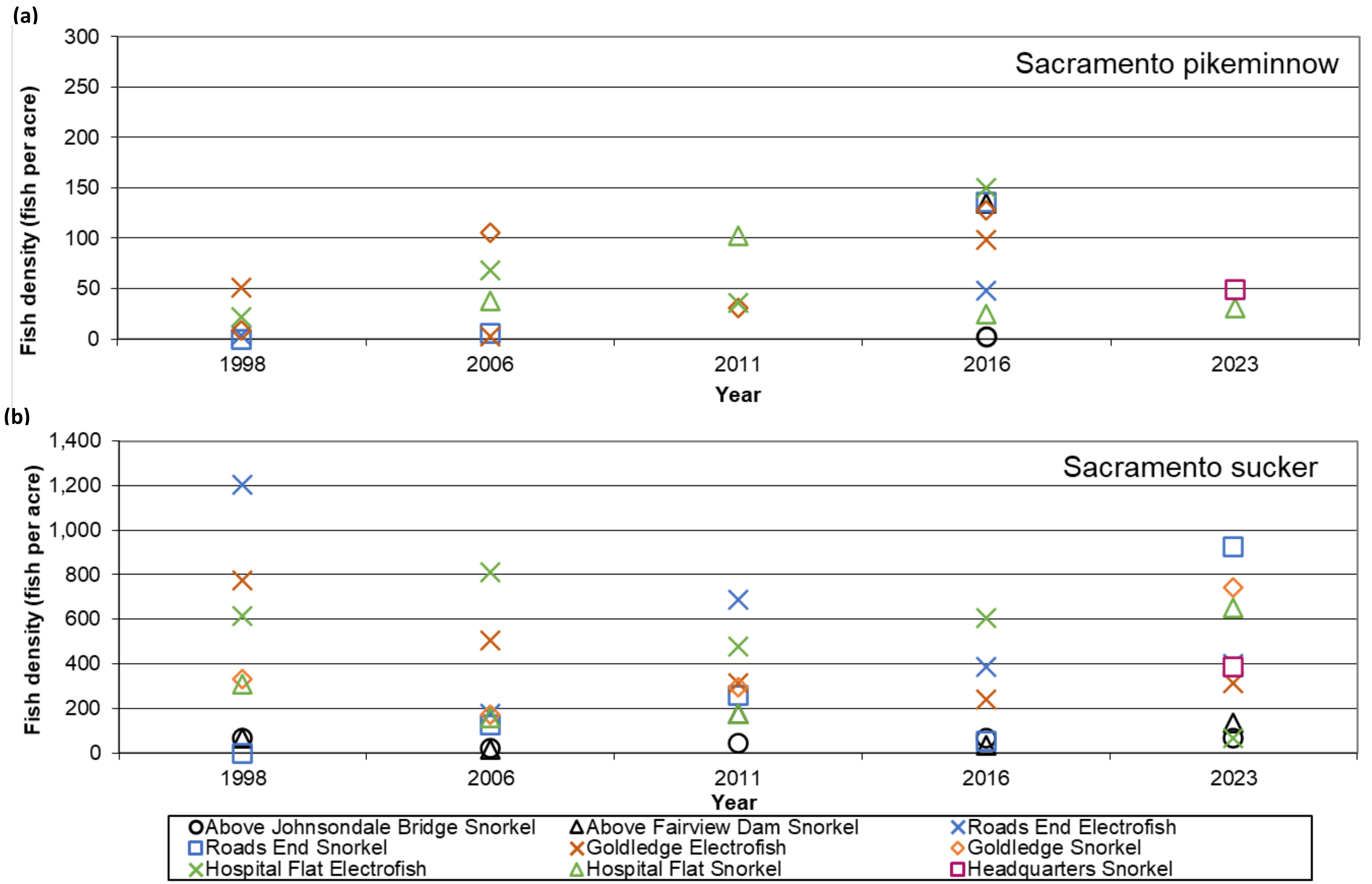


Figure 7.4-16. Densities of (a) Sacramento Pikeminnow and (b) Sacramento Sucker at Fish Monitoring Sites, 1998–2023.

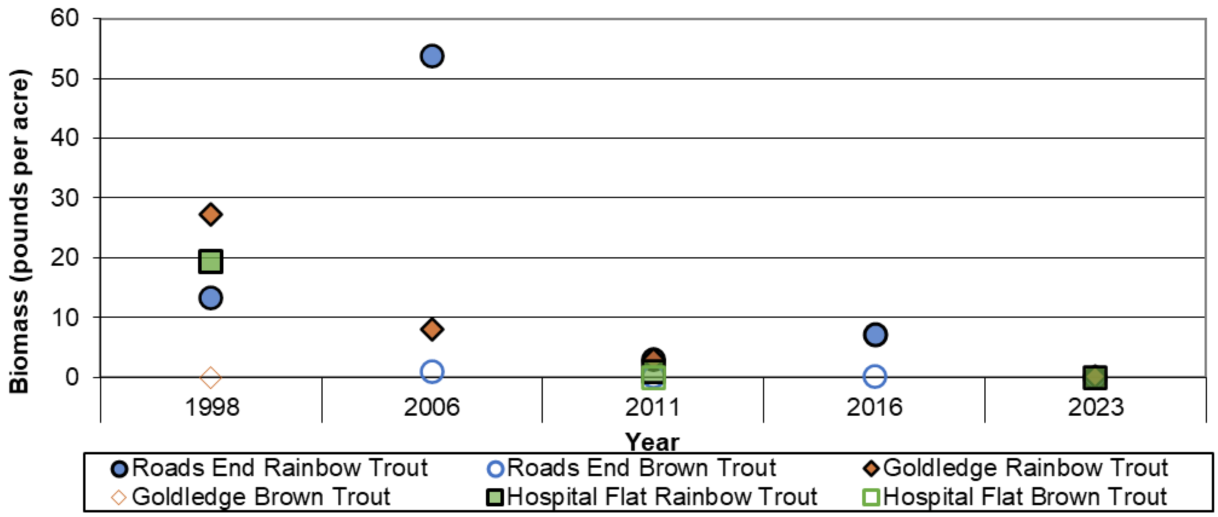


Figure 7.4-17. Rainbow Trout and Brown Trout Biomass at Electrofishing Sites, 1998–2023.

Therefore, with the inclusion of the above measures, the proposed Project would have a beneficial effect on fish populations.

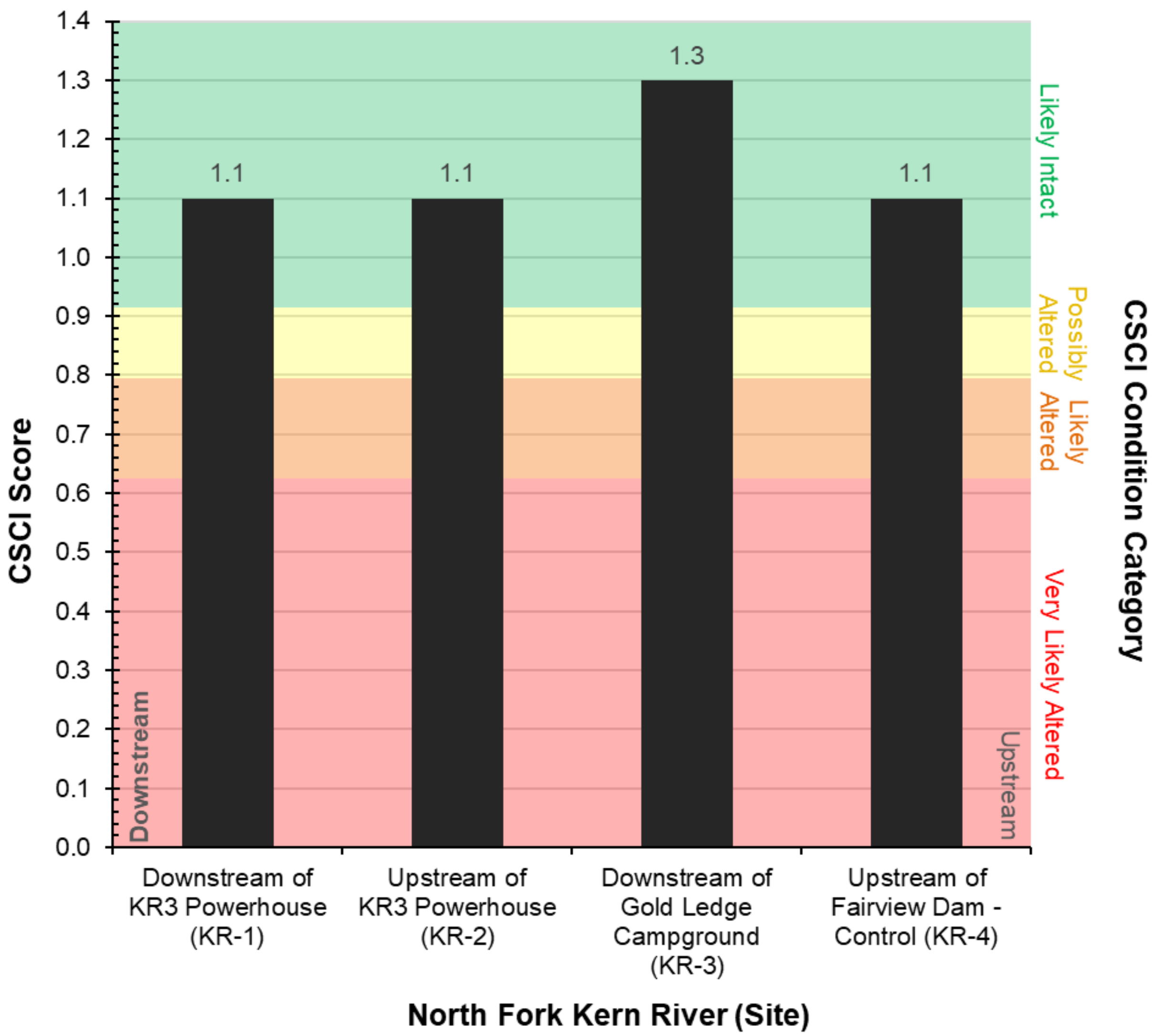
<u>Benthic Macroinvertebrates</u>

Implementation of the proposed Project, including proposed measures listed in Section 7.4.2, *Proposed Environmental Measures*, would have no effect on the BMI assemblages and aquatic ecosystem health in Project-affected reaches. BMI assemblages and aquatic ecosystem health in Project-affected reaches of the NFKR are not impaired under current Project O&M conditions.

The California Stream Condition Index (CSCI) was used to evaluate aquatic ecosystem health as reflected by the sampled BMI assemblages and identify potential Project-related effects. The CSCI integrates two measures for evaluating sites: BMI taxonomic completeness and a multi-metric index. CSCI scores typically range from 0.1 to 1.4 and are divided categorically in comparison with reference sites as follows (Rehn et al., 2015):

- Greater than or equal to 0.92: likely intact condition
- 0.91 to 0.80: possibly altered condition
- 0.79 to 0.63: likely altered condition
- Less than or equal to 0.62: very likely altered condition

CSCI scores for the BMI samples collected upstream of Fairview Dam, within the Fairview Dam Bypass Reach, and downstream of KR3 Powerhouse were all within the condition category described as “likely intact” with a score greater than or equal to 0.92 (Figure 7.4-18). Additional details regarding these analyses including their component metrics are described in the BIO-4 Technical Memorandum provided in Appendix E.2.



CSCI = California Stream Condition Index

Figure 7.4-18. California Stream Condition Index Scores and Condition Categories for Samples Collected During Benthic Macroinvertebrate Sampling in 2023 for the Kern River No. 3 Hydroelectric Project.

Project water diversions, flow fluctuations (i.e., whitewater recreation flow releases), and Fairview Dam sandbox flushing have the potential to directly affect environmental conditions within aquatic habitats by altering flow regimes and releasing sediment. Regulated flow regimes and sediment accumulation can directly influence BMI communities, which are often used as indicators of water quality and overall aquatic ecosystem health. Regulated flows can also have indirect effects by altering water temperatures or transporting sediment. Oil and hazardous substances may directly affect BMI communities if released into aquatic habitats. These effects, both direct and indirect, have the potential to alter the distribution, abundance, and structure of the BMI communities. To protect and enhance aquatic conditions, SCE proposes to implement the following six measures:

- Measure WR-1 would enhance current downstream of Fairview Dam by shifting the timing of greater MIFs from the summer months of July and August to the spring months of May and June to align with the spring snowmelt and the natural hydrograph (Section 7.3.1.1, *Water Use and Hydrology*).
- Measure WR-2 would extend the existing measure restricting the rate of change for diversion increases (i.e., down-ramping of releases within the Fairview Dam Bypass Reach).[26.]
- Measure WR-4 outlines sandbox flushing procedures to pass sediment diverted at Fairview Dam into the flowline back into the Fairview Dam Bypass Reach and describes sediment management activities at the two smaller diversions—Salmon Creek Diversion and Corral Creek Diversion—when there is a need to periodically remove accumulated sediment from behind the diversions to maintain flows into the diversion infrastructure and MIF release valves.
- Measure WR-5 would enhance current flow conditions by including a spring-pulse flow on the ascending limb of the natural hydrograph. Although the Project has no significant storage capacity and spills regularly in the spring, the addition of full natural flows in spring would enhance flow conditions for native species and would reduce the daily fluctuations resulting from the current whitewater boating flows condition.
- Measure LU-1 would include required road maintenance activities to reduce erosion and sedimentation into waterways. The plan would also include the existing *Control of Erosion, Stream Sedimentation, Soil Mass Movement Plan* and would include required facility maintenance activities to reduce the potential for erosion and sedimentation into waterways.
- Measure LU-4 would include prevention and cleanup measures to control spills and prevent hazardous leaks into stream channels in the NFKR, Salmon Creek, and Corral Creek Bypass Reaches.

Implementation of the proposed measures are expected to enhance aquatic habitats within Project-affected stream reaches and benefit BMIs. The measures would provide flows that align better with the natural hydrograph, continue restrictions on the stream flow rate of change, minimize erosion and the delivery of fine sediment to streambeds, and reduce the chance of hazardous substances entering waterways. Increased flushing activities at the sandbox and removal of sediment could temporarily increase turbidity and deposited sediment at the sandbox outlet, but any potential effects would be minor, local, and short-term. Because the current CSCI scores indicate all sites are “likely intact,”

[26] Decreases in diverted flows (i.e., up-ramping in the NFKR) are described in Exhibit B, Section 2.3, *Hydraulic Capacity*.

implementation of the proposed Project would result in no adverse effect on the BMI community.

Mollusks

Implementation of the proposed Project would have, at most, a minor, local, and short-term effect on populations of special-status mollusks, including western pearlshell, within Project-affected reaches. Suitable aquatic habitat is present within the NFKR, upstream and downstream of Fairview Dam, throughout the year. Western pearlshell requires perennial, flowing, cold water with adequate DO, minimal temperature fluctuations, bed sediment composed of sand, gravel, or cobble, along with the presence of salmonid host species (Nedeau et al., 2009). The current channel conditions in Project-affected reaches include water quality typical of western pearlshell suitable habitat, with perennial cool streamflow, low turbidity, and fully saturated DO concentrations (see Section 7.3, *Water Resources*). Additionally, suitable substrate and host species (i.e., rainbow trout) for the western pearlshell are present under current conditions (Nedeau et al., 2009; see the *Aquatic Habitats* subsection and *Fish Populations* subsections).

Changes in water temperature could affect populations of western pearlshell in Project-affected reaches. Although little is known about local adaptations and temperature tolerances of western pearlshell in southern California river systems, in a laboratory study, warm temperatures greater than 25 °C have resulted in mortalities in individuals from rivers in Washington (Martin, 2016). Additionally, mollusk reproduction can be modulated by water temperature (Aldridge et al., 1987; Watters, 2000). The proposed Measure WR-5 MIFs would mimic the natural hydrograph of the NFKR; proposed Measure WR-1 would decrease flows from July through August, potentially resulting in seasonally warmer temperatures in the summer months intended to benefit transitional zone fish species (see *Fish Populations* subsection above). Water temperature model results indicate that reduced flows would increase water temperatures in August by less than 1 °C (Section 7.3.3.2, *Water Quality*). This shift would increase the amount of habitat available for transitional zone fish species but would subsequently reduce the habitat for cold water trout species, which western pearlshell are dependent upon. Given that the Fairview Dam Bypass Reach is already at the edge of the temperature range for the species in summer months, an increase in water temperatures may result in a small reduction of habitat, and therefore a minor, local, and short-term effect on the western pearlshell population within the bypass reach.

In addition to water temperature, mollusk respiration and growth can be affected by DO concentrations and turbidity (Aldridge et al., 1987; Watters, 2000), and changes in bed sediment composition can affect rates of oxygen delivery via hyporheic flow and the availability of stable substrates, velocity refuges, and food sources (e.g., diatoms, algae) for aquatic mollusks (Geist and Auerswald, 2007; Hardison and Layzer, 2001; Howard and Cuffey, 2003; Lake et al., 2000). Habitat within the Fairview Dam Bypass Reach would be protected and enhanced by implementation of the following proposed environmental measures:

- Measure WR-5 would enhance current flow conditions by including a spring-pulse flow on the ascending limb of the natural hydrograph. Although the Project has no significant storage capacity and spills regularly in the spring, the addition of full natural flows in spring would enhance flow conditions for native species and would reduce the daily fluctuations resulting from the current whitewater boating flows condition.

- Measure WR-2 would extend the existing measure restricting the rate of change for diversion increases (i.e., down-ramping of releases within the Fairview Dam Bypass Reach) protecting mollusks by reducing rapid temperature fluctuations.[27]

- Measure WR-4 would extend and modify an existing protection measure that regulates the passage of sediment into the Fairview Dam Bypass Reach to protect aquatic resources.

- Measure LU-1 would include required road maintenance activities to reduce erosion and sedimentation into waterways. The plan would also include the existing *Control of Erosion, Stream Sedimentation, Soil Mass Movement Plan* and would include required facility maintenance activities to reduce the potential for erosion and sedimentation into waterways.

Although implementation of proposed Measure WR-1 may have, at most, minor, local, and short-term effects on habitat for western pearlshell within the Fairview Dam Bypass Reach, implementation of proposed environmental Measures WR-2, WR-4, WR-5, and LU-1 would also protect and enhance western pearlshell habitat suitability and quality by providing perennial flows that better reflect the natural hydrology and by continuing to minimize erosion and sediment delivery to stream channels. Therefore, implementation of the proposed Project would have at most minor, local, and short-term effects on special-status mollusks.

[27] Decreases in diverted flows (i.e., up-ramping in the NFKR) are described in Exhibit B, Section 2.3, *Hydraulic Capacity*.

Amphibian and Aquatic Reptiles

The proposed Project is anticipated to have no adverse population-level effects on common amphibian and aquatic reptile species described in Section 7.4.1.5, *Amphibian and Aquatic Reptiles* (i.e., Sierran treefrog, Sierra garter snake, and California toad), because these species commonly occur in the region, and localized Project O&M activities would not affect the viability of their populations. Aquatic herpetofauna and their habitat within Project-affected reaches would be protected and enhanced by implementation of the following proposed environmental measures:

- Measure WR-1 would enhance current flow conditions by shifting the higher base flows from summer to spring, in alignment with natural flow patterns (Section 7.3, *Water Resources*).
- Measure WR-2 would limit flow reductions to not exceed 30 percent of existing flow per half-hour within the Fairview Dam Bypass Reach. Implementation of this measure would protect aquatic resources and their habitats by reducing the risk of stranding individuals and reducing rapid temperature fluctuations.
- Measure WR-4 would require facility maintenance activities to reduce erosion and sedimentation into waterways and associated impacts on amphibian stream habitat.
- Measure LU-1 would minimize or eliminate potential effects from road activities on sensitive biological habitats.
- Measure TB-2 would continue existing protection measures for wildlife, including aquatic reptiles and amphibians, in the vicinity of the Project, including special-status species that may be present when conducting Project maintenance activities. This measure would also include notification to applicable resource agencies when new sensitive species are found within the FERC Project Boundary or affected stream reaches, and annual environmental awareness trainings about special-status biological species and wildlife protection within the FERC Project Boundary. The trainings would include a review of measures to protect special-status wildlife species and their habitats during routine Project maintenance activities, and photographs, habitat, and life history information for special-status wildlife species that are known to occur or may potentially occur in the FERC Project Boundary.

7.4.3.2. Threatened and Endangered Species

No federally listed threatened or endangered aquatic species or critical habitats are known to occur within the FERC Project Boundary or Project-affected stream reaches. The proposed Project would have no adverse effects on foothill yellow-legged frogs because they are likely extirpated from the FERC Project Boundary and Project-affected reaches. The proposed Project would have no effect on mountain yellow-legged frogs or California red-legged frogs because they do not occur within the FERC Project Boundary or Project-affected stream reaches; these areas are outside the range for California red-legged frogs and contain no suitable habitat for mountain yellow-legged frogs (Table 7.4-7 and Section 7.4.1.5, *Amphibian and Aquatic Reptiles*). Northwestern pond turtle is proposed as threatened with Section 4(d) rule under the ESA and occurs in portions of the NFKR and Cannell Creek (described in more detail below).

If the ESA is updated or a newly federally listed threatened or endangered species is present within the FERC Project Boundary over the term of the new license, the species and its habitat would be protected and enhanced by implementation of the following proposed environmental measure:

- Measure TB-2 would continue existing protection measures for wildlife, including aquatic species, within the FERC Project Boundary, including special-status species that may be present when conducting Project maintenance activities. This measure would also include notification when new special-status species are found within the FERC Project Boundary, and environmental awareness trainings about special-status biological species and wildlife protection within the FERC Project Boundary. The trainings would include a review of measures to protect special-status wildlife species and their habitats during routine Project maintenance activities, and photographs, habitat, and life history information for special-status wildlife species that are known to occur or may potentially occur in the FERC Project Boundary.

Northwestern Pond Turtles

With implementation of proposed Measures WR-1, LU-1, and TB-2, the proposed Project may affect but is not likely to adversely affect populations of northwestern pond turtle within the FERC Project Boundary or Project-affected reaches. Populations of northwestern pond turtle are present in Cannell Creek and in the NFKR within the Fairview Dam Bypass Reach, and suitable habitat is present along some tributaries to the NFKR and Project-affected reaches.

The proposed Project is not likely to adversely affect populations of northwestern pond turtles within the Fairview Dam Bypass Reach. Proposed Measure WR-1 would enhance current flow conditions by shifting the higher base flows from summer to spring in alignment with natural flow patterns. The reduced summer instream flows could cause warmer water temperatures, following patterns that are associated with the natural hydrograph and would potentially benefit the northwestern pond turtle.

The proposed Project may affect but is not likely to adversely affect populations of northwestern pond turtles within Cannell Creek. Populations within Cannell Creek upstream of the spillway would continue to be unaffected by the proposed Project. Habitat within Cannell Creek downstream of the spillway may be affected during the short-term release of water from the flowline at the Cannell Creek Spillway. If excess pressure within the flowline needs to be reduced (e.g., a unit trips at the KR3 Powerhouse), the upstream section of the Cannell Creek Siphon is equipped to automatically release water from the flowline down the Cannell Creek Spillway and into Cannell Creek. The confluence of Cannell Creek and the NFKR is approximately 1 river mile downstream from the spillway. Releases from Cannell Creek Spillway may alter habitat for, or potentially result in displacement of, adult and juvenile turtles in this section of stream. Given the existing presence of turtles in the affected reach and existing Project-related releases into the reach, any effect on the turtles is expected to be minor, local, short-term. Therefore, the proposed Project may affect but is not likely to adversely affect populations within Cannell Creek.

Project O&M within the FERC Project Boundary may affect but is not likely to adversely affect upland terrestrial habitats that northwestern pond turtles use for nesting. In these areas, underground eggs could be inadvertently disturbed or crushed by ground-moving activities. Crushing of individuals could also occur on Project roads, specifically the Cannell Creek Siphon Access Road, during the species' periods of terrestrial movement. The Cannell Creek Siphon Access Road is currently gated, which restricts public vehicle access closest to where northwestern pond turtles are located. Additionally, proposed Measure LU-1 would minimize or eliminate potential effects from road activities on sensitive biological habitats, and TB-2 includes environmental training related to special-status species. Therefore, the proposed Project may affect but is not likely to adversely affect upland terrestrial habitats for northwestern pond turtles.

With implementation of proposed Measures WR-1, LU-1, and TB-2, implementation of the proposed Project may affect but is not likely to adversely affect populations of northwestern pond turtle within the FERC Project Boundary or Project-affected reaches.

7.4.3.3. Unavoidable Adverse Effects

The proposed Project would not result in unavoidable adverse effects on aquatic resources.

7.5. WILDLIFE RESOURCES

This section describes the wildlife resources and the applicable management direction regarding wildlife resources within the FERC Project Boundary and lands surrounding the Project, including Project bypass reaches. Section 7.5.1 describes the affected environment and resource conditions under current Project O&M (i.e., baseline condition). Section 7.5.2 identifies environmental measures, management plans, and programs that are included in the proposed Project. Section 7.5.3 includes an analysis of ongoing or new environmental effects of O&M from the proposed Project, including potential effects from proposed measures. The full description of proposed measures is provided in Appendix E.1.

The descriptions within this section were developed using existing, relevant, and reasonably available information and include results from the following relicensing studies where additional information was collected to further describe the resources:

- BIO-2 Special-Status Salamanders
- BIO-3 General Wildlife Resources

The BIO-2 and BIO-3 Technical Memoranda that support wildlife resources are included in Appendix E.2.

7.5.1. AFFECTED ENVIRONMENT

The Project facilities generally run parallel to the NFKR from approximately 2,700 to 3,800 feet amsl. The landscape within the FERC Project Boundary is characterized by steep slopes and deeply incised canyon topography, primarily formed by the Kern River and its tributaries (Stock et al., 2004; Krugh and Foreshee, 2018).

Habitats within the vicinity of the Project were described within a 0.5-mile buffer to the east and west of the Project alignment centerline. Habitats within the vicinity of the Project consist of upland vegetation communities in higher terrace areas and riparian communities in and adjacent to the NFKR and select tributaries. Plant community types (alliances) mapped in the Botanical Study Area consist of Rabbitbrush, Chamise, Wedgeleaf Ceanothus, Lower Montane Mixed Chaparral, Scrub Oak, Ephedra, Annual Grasses and Forbs, Scalebroom, Baccharis (Riparian), Riparian Mixed Hardwood, Gray Pine, Willow, Interior Live Oak, and Buckwheat. See Section 7.6, *Botanical Resources*, for a description of these vegetation communities.

The NFKR canyon supports a variety of wildlife that use the equally diverse plant communities. A search of iNaturalist records along the NFKR identified 8 species of amphibians, 15 species of reptiles, 102 species of birds, and 19 species of mammals (iNaturalist, n.d.). The upland terrestrial communities support populations of southern alligator lizard (*Elgaria multicarinata*), California whiptail (*Aspidoscelis tigris munda*), California kingsnake (*Lampropeltis californiae*), California quail (*Callipepla californica*), Nuttall's woodpecker (*Picoides nuttallii*), California scrub-jay (*Aphelocoma californica*), gray fox (*Urocyon cinereoargenteus*), agile kangaroo rat (*Dipodomys agilis*), Merriam's chipmunk (*Neotamias merriami*), and western gray squirrel (*Sciurus griseus*). Riparian habitats provide nesting and foraging habitat for Baja California treefrog (*Pseudacris hypochondriaca*), garter snakes (*Thamnophis* spp.), yellow warbler, various flycatchers (*Empidonax* spp.), northern raccoon (*Procyon lotor*), big brown bat (*Eptesicus fuscus*), and California myotis (*Myotis californicus*).

7.5.1.1. Listed Species Critical Habitat

The Project does not overlap with designated critical habitat for terrestrial wildlife species (USFWS, 2024).

7.5.1.2. Wildlife Species

<u>Non-Special-Status Species</u>

Non-special-status or common species are those that are not recognized as needing special protection by resource agencies. The NFKR valley supports a variety of common species of wildlife. Common species of wildlife known to occur in the vicinity of the Project include western toad (*Anaxyrus boreas*), California newt (*Taricha torosa*), California kingsnake, coral-bellied ring-necked snake (*Diadophis punctatus pulchellus*), northern Pacific rattlesnake (*Crotalus oreganus oreganus*), and garter snakes. California quail, Nuttall's woodpecker, California scrub-jay, common raven (*Corvus corax*), Bewick's wren (*Thryomanes bewickii*), mountain bluebird (*Sialia currucoides*), and lesser goldfinch (*Spinus psaltria*). During spring and fall migration, areas within 0.5 mile of the Project also provide foraging habitat for a variety of migratory species. Some fall migrants that occur within the vicinity of the Project include gray flycatcher (*Empidonax wrightii*), sage thrasher (*Oreoscoptes montanus*), turkey vulture (*Cathartes aura*), red-tailed hawk (*Buteo jamaicensis*), mule deer (*Odocoileus hemionus*), coyote (*Canis latrans*), striped skunk (*Mephitis mephitis*), long-tailed weasel (*Mustela frenata*), black-tailed jackrabbit (*Lepus californicus*), California pocket mouse (*Chaetodipus californicus*), agile kangaroo rat, and Botta's pocket gopher (*Thomomys bottae*).

<u>Special-Status Species</u>

Special-status wildlife that occur or may potentially occur in the vicinity of the Project are described below. Special-status wildlife species are those considered threatened or endangered by the USFWS or the state of California pursuant to the federal or California ESA, species of special concern by the state of California, or species of conservation concern by the Forest Service or USFWS.

A list of special-status wildlife species was compiled from the following sources:

- A query of the CNDDB (CDFW, 2024a) to obtain information on known occurrences in the vicinity of the Project
    - The following USGS 7.5-minute topographic Quadrangles were queried for special-status wildlife species: Fairview, Kernville, Sentinel Peak, Durrwood

Creek, Bonita Meadows, Sirretta Peak, Cannell Peak, Weldon, Lake Isabella North, Alta Sierra, Tobias Peak, and Johnsondale

- CNDDB Special Animals List (CDFW, 2024b)
- USFWS's IPaC website (USFWS, 2024)
- *Rationales for Animal Species Considered for Species of Conservation Concern Sequoia National Forest* (Forest Service, 2023)
- *Final License Application for the Kern River No 3 Project, USFS Comments on Exhibit E Wildlife Resources and Recreational Resources* (SCE, 1994)
- *Environmental Assessment for Hydropower License Kern River No. 3 Hydroelectric Project, FERC Project No. 2290* (FERC, 1996)
- *Biological Resource Evaluation of the Kern River 3 Hydroelectric Facility Power Pole and Communication Installation Project* (Psomas, 2004)
- *Biological Determinations of No Effect of Listed Species for the Kern River 3 Calibrated Flume Installation* (Psomas, 2006, 2008, 2011)
- *Biological Resources Technical and Jurisdictional Delineation Report for the Fairview Dam and Calibrated Flume Protection Project at Kern River 3 Hydroelectric Facility* (Psomas, 2013a)
- *Biological Resources Technical Report for Kern River 3 Hydroelectric Facility Tunnel Repair Project* (Psomas, 2013b)
- *Biological Resources Technical Report for the Kern River 3 Sandbox Repair Project at Kern River 3 Hydroelectric Facility* (Psomas, 2013c)
- *Southwestern Pond Turtle Notification Memorandum* (Psomas, 2013d)

Aquatic frog species (i.e., mountain yellow-legged frog (*Rana muscosa*), foothill yellow-legged frog (*Rana boylii*) and California red-legged frog (*Rana draytonii*), and the northwestern pond turtle (*Actinemys marmorata*) are discussed in Section 7.4, *Fish and Aquatic Resources*.

Terrestrial Amphibians and Reptiles

Table 7.5-1 provides a list of potentially occurring special-status amphibians and reptiles, general habitat description, assessment of each species' potential to occur, and observations of the species during field surveys.

Table 7.5-1. Special-Status Terrestrial Amphibians and Reptiles

Common Name (*Scientific Name*)	Status (Federal/State)	Habitat Associations	Likelihood for Occurrence/ Occurrence Notes
Amphibians			
Fairview slender salamander *(Batrachoseps bramei)*	SCC/—	Known only from the Upper Kern River Canyon and west side of Lake Isabella, within metamorphic rock outcrops in a variety of habitats, including chaparral and mixed oak and conifer woodland. Generally found beneath rocks, often on talus slopes. Occasionally found beneath logs, river gravel, and leaf litter.	Present. Species documented within the FERC Project Boundary (CDFW, 2024a). Suitable habitat exists within the FERC Project Boundary and along Project-affected stream reaches. Observed during 2023 surveys.
Kern Plateau salamander (*Batrachoseps robustus)*	SCC/—	Found only in the semi-arid Kern Plateau and Scodie Mountains. Frequently found in Jeffrey pine/red fir, lodgepole pine, or riparian scrub habitat. Found under rocks, bark fragments, and logs and within and under wet logs, especially in spring and seep areas.	Not likely to occur. Only known from the upper Kern Plateau (Jockusch et al., 2012). Not observed during general biological surveys in 2023.
Kern Canyon slender salamander *(Batrachoseps simatus)*	SCC/ST	A semi fossorial species that occurs in isolated colonies along stream courses and on ridges and hillsides. Cool, moist north-facing slopes and shaded narrow tributary canyons seem to be favored. Found in talus slopes and under logs and other surface objects especially after rains. Frequents streamside vegetation of willows and cottonwoods and slopes grown to interior live oak, canyon oak, pine, and mixed chaparral.	Not likely to occur. No known occurrences of this species north of Lake Isabella. Not observed during general biological surveys in 2023.
Reptiles			
Southern Sierra legless lizard *(Anniella campi)*	—/SSC	Found in desert canyons and springs along western edge of the Mojave Desert in Kern and Inyo Counties. Microhabitat of this species poorly known. Other legless lizard species occur in sparsely vegetated areas with moist, loose soil. Often found underneath leaf litter, rocks, and logs.	May occur. Suitable habitat in chaparral and woodland habitats within 0.5 mile of the Project. Known to occur just north of Kernville. Not observed during general biological surveys in 2023.

Common Name (*Scientific Name*)	Status (Federal/State)	Habitat Associations	Likelihood for Occurrence/ Occurrence Notes
California legless lizard (*Anniella* spp.)	—/SSC	Occurs from Contra Costa County south to San Diego, within a variety of open habitats. Generally found in moist, loose soil. Prefers soils with a high moisture content.	May occur. Suitable habitat in chaparral and woodland habitats in and within 0.5 mile of the Project. Not observed during general biological surveys in 2023.

ESA = Endangered Species Act; FERC = Federal Energy Regulatory Commission; SCC = designated as Forest Service species of conservation concern; SSC = designated as a California species of special concern; ST= listed as threatened under the California ESA

Of the special-status amphibians and reptiles listed in Table 7.5-1, only the Fairview slender salamander (*Batrachoseps bramei*) was determined to be present within the FERC Project Boundary based on field surveys and direct observations.

Birds

Table 7.5-2 provides a list of potentially occurring special-status birds, general habitat description, assessment of each species' potential to occur, and observations of the species during field surveys.

Table 7.5-2. Special-Status Birds

Common Name (*Scientific Name*)	Status (Federal/State)	Habitat Associations	Likelihood for Occurrence/ Occurrence Notes
American goshawk (*Accipiter gentilis*)	SCC/SSC	Found within, and in vicinity of, coniferous forest. Uses old nests and maintains alternate sites. Usually nests on north slopes near water. Red fir, lodgepole pine, Jeffrey pine, and aspens are typical nest trees.	May occur, but the potential is low for nesting and moderate for foraging. Suitable coniferous habitat within 0.5 mile of the Project. Not observed during general biological surveys in 2023.
Tricolored blackbird (*Agelaius tricolor*)	BCC, SCC/ST	A highly colonial species, most numerous in Central Valley and vicinity. Largely endemic to California and requires open water, protected nesting substrate, and foraging area with insect prey within a few miles of the colony.	May occur, but the potential is low for nesting and foraging. No suitable open water, marsh, limited cattail nesting habitat within 0.5 mile of the Project. Not observed during general biological surveys in 2023.

Common Name (*Scientific Name*)	**Status (Federal/State)**	**Habitat Associations**	**Likelihood for Occurrence/ Occurrence Notes**
Swainson's hawk *(Buteo swainsoni)*	—/ST	Breeds in grasslands with scattered trees, juniper-sage flats, riparian areas, savannas, and agricultural or ranch lands with groves or lines of trees. Requires adjacent suitable foraging areas such as grasslands or alfalfa or grain fields supporting rodent populations.	May occur during migration, but the potential is low for nesting and foraging. Outside the current known breeding range. No suitable grassland habitat within 0.5 mile of the Project. Not observed during general biological surveys in 2023.
Western yellow-billed cuckoo—western DPS *(Coccyzus americanus occidentalis)*	FT/SE	A riparian forest nester along the broad, lower flood-bottoms of larger river systems. Nests in riparian jungles of willow, often mixed with cottonwoods, with lower story of blackberry, nettles, or wild grape.	May occur, but the potential is low for nesting. Limited suitable riparian habitat within 0.5 mile of the Project. However, species known to nest in areas where suitable riparian habitat is present around Lake Isabella, the Kern River Preserve, and the South Fork Wildlife Area. Not observed during riparian bird surveys in 2023. Project outside designated critical habitat.
Black swift *(Cypseloides niger)*	BCC/SSC	Occurs within the coastal belt of Santa Cruz and Monterey Counties, central and southern Sierra Nevada, San Bernardino and San Jacinto Mountains. Breeds in small colonies on cliffs behind or adjacent to waterfalls in deep canyons and sea bluffs above the surf; forages widely.	May occur, but the potential is low for nesting. Limited nesting habitat within 0.5 mile of the Project. Not observed during general biological surveys in 2023.
Mount Pinos sooty grouse (*Dendragapus fuliginosus howardi)*	SCC/SSC	An inhabitant of the southern Sierra Nevada in small islands of populations. Mainly inhabits white fir-covered slopes. Also found in other conifer types and open, brushy areas adjacent to forest.	May occur, but the potential is low for nesting and foraging. Limited nesting habitat within 0.5 mile of the Project. Not observed during general biological surveys in 2023.

Common Name (*Scientific Name*)	**Status (Federal/State)**	**Habitat Associations**	**Likelihood for Occurrence/ Occurrence Notes**
Southwestern willow flycatcher *(Empidonax traillii extimus)*	FE, SCC/SE	Found in riparian woodlands in Southern California. Willow-dominated riparian habitats similar to least Bell's vireo (*Vireo bellii pusillus*) nesting habitats; shows a stronger preference for sites with surface water in the vicinity, such as along streams, on the margins of a pond or lake, and in wet mountain meadows.	May occur, but the potential is low for nesting. Limited suitable riparian habitat within 0.5 mile of Project. However, species known to nest in areas where there is suitable riparian habitat around Lake Isabella, the Kern River Preserve, and the South Fork Wildlife Area. Not observed during riparian bird surveys in 2023. Project outside designated critical habitat.
California condor *(Gymnogyps californianus)*	FE/SE	Suitable habitat for the condor includes open areas with reliable air movements to allow for extending soaring (Bloom, 2009). Foraging habitat consists of vast expanses of open savanna and grassland, chaparral with cliffs. Roosting habitat located near foraging grounds. Nesting habitat ranges from chaparral to forested montane regions. Nests in caves, crevices, and large ledges on high sandstone cliffs. Breeding birds typically forage within 31.0 to 43.5 miles of their nesting areas.	May occur, but the potential is low for nesting. Suitable foraging habitat to support species within the FERC Project Boundary. Not observed during general biological surveys in 2023. Project outside designated critical habitat.
Yellow-breasted chat (*Icteria virens*)	—/SSC	A summer resident; inhabits riparian thickets of willow and other brushy tangles near watercourses. Nests in low, dense riparian, consisting of willow, blackberry, and wild grape; forages and nests within 10 feet of ground.	May occur. Moderate potential for nesting and foraging due to suitable riparian habitat within 0.5 mile of the Project. Species observed south of the Project just north of Lake Isabella. Not observed during riparian bird surveys in 2023.

Common Name (*Scientific Name*)	Status (Federal/State)	Habitat Associations	Likelihood for Occurrence/ Occurrence Notes
Yellow warbler *(Setophaga petechia)*	—/SSC	Found in riparian plant associations in proximity to water. Also nests in montane shrubbery in open conifer forests in the Cascades and Sierra Nevada. Frequently found nesting and foraging in willow shrubs and thickets and in other riparian plants including cottonwoods, sycamores, ash, and alders.	Present. Species observed along Salmon Creek, Corral Creek, Cannell Creek, and various locations along the Kern River. Observed during 2023 relicensing surveys.
Least Bell's vireo (*Vireo bellii pusillus*)	FE/SE	A summer resident of Southern California in low riparian areas, in vicinity of water or in dry river bottoms; below 2,000 feet. Nests placed along margins of bushes or on twigs projecting into pathways, usually willow, Baccharis, and mesquite.	May occur, but the potential is low for nesting. Limited suitable riparian habitat within 0.5 mile of the Project. However, species observed around Lake Isabella, the Kern River Preserve, and the South Fork Wildlife Area. Not observed during riparian bird surveys in 2023. Project outside designated critical habitat.

BCC = USFWS Birds of Conservation Concern; DPS = Distinct Population Segment; ESA = Endangered Species Act; FE = listed as endangered under the federal ESA; FT = listed as threatened under the federal ESA; SCC = designated as Forest Service species of conservation concern; SE = listed as endangered under the California ESA; SSC = designated as a California species of special concern; ST = listed as threatened under the California ESA; USFWS = U.S. Fish and Wildlife Service

Of the special-status birds list in Table 7.5-2, only the yellow warbler *(Setophaga petechia)* was observed within the FERC Project Boundary based on field surveys and direct observations.

Mammals

Table 7.5-3 provides a list of potentially occurring special-status mammals, general habitat description, assessment of each species' potential to occur, and observations of the species during field surveys.

Table 7.5-3. Special-Status Mammals

Common Name (*Scientific Name*)	**Status (Federal/State)**	**Habitat Associations**	**Likelihood for Occurrence/ Occurrence Notes**
Pallid bat *(Antrozous pallidus)*	—/SSC	Found in deserts, grasslands, shrublands, woodlands, and forests. Most common in open, dry habitats with rocky areas for roosting. Roosts must protect bats from high temperatures. Very sensitive to disturbance of roosting sites.	May occur, but the potential is low for roosting and moderate for foraging. Species documented south of the Project at Lake Isabella.
Sierra Nevada mountain beaver *(Aplodontia rufa califórnica)*	—/SSC	Found in the dense growth of small deciduous trees and shrubs, wet soil, and abundance of forbs in the Sierra Nevada and east slope. Needs dense understory for food and cover. Burrows into soft soil. Needs abundant supply of water.	May occur. Moderate potential due to marginally suitable habitat within the FERC Project Boundary. However, suitable wet forest habitat occurs along streams in the vicinity of the Project. Multiple documented occurrences along the Kern River.
Gray wolf (*Canis lupus)*	FE/SE	A habitat generalist that historically occupied diverse habitats in North America, including tundra, forests, grasslands, and deserts. Primary habitat requirement is the presence of adequate ungulate prey and water; additionally, occupied habitat is strongly affected by the availability of den sites.	May occur. Suitable habitat within FERC Project Boundary. Species expanded its range southward into the Sierra Nevada and known to occur in Tulare County (CDFW, 2024a).
Townsend's big-eared bat *(Corynorhinus townsendii)*	SCC/SSC	Found throughout California in a variety of habitats. Most common in mesic sites. Roosts in the open, hanging from walls and ceilings. Roosting sites limiting. Extremely sensitive to human disturbance.	May occur, but the potential is low for roosting and high for foraging. Species documented south of the Project near Lake Isabella.

Common Name (*Scientific Name*)	**Status (Federal/State)**	**Habitat Associations**	**Likelihood for Occurrence/ Occurrence Notes**
Western bonneted bat (western mastiff bat) (*Eumops perotis californicus)*	—/SSC	Found in many open, semi-arid to arid habitats, including conifer and deciduous woodlands, coastal scrub, annual and perennial grasslands, palm oases, chaparral, desert scrub, and urban areas. Crevices in cliff faces, high buildings, trees, and tunnels required for roosting.	May occur, but the potential is low for roosting and high for foraging. Species documented south of the Project near Lake Isabella.
Wolverine *(Gulo gulo)*	FT/ST, FP	Found in the north coast mountains and the Sierra Nevada. Found in a variety of high elevation habitats. Needs water source. Uses caves, logs, and burrows for cover and den area. Hunts in more open areas. Can travel long distances.	No potential to occur. Extirpated from this part of California.
Sierra marten *(Martes caurina sierrae)*	SCC/—	Found in mixed evergreen forests with more than 40% crown closure along the Sierra Nevada and Cascades. Needs a variety of different-aged stands, particularly old-growth conifers and snags that provide cavities for dens/nests.	May occur, but no suitable denning habitat exists within or adjacent to the FERC Project Boundary, and Project below the known elevation range of the species in California. Potential foraging habitat.
Tulare grasshopper mouse *(Onychomys torridus tularensis)*	—/SSC	Found in hot, arid valleys and scrub deserts in the southern San Joaquin Valley. Has a diet almost exclusively composed of arthropods; therefore, needs abundant supply of insects.	No potential to occur. No suitable habitat exists within the FERC Project Boundary, and Project outside the known historical and elevation range.

Common Name (*Scientific Name*)	Status (Federal/State)	Habitat Associations	Likelihood for Occurrence/ Occurrence Notes
Fisher—southern Sierra Nevada DPS *(Pekania pennant)*	FE/ST, SSC	Found in the intermediate to large-tree stages of coniferous forests and deciduous-riparian areas with high percent canopy closure. Uses cavities, snags, logs and rocky areas for cover and denning. Needs large areas of mature, dense forest.	No potential to occur. No suitable denning habitat exists within or adjacent to the FERC Project Boundary. Suitable dense forest and canopy cover not present in or adjacent to the FERC Project Boundary. Project outside proposed critical habitat.
American badger *(Taxidea taxus)*	—/SSC	Most abundant in drier open stages of most shrub, forest, and herbaceous habitats, with friable soils. Needs sufficient food, friable soils, and open, uncultivated ground. Preys on burrowing rodents. Digs burrows.	May occur, but the potential is low. No known records of occurrence within the FERC Project Boundary. However, suitable habitat exists within the FERC Project Boundary.
Sierra Nevada red fox—Sierra Nevada DPS *(Vulpes vulpes necátor)*	FC/ST	Historically, found from the Cascades down to the Sierra Nevada. Found in a variety of habitats from wet meadows to forested areas. Uses dense vegetation and rocky areas for cover and den sites. Prefers forests interspersed with meadows or alpine fell-fields.	No potential to occur. Suitable habitat not present within the FERC Project Boundary, and known populations occur at higher elevations further north.

CDFW = California Department of Fish and Wildlife; DPS = Distinct Population Segment; ESA = Endangered Species Act; FC = federal candidate species; FE = listed as endangered under the federal ESA; FERC = Federal Energy Regulatory Commission; FP = CDFW fully protected; FT = listed as threatened under the federal ESA; SCC = designated as Forest Service species of conservation concern, SE = listed as endangered under the California ESA; SSC = designated as a California species of special concern; ST = listed as threatened under the California ESA

None of the special-status mammals listed in Table 7.5-3 were observed during field surveys.

<u>Game Species</u>

Game species are animals hunted for sport or pleasure. Information on game species potentially present in the vicinity of the Project is provided in this section because of their commercial and recreational value. Game species are regulated by the CDFW and defined under the California Fish and Game Code.

Resident and migratory game birds are defined in California Fish and Game Code Section 3500. Examples of upland resident game birds listed include sooty grouse (*Dendragapus fuliginosus*), wild turkey (*Meleagris gallopavo*), mountain quail (*Oreortyx pictus*), and California quail. 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 as defined in California Fish and Game Code Section 3950(a) include, but are not limited to, deer (*Odocoileus* spp.), elk (*Cervus* spp.), wild pig (*Sus* spp.), and black bear (*Ursus* ssp.), while rabbits (*Sylvilagus* spp.), hares (*Lepus* spp.), and tree squirrels (*Sciurus* spp. and *Tamiasciurus* spp.) are defined as small game mammals. Mountain lions (*Puma* ssp.) are included in Section 3950 but are explicitly excluded as a game mammal in Section 3950.1.

A brief summary of prevalent game species in the vicinity of the Project; including resident game birds, migratory game birds, and game mammals; is provided below.

Resident and Migratory Game Birds

Upland birds occurring in the vicinity of the Project that meet the definition of resident game birds (California Fish and Game Code Section 3500) include, but are not limited to, mountain quail and California quail. Birds that meet the definition of migratory game birds (California Fish and Game Code Section 3500) include mourning dove.

Game Mammals

Mule Deer

Hunting is regulated by California state law through the 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. The Project is included in Deer Hunting Zone D-8. The hunting season runs from the fourth Saturday in September and extends for 30 consecutive days, and archery season runs from the third Saturday in August and extends for 23 days.

Mule deer were observed within the FERC Project Boundary during 2023 wildlife surveys.

Other Game Mammals

Other game mammals occurring in the vicinity of the Project include, but are not limited to, jackrabbit (*Lepus* ssp.), western gray squirrel, black bear, and bobcat (*Lynx rufus*). Western gray squirrel, black bear, and bobcat were observed on trail cameras or directly during wildlife surveys.

7.5.2. Proposed Environmental Measures

SCE proposes to implement the following environmental measures related to wildlife resources:

- Measure LU-1, *Project Road and Facilities Management Plan*
- Measure TB-1, *Vegetation Management Plan*
- Measure TB-2, *Wildlife Resources Management Plan*

The proposed measures and their key features are described below. Refer to Appendix E.1 for a complete description of the proposed environmental measures, management plans, and programs that are included for the proposed Project.

7.5.3. Potential Project Effects

Under the No-Action Alternative, the Project would continue to operate under the terms and conditions of the current license, as described in Section 5.1. The No-Action Alternative is considered the environmental baseline for this analysis of potential effects. Potential effects on wildlife resources were identified in FERC's SD2 (FERC, 2022) and based on an evaluation of continued O&M activities described as part of the proposed Project (Section 5.2, *Proposed Action Alternative*). Potential effects identified in FERC's SD2 include the following:

- Effects of continued Project O&M activities including Project-related recreation, vegetation management, and herbicide use on special-status wildlife species including those identified in the SCE's PAD (SCE, 2021), as well as Forest Service species of conservation concern and nesting migratory birds;
- Effects of continued Project operations on instream flows and aquatic habitat in the NFKR and Salmon and Corral Creeks, including the Project bypass reaches, on aquatic and semi-aquatic amphibians and reptiles, including the Fairview slender salamander, Greenhorn Mountains slender salamander (*Batrachoseps altasierrae*), foothill yellow-legged frog, and northwestern pond turtle;
- Effects of existing aboveground sections of Project pipelines, conduits, and penstocks and operation of other Project facilities, including artificial lighting, on terrestrial species and on the movements of wildlife traversing the FERC Project Boundary;
- Effects of continued Project O&M activities on wildlife hunting and plant gathering in within the FERC Project Boundary; and

- Effects of continued and proposed Project O&M on the federally endangered southern Sierra Nevada DPS of fisher (*Pekania pennanti*) and its proposed critical habitat; California condor (*Gymnogyps californianus*); least Bell's vireo (*Vireo bellii pusillus*); southwestern willow flycatcher (*Empidonax traillii extimus*) and its critical habitat; western DPS of western yellow-billed cuckoo (*Coccyzus americanus occidentalis*) and its critical habitat; and monarch butterfly (*Danaus plexippus*), a candidate for listing under the federal ESA.

The following sections describe the potential effects of the proposed Project, including the proposed environmental measures, on wildlife resources. Potential effects on the foothill yellow-legged frog and northwestern pond turtle are described in Section 7.4.3.1, *Effects of Project Operation and Maintenance on Fish and Aquatic Resources*, subsection *Amphibian and Aquatic Reptiles;* and potential effects on plant gathering are described in Section 7.6.3.1*, Effects of Project Operations and Maintenance on Botanical Resources,* subsection *Plant Gathering*. Unavoidable adverse effects are discussed at the end of this section and summarized in Section 10.0, *Conclusions and Recommendations*.

7.5.3.1. Terrestrial Amphibians and Reptiles

With implementation of the proposed environmental measures included in Section 7.5.2, the proposed Project would have no adverse effect on non-special-status terrestrial amphibians and reptiles. As described in Section 5.1, *No-Action Alternative*, Project O&M activities are limited in areas that could affect terrestrial species, including vegetation management. In general, vegetation management using hand trimming and/or herbicides occurs during the spring and early summer to avoid work during periods of high fire danger and is implemented only within the area necessary to provide access and protect Project facilities and provide for worker/public health. Herbicide treatment is conducted in accordance with Forest Service 4(e) Condition 27.

Although no existing direct effects were identified, proposed Measure TB-2 would be developed for the ongoing protection of terrestrial wildlife within the FERC Project Boundary that may be present when conducting Project O&M. Proposed Measure TB-2 would include the development of a new management plan that would outline measures for the protection of terrestrial amphibians and reptiles and other wildlife. Measure TB-2 would include the following elements:

- Measures to protect and prevent wildlife trappings or drowning in the aboveground segments of the flowline;

- BMPs to be implemented during maintenance activities for the protection or avoidance of threatened or endangered or special-status wildlife;

- Notification to applicable resource agencies if any existing or newly federally listed threatened, endangered, or sensitive species other than those described in the plan are identified within the FERC Project Boundary over the term of the new license; and

- Environmental awareness trainings about special-status biological species and wildlife protections.

Proposed Measures TB-1 and LU-1 include the development of new management plans. These new management plans would include measures for the protection of terrestrial amphibians and reptiles that may be present when conducting vegetation and road maintenance a within the FERC Project Boundary.

An assessment of aquatic reptiles and amphibians is included in Section 7.4, *Fish and Aquatic Resources*.

Special-Status Species

Greenhorn Mountain Salamander

The proposed Project would have no effect on Greenhorn Mountain slender salamander. The Greenhorn Mountain slender salamander occurs outside the FERC Project Boundary; it is found only in the Greenhorn Mountains approximately 7.5 miles west of the Project. This species occurs from the higher elevations on the northern side of the Lower Kern River Canyon to the Tule River drainage and upper elevations of the Little Kern River drainage in Kern and Tulare Counties, California (Nafis, 2024; Jockusch et al., 2012). It is also known from one area on the western edge of the Kern Plateau east of the Kern River in Tulare County at a higher elevation than the Project, and most populations are found in coniferous forest containing a mixture of pine, fir, and incense cedar (Jockusch et al., 2012). The habitats preferred by this species are not found within the FERC Project Boundary.

Fairview Slender Salamander

With implementation of proposed Measures LU-1, TB-1, and TB-2, the proposed Project would have no effect on Fairview slender salamander or its habitat. The Fairview slender salamander is a Forest Service species of conservation concern (Forest Service, 2023); it is not listed under the federal ESA or California ESA, and it is not a California species of special concern. The Fairview slender salamander is known from multiple locations around the FERC Project Boundary (CDFW, 2024a). The NFKR designation as a wild and scenic river includes a wildlife outstandingly remarkable value: “The only wildlife feature considered outstandingly remarkable is the presence of the only know habitat for the presently undescribed but distinct, species of slender salamander in the genus (*Batrachoseps* spp.),” which was identified between Johnsondale Bridge and Fairview Dam (Forest Service, 1982). The undescribed species above has since been recognized as *B. bramei*, the Fairview slender salamander (Jockush et al., 2012); however, its distribution is much more extensive than indicated in Forest Service (1982) and most likely includes most of the NFKR from Kernville to well above Johnsondale, and perhaps into the Sequoia National Park.

Fairview salamander is a member of the genus *Batrachoseps*, which is one of the most diverse groups of salamanders in North America with approximately 19 to 20 recognized species (Stebbins, 2003; Jockush et al., 2012). These species tend to occur allopathically (i.e., one species does not overlap the range of another species; Jockush et al., 2012).

The Fairview slender salamander is the only species in the genus with the potential to occur within the FERC Project Boundary.

Fairview slender salamanders do not directly inhabit running creeks or streams where Project water releases could affect individuals, although their potential habitat can occur in riparian areas, including along the banks of perennial or ephemeral streams and creeks. Individuals are subterranean, living in rock interstices, and under logs or stones in locations supporting moist micro-environments (Stebbins, 2003). The species is generally associated with drier talus on north-facing slopes in steep canyons in a variety of habitats including riparian, forests and woodlands, and chaparral plant communities, and is most often found beneath rocks (Stebbins, 2003; Jockusch et al., 2012). These areas typically do not get sun in the winter and remain moist and cool into the spring (Jockusch et al., 2012).

Potentially suitable habitat for the Fairview slender salamander is located at Packsaddle Canyon (type locality for the species[28]; Jockusch et al., 2012) and the gully directly to the north; along the access road to the Salmon Creek Diversion; at the Corral Creek Diversion and pipeline; Tunnel 18/19 Flume Access Road; Gold Ledge Creek; Salmon Creek Diversion and pipeline; Tunnel 16/17 Flume Access Road; the NFKR confluences with Salmon, Gold Ledge, Corral, and Cannell Creeks; and the drainage originating at the forebay and extending down to the NFKR (Appendix E.2). Surveys recorded three individuals in the survey area—two in Packsaddle Canyon (outside the FERC Project Boundary) and one in a small unnamed canyon adjacent to Adit 16/17.

While no Fairview slender salamanders were observed along Cannell Creek, suitable habitat is present within rocky, drier sections along the margins downstream of the Cannell Creek Spillway confluence. This section of stream receives spill flows from the Cannell Creek Spillway; however, the areas within the highwater line of Cannell Creek would not be considered suitable habitat for the species. Therefore, Project-related releases from the Cannell Creek Spillway would have no effect on the salamanders.

As described in Section 5.1, *No-Action Alternative*, Project maintenance activities are limited within areas that are considered suitable habitat for terrestrial wildlife species. Areas of suitable habitat within the FERC Project Boundary occur on slopes off, but not overlapping, Project access roads. Road maintenance is mainly confined to the existing road prism, which avoids habitat. Culvert maintenance occurs as needed, but culverts are located within stream courses, which are not habitat for the Fairview slender salamander. Vegetation maintenance involves mowing or trimming back vegetation using hand tools to maintain roads or maintain access to Project facilities. Herbicides are allowed at some Project facilities; including the sandbox, pressure flume, forebay, penstocks, and powerhouse; which are locations that do not support suitable habitat for the Fairview slender salamander. Vegetation management, using hand trimming and/or herbicides, occurs during the spring and early summer to avoid work during periods of high fire danger and is implemented only within the area necessary to provide safe access and

[28] "Type locality" for a species is the location from which the individual that was used as the basis of the original species description was collected.

protect Project facilities. Herbicide treatment is conducted in accordance with Forest Service 4(e) Condition 27. Given the lack of potentially suitable habitat within the FERC Project Boundary in areas routinely used by Project O&M, ongoing road and vegetation maintenance activities would have no effect on Fairview slender salamander or its habitat.

No changes in habitat conditions for the Fairview slender salamander are expected under the proposed Project. Additionally, Measures LU-1, TB-1, and TB-2 would include protective measures for special-status species during Project O&M activities. Therefore, the proposed Project would have no effect on the Fairview slender salamander or its habitat.

7.5.3.2. Wildlife

Game Species

SCE's proposed Project operations would not disturb, remove, or modify any of the existing vegetation communities or habitats used by game species (routine O&M is described in Section 5.1, *No-Action Alternative*). Road work is confined to the existing road prism, which avoids habitat. Culvert maintenance occurs as needed. Routine maintenance also includes vegetation maintenance. Vegetation maintenance involves mowing or trimming back vegetation to maintain roads or maintain access to Project facilities. Vegetation around Project facilities is mostly maintained using hand tools; however, herbicide use is allowed at some Project facilities; including the sandbox, forebay, pressure flumes, tunnels, penstocks, and powerhouse; which are developed locations. Herbicide use is currently performed in accordance with Forest Service 4(e) Condition 27. The proposed Project would include the use and authorization of herbicide on national forest systems lands and be included as part of Measure TB-1. Therefore, continued operations of the Project is unlikely to affect game species.

Wildlife Hunting

The proposed Project would have no effect on hunting. Current Project O&M activities do not affect wildlife hunting, and SCE does not propose to change Project O&M in a way that would affect wildlife hunting or access to SQF lands. Hunting opportunities in and around the Project are ample, and Project roads provide access to numerous areas open to hunting. Measure LU-1 would describe SCE's responsibility associated with the maintenance of the Project and shared access roads, of which many are ungated and the public can use to access other areas in the SQF.

Wildlife Movements

The presence of the existing aboveground sections of the Project is not anticipated to affect terrestrial biological resources. The aboveground Project facilities do not interfere with or pose an impediment to wildlife movement. Birds and bats are able to freely fly within the FERC Project Boundary. Bats, or evidence of bat use of Project facilities for roosting, were not observed (BIO-3 Technical Memorandum [Appendix E.2]). Bats can easily fly over any of the Project facilities without interference. Large wildlife species can easily move around large structures such as the penstock or siphon. The elevated flumes, such as the one that cross above Salmon Creek, are high enough above the ground so that they do not present a barrier to large species of wildlife. Aboveground flowline segments, such as the open flumes crossing Salmon Creek, do not present any barriers to the movement of terrestrial wildlife and may present an additional pathway for crossing above the creeks and roadways. As part of Project safety features, fences are located around accessible open flume segments for the protection of public health and wildlife safety. No documented occurrences of wildlife drowning have been recorded at the Project.

The aboveground sections of the Project do not emit artificial lighting, so artificial lighting is not an element of the landscape that would have an effect on terrestrial wildlife. If artificial lighting is used, it would be for short-term maintenance work and would not be used at night.

Maintenance of the fences and roads for public and wildlife safety would be included as part of the proposed Measure LU-1. Additionally, the proposed Measure TB-2 would describe the BMPs that would be implemented for the protection of wildlife resources. Therefore, continued operations of the Project is unlikely to affect wildlife movement.

<u>Special-Status Species</u>

Habitat descriptions for special-status wildlife species are presented in Table 7.5-1 through Table 7.5-3. SCE's proposed Project operations would not disturb, remove, or modify any of the existing vegetation communities or habitats used by these species during their life cycles. Routine O&M (Section 5.1, *No-Action Alternative*) lists road and vegetation maintenance activities within vegetation communities used by special-status wildlife species. Road work, including culvert maintenance, is mainly confined to the existing road prism, which avoids habitat. Vegetation maintenance involves mowing or trimming back vegetation to maintain roads or maintain access to Project facilities. Vegetation around Project facilities is mostly maintained using hand tools; however, herbicide use is allowed at some Project facilities; including the sandbox, forebay, pressure flumes, tunnels, penstocks, and powerhouse; which are existing developed locations. Herbicide use is performed in accordance with Forest Service 4(e) Condition 27.

Proposed Measures TB-1 and LU-1 include the development of new management plans that would include measures for the protection of special-status wildlife species that may be present when conducting vegetation and road maintenance and management activities within the FERC Project Boundary.

Proposed Measure TB-2 would continue existing protection measures for special-status wildlife within the FERC Project Boundary that may be present when conducting Project maintenance activities. Proposed Measure TB-2 would also incorporate the requirements for nest checks prior to removal of hazardous woody vegetation (shrubs and trees) to prevent effects on nests protected under the Migratory Bird Treaty Act. Therefore, continued operations of the Project is not expected to affect special-status wildlife species.

7.5.3.3. Threatened and Endangered Species

No federally listed threatened or endangered terrestrial wildlife species are known to occur within the FERC Project Boundary, and there is no critical habitat within the FERC Project Boundary. Potentially occurring federally listed threatened or endangered terrestrial wildlife species within the Project Area were determined through the literature review as described in BIO-3 Technical Memorandum (Appendix E.2) and FERC's SD1 (FERC, 2021).

If newly or current federally listed threatened or endangered species are determined to be present within the FERC Project Boundary over the term of the new license, proposed Measure TB-2 would include protection measures for wildlife, including threatened and endangered species that may be present when conducting Project maintenance activities. This measure would also include a USFWS notification procedure when a threatened or endangered species is found within the FERC Project Boundary.

<u>Fisher and Its Proposed Critical Habitat</u>

The southern Sierra Nevada DPS of fisher has not been recorded within the FERC Project Boundary (CDFW, 2024a). However, it has been reported just north of the town of Johnsondale, which is approximately 4 miles northwest of the Fairview Dam. No proposed critical habitat overlaps the FERC Project Boundary. Proposed critical habitat Unit 1 extends as far south as Cannell Peak approximately 5 miles east of the FERC Project Boundary. Unit 2 of proposed critical habitat is located west of the Kern River in the Greenhorn Mountains, well outside the FERC Project Boundary (87 *Federal Register* 66987 [November 7, 2022]). Only marginal habitat for the fisher exists within the FERC Project Boundary. Salmon Creek Diversion, Corral Creek Diversion, and forested areas adjacent to NFKR may contain marginal foraging and resting habitat for dispersing fisher from critical habitat Unit 1 east of the Project. These areas contain riparian habitat with high canopy cover (mostly greater than 60 percent) that fisher require for movement. Dens are located primarily in mixed-coniferous and coniferous-hardwood stands with dense canopy cover, a moderate intermix of California black oaks, and on steep slopes (approximately 20 to 50 percent slopes)—habitat elements that are lacking within the FERC Project Boundary.

Continued operations of the Project as proposed by SCE would have no effect on suitable dispersal habitat for fisher. SCE's O&M practices, as previously described for Fairview slender salamander (see also Section 5.1, *No-Action Alternative*), do not include disturbing areas other than existing roads and locations disturbed by current, routine maintenance. Furthermore, the proposed Project would not affect denning habitat because no suitable denning habitat is present in or adjacent to the FERC Project Boundary. Finally, the fisher is mobile and nocturnal and would be able to negotiate around any disturbances if encountered; SCE normally does not perform maintenance at night. Therefore, the continued Project O&M would have no effect on the southern Sierra Nevada DPS of fisher.

California Condor and Its Critical Habitat

The closest recorded occurrence of a nesting California condor is approximately 30 miles northeast of the northern end of the FERC Project Boundary. This historical occurrence was recorded in 1978 at the Blue Ridge Condor Area. The most recent occurrence of a condor in the vicinity of the study area was recorded in 2021 and is approximately 8 miles south on the west side of Lake Isabella (eBird, 2021). Based on habitat requirements for nesting, the California condor is not expected to breed within the FERC Project Boundary. Foraging habitat for California condor consists of large expanses of open savanna and grasslands. Marginal foraging habitat occurs within the FERC Project Boundary. Potentially suitable foraging habitat occurs in the grassland areas in the southern portion of the FERC Project Boundary.

On September 24, 1976, the USFWS designated critical habitat for the condor consisting of nine areas that encompass approximately 600,000 acres (41 *Federal Register* 41914 [September 24, 1976]). These areas occur in the following counties: Tulare, San Luis Obispo, Ventura, Kern, Santa Barbara, and Los Angeles. The Project is not located within designated critical habitat for this species.

Continued Project O&M as proposed by SCE would not affect suitable foraging habitat for California condor. SCE's O&M practices, as previously described for Fairview slender salamander (see also Section 5.1, *No-Action Alternative*), do not include disturbing areas beyond existing roads and locations disturbed by current, routine maintenance. Nesting habitat would not be affected because no suitable nesting habitat is present in or adjacent to the FERC Project Boundary. Therefore, the continued Project O&M would have no effect on the California condor or its potentially suitable foraging habitat.

Least Bell's Vireo and Its Critical Habitat

The least Bell's vireo is an obligate riparian species (i.e., nests exclusively in riparian habitat) and prefers early successional habitat. The most critical factor in habitat structure is the presence of a dense understory shrub layer from approximately 3 to 6 feet above ground, where nests are typically placed, and a dense stratified canopy for foraging (Goldwasser, 1981; Gray and Greaves, 1981, 1984; Salata, 1983). The FERC Project Boundary does not support the dense understory required by this species for nesting. The closest known occurrence of least Bell's vireo is south of the study area around Lake Isabella, the Kern River Preserve, and the South Fork Wildlife Area. Based on the habitat needs for least Bell's vireo, there is low potential for nesting in the study area; however, least Bell's vireo may forage and migrate through the study area on its way to/from suitable habitat near the NFKR. This species was not observed or detected through vocalization during riparian bird surveys in 2023 (BIO-3 Technical Memorandum [Appendix E.2]).

On February 2, 1994, the USFWS issued its final determination of critical habitat for the least Bell's vireo, identifying approximately 37,560 acres as critical habitat in Santa Barbara, Ventura, Los Angeles, San Bernardino, Riverside, and San Diego Counties

(59 *Federal Register* 4845 [March 4, 1994]). The Project is not located in designated critical habitat for this species.

Continued operations of the Project as proposed by SCE would not affect potentially suitable riparian habitat for least Bell's vireo. SCE's O&M practices, as previously described for Fairview slender salamander (see also Section 5.1, *No-Action Alternative*), do not include disturbing areas beyond existing roads and locations disturbed by current, routine maintenance. Therefore, the continued Project O&M would have no effect on the least Bell's vireo or its potentially suitable habitat.

Southwestern Willow Flycatcher and Its Critical Habitat

The southwestern willow flycatcher occurs in dense riparian habitat along rivers, streams, and other wetlands. Typically, southwestern willow flycatcher nests in thickets of trees and shrubs 13 to 23 feet or greater in height, with a dense understory and a high percentage of canopy cover (60 *Federal Register* 38 [February 27, 1995]). The dense patches are often interspersed with small openings, open water, or small areas of shorter/sparse vegetation that create a mosaic of habitat that is not uniformly dense (USFWS, 2002). In almost all cases, slow-moving or still surface water and/or saturated soil is present during wet or non-drought years (USFWS, 2002).

The closest known occurrence of southwestern willow flycatcher is south of the Project around Lake Isabella, the Kern River Preserve, and the South Fork Wildlife Area. Based on the habitat needs for southwestern willow flycatcher, there is low potential for nesting in the study area; however, the southwestern willow flycatcher may forage and migrate through the study area on its way to/from suitable habitat near the NFKR. This species was not observed or detected through vocalization during riparian bird surveys in 2023 (BIO-3 Technical Memorandum [Appendix E.2]).

On January 3, 2013, the USFWS published a rule revising critical habitat for the southwestern willow flycatcher (78 *Federal Register* 344 [January 3, 2013]). This final rule designated 208,973 acres (1,227 stream miles) in 24 management units on a combination of federal, state, Tribal, and private lands in California, Nevada, Utah, Arizona, and New Mexico. In California, critical habitat was designated in Inyo, Kern, Los Angeles, Riverside, Santa Barbara, San Bernardino, San Diego, and Ventura Counties. The Project is not located within the 2013 revised critical habitat for the southwestern willow flycatcher.

Continued operations of the Project as proposed by SCE would not affect potentially suitable riparian habitat for southwestern willow flycatcher. SCE's O&M practices, as previously described for Fairview slender salamander (see also Section 5.1, *No-Action Alternative*), do not include disturbing areas beyond existing roads and locations disturbed by current, routine maintenance. Therefore, the continued Project O&M would have no effect on the southwestern willow flycatcher or its potentially suitable habitat.

Distinct Population Segment of Western Yellow-Billed Cuckoo and Its Critical Habitat

The DPS of the western yellow-billed cuckoo requires large tracts of riparian forest or woodland habitat along low-gradient rivers and streams in open riverine valleys that provide wide floodplain conditions; the species does not use narrow, steep-walled canyons (79 *Federal Register* 59992 [October 3, 2014]). Stopover and foraging sites can be similar to breeding sites but can be smaller in size (sometimes less than 10 acres in extent), narrower in width, and lack understory vegetation when compared to nesting sites (Laymon et al.,1997; 79 *Federal Register* 59992 [October 3, 2014]). The closest known occurrence of western yellow-billed cuckoo is south of the Project around Lake Isabella, the Kern River Preserve, and the South Fork Wildlife Area. Based on the habitat needs for western DPS of western yellow-billed cuckoo, there is low potential for nesting in the study area; however, the western yellow-billed cuckoo may forage and migrate through the study area on its way to/from suitable habitat near the NFKR.

On August 15, 2014, the USFWS published a rule designating proposed critical habitat for the western DPS of western yellow-billed cuckoo (79 *Federal Register* 48548 [August 15, 2014]). This proposed rule designated approximately 546,335 acres in Arizona, California, Colorado, Idaho, Nevada, New Mexico, Texas, Utah, and Wyoming. In California, proposed critical habitat includes Eel River (Humboldt County), Sacramento River (Colusa, Glenn, Butte, and Tehama Counties), Sutter Bypass (Sutter County), South Fork Kern River Valley (Kern County), Owens River (Inyo County), Prado Flood Control Basin (Riverside County), and in two areas along the Colorado River (Imperial, Riverside, and San Bernardino Counties in California and Yuma, La Paz, and Mojave Counties in Arizona) (79 *Federal Register* 48548 [August 15, 2014]). The USFWS has not yet finalized this proposed rule. The Project is not located within the proposed designated critical habitat area for this species.

Continued operations of the Project as proposed by SCE would not affect potentially suitable riparian habitat for western yellow-billed cuckoo. SCE's O&M practices, as previously described for Fairview slender salamander (see Section 5.1, *No-Action Alternative*), do not include disturbing areas beyond existing roads and locations disturbed by current, routine maintenance. Therefore, the continued Project O&M would have no effect on the western yellow-billed cuckoo or its potentially suitable habitat.

Monarch Butterfly

The monarch butterfly is a federal candidate[29] species that is not yet listed or proposed for listing; California overwintering sites would be protected by this status. While the USFWS determined that listing the species' overwintering sites as threatened is warranted, it has been precluded by higher priority actions. Monarch butterflies lay their eggs on the obligate milkweed (*Asclepias* spp.). In the western United States, monarchs overwinter at groves of trees along the Pacific Coast with a large concentration overwintering in California. Currently, the most common overwintering groves consist of

[29] The USFWS does not treat candidate species as if they are listed until they are formally proposed for listing.

non-native blue gum (*Eucalyptus* spp.), but they also use native Monterey pine (*Pinus radiata*), Monterey cypress (*Hesperocyparis macrocarpa*), western sycamore (*Platanus racemosa*), and coast redwood (*Sequoia sempervirens*). The majority of overwintering sites are found within 1.5 miles of the Pacific Ocean, which moderates temperatures, at lower elevations (i.e., 200 to 300 feet amsl), and situated on slopes oriented to the south, southwest, or west that provide the most solar radiation (Pelton et al., 2016). Suitable habitat is present within the FERC Project Boundary, but the nearest reported location of a monarch individual is in Weldon, 10 miles south. The closest known overwintering population is approximately 25 miles south of Lake Isabella near Lake Ming and the Kern River Golf Course (Western Monarch Count, 2024). Additionally, this species was not observed within the FERC Project Boundary during wildlife surveys (BIO-3 Technical Memorandum [Appendix E.2]).

Continued Project O&M as proposed by SCE would not affect potentially suitable habitat for overwintering or migrating monarch butterflies. SCE's O&M practices, as previously described for Fairview slender salamander (see also Section 5.1, *No-Action Alternative*), do not include disturbing areas beyond existing roads and locations disturbed by current, routine maintenance. Additionally, no milkweed, host plants for the monarch butterfly, was observed during relicensing surveys (Section 7.6, *Botanical Resources*). Therefore, the continued Project O&M would have no effect on the monarch butterfly or its potentially suitable overwintering habitat.

7.5.3.4. Unavoidable Adverse Effects

The proposed Project would not result in unavoidable adverse effects on wildlife resources.

7.6. BOTANICAL RESOURCES

This section describes the vegetation communities, special-status plant species, non-native invasive plants (NNIPs), and applicable management direction regarding botanical resources within the FERC Project Boundary and lands surrounding the Project, including Project bypass reaches. Section 7.6.1 describes the affected environment and resource conditions under current Project O&M (i.e., baseline condition). Section 7.6.2 identifies environmental measures, management plans, and programs that are included in the proposed Project. Section 7.6.3 includes an analysis of ongoing or new environmental effects of O&M from the proposed Project, including potential effects from proposed environmental measures. The full description of proposed measures is provided in Appendix E.1.

The descriptions within this section were developed using existing, relevant, and reasonably available information and include results from the following relicensing study where additional information was collected to further describe the resources:

- BOT-1 General Botanical Resources

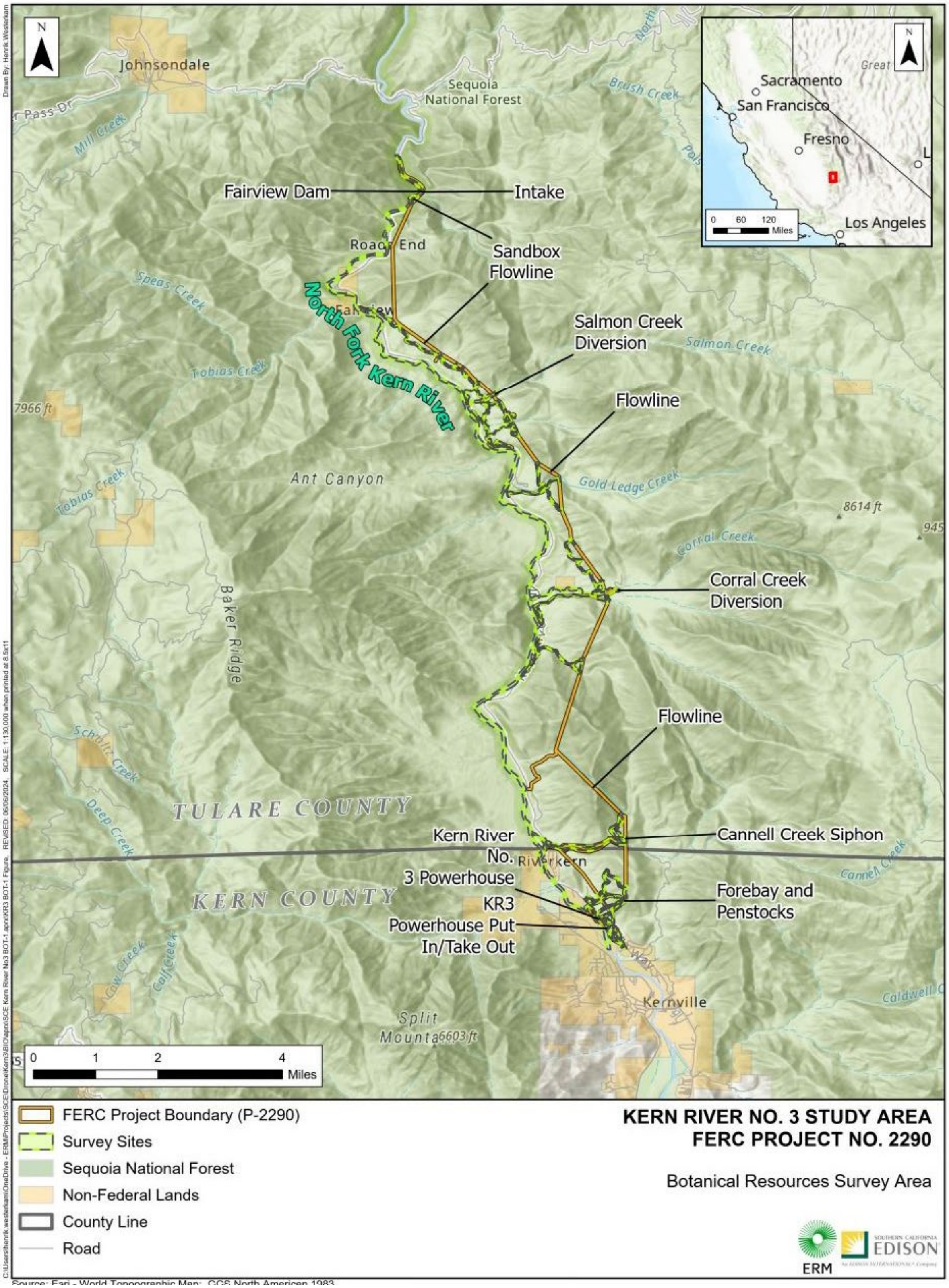
The BOT-1 Technical Memorandum that supports the botanical resource area is included in Appendix E.2.

7.6.1. AFFECTED ENVIRONMENT

Botanical resources were evaluated at areas within the FERC Project Boundary during the relicensing BOT-1 Study (Figure 7.6-1). Vegetation within the FERC Project Boundary is diverse and includes 19 vegetation alliances or cover types, 347 plant species (Table 7.6-1), and 10 special-status plant species.

7.6.1.1. Endangered Species Act-Listed Species and Designated Critical Habitat

Springville clarkia (*Clarkia springvillensis*; federally threatened), Bakersfield cactus (*Opuntia basilaris* var. *treleasei*; federally endangered), and San Joaquin woolythreads (*Monolopia congdonii*; federally endangered) were determined to be unlikely to occur during pre-survey analysis. These species were not found during field surveys, and no other federally listed plants were identified during surveys. No designated critical habitat for federally listed plant species is present within the FERC Project Boundary.



FERC = Federal Energy Regulatory Commission

Figure 7.6-1. Botanical Resources Survey Area.

Table 7.6-1. Plants Documented During Relicensing Surveys

Family [a]	**Scientific Name** [a]	**Common Name** [a]	**Status** [b, c] **(Federal/State/CRPR/Forest Service)**
Agavaceae	*Hesperoyucca whipplei*	Chaparral yucca	Native
Asteraceae	*Brickellia californica*	California brickellia	Native
Asteraceae	*Brickellia microphylla*	Little leaved brickellia	Native
Asteraceae	*Centromadia pungens*	Common tarweed	Native
Asteraceae	*Chaenactis fremontii*	Fremont pincushion	Native
Asteraceae	*Chaenactis glabriuscula*	Common yellow chaenactis	Native
Asteraceae	*Chaenactis xantiana*	Xantus' chaenactis	Native
Asteraceae	*Cirsium occidentale*	Western thistle	Native
Asteraceae	*Cirsium occidentale* var. *californicum*	California thistle	Native
Asteraceae	*Cirsium vulgare*	Bull thistle	Cal-IPC Moderate
Asteraceae	*Corethrogyne filaginifolia*	Common sandaster	Native
Asteraceae	*Deinandra mohavensis*	Mojave tarplant	—/SE/1B.3/SCC
Asteraceae	*Encelia actoni*	Acton encelia	Native
Asteraceae	*Ericameria arborescens*	Goldenfleece	Native
Asteraceae	*Ericameria cuneata*	Rock goldenbush	Native
Asteraceae	*Ericameria linearifolia*	Interior goldenbush	Native
Asteraceae	*Ericameria nauseosa*	Rubber rabbitbrush	Native
Asteraceae	*Ericameria teretifolia*	Green rabbitbrush	Native
Asteraceae	*Erigeron canadensis*	Canada horseweed	Native
Asteraceae	*Erigeron multiceps*	Kern River daisy	—/—/1B.3/SCC
Asteraceae	*Eriophyllum ambiguum*	Annual woolly sunflower	Native
Asteraceae	*Eriophyllum confertiflorum*	Yellow yarrow	Native
Asteraceae	*Eriophyllum lanatum*	Wooly sunflower	Native
Asteraceae	*Eriophyllum pringlei*	Pringle eriophyllum	Native
Asteraceae	*Euthamia occidentalis*	Western goldenrod	Native
Asteraceae	*Gnaphalium palustre*	Lowland cudweed	Native
Asteraceae	*Helianthus annuus*	Hairy leaved sunflower	Native
Asteraceae	*Hemizonella minima*	Opposite leaved tarweed	Native

Family [a]	Scientific Name [a]	Common Name [a]	Status [b, c] (Federal/State/CRPR/Forest Service)
Asteraceae	*Heterotheca grandiflora*	Telegraph weed	Native
Asteraceae	*Heterotheca sessiliflora*	Golden aster	Native
Asteraceae	*Holocarpha heermannii*	Heermann's tarweed	Native
Asteraceae	*Lactuca serriola*	Prickly lettuce	Non-native
Asteraceae	*Lasthenia debilis*	Greene's goldfields	Native
Asteraceae	*Lasthenia gracilis*	Needle goldfields	Native
Asteraceae	*Layia glandulosa*	White layia	Native
Asteraceae	*Lepidospartum squamatum*	Scale broom	Native
Asteraceae	*Leptosyne bigelovii*	Bigelow coreopsis	Native
Asteraceae	*Logfia filaginoides*	Filago	Native
Asteraceae	*Logfia gallica*	Narrowleaf cottonrose	Native
Asteraceae	*Malacothrix californica*	California dandelion	Native
Asteraceae	*Malacothrix clevelandii*	Cleveland's malacothrix	Native
Asteraceae	*Malacothrix glabrata*	Desert dandelion	Native
Asteraceae	*Matricaria discoidea*	Pineapple weed	Native
Asteraceae	*Micropus californicus*	Qtips	Native
Asteraceae	*Monolopia lanceolata*	Common monolopia	Native
Asteraceae	*Orochaenactis thysanocarpha*	Mountain pincushion	Native
Asteraceae	*Pseudognaphalium beneolens*	Cudweed	Native
Asteraceae	*Pseudognaphalium luteoalbum*	Jersey cudweed	Non-native
Asteraceae	*Rafinesquia californica*	California chicory	Native
Asteraceae	*Rigiopappus leptocladus*	Wireweed	Native
Asteraceae	*Senecio flaccidus* var. *douglasii*	Bush groundsel	Native
Asteraceae	*Senecio vulgaris*	Common groundsel	Non-native
Asteraceae	*Solidago elongata*	West coast Canada goldenrod	Native
Asteraceae	*Stephanomeria pauciflora*	Wire lettuce	Native
Asteraceae	*Stephanomeria virgata*	Twiggy wreath plant	Native
Asteraceae	*Stylocline gnaphaloides*	Everlasting stylocline	Native

Family [a]	**Scientific Name** [a]	**Common Name** [a]	**Status** [b, c] **(Federal/State/CRPR/Forest Service)**
Asteraceae	*Syntrichopappus fremontii*	Fremont's syntrichopappus	Native
Asteraceae	*Uropappus lindleyi*	Silver puffs	Native
Asteraceae	*Xanthium strumarium*	Cocklebur	Native
Bartramiaceae	*Anacolia* sp.	No common name	Native
Betulaceae	*Alnus rhombifolia*	White alder	Native
Boraginaceae	*Amsinckia intermedia*	Common fiddleneck	Native
Boraginaceae	*Amsinckia menziesii*	Menzies' fiddleneck	Native
Boraginaceae	*Amsinckia tessellata*	Devil's lettuce	Native
Boraginaceae	*Cryptantha echinella*	Prickly cryptantha	Native
Boraginaceae	*Cryptantha flaccida*	Beaked cryptantha	Native
Boraginaceae	*Cryptantha muricata*	Prickly cryptantha	Native
Boraginaceae	*Pectocarya penicillata*	Winged pectocarya	Native
Boraginaceae	*Pectocarya setosa*	Moth combseed	Native
Boraginaceae	*Plagiobothrys acanthocarpus*	Adobe allocarya	Native
Boraginaceae	*Plagiobothrys arizonicus*	Arizona popcornflower	Native
Boraginaceae	*Plagiobothrys tenellus*	Slender popcorn flower	Native
Brassicaceae	*Boechera arcuata*	Arching rockcress	Native
Brassicaceae	*Boechera sparsiflora*	Sicklepod rockcress	Native
Brassicaceae	*Boechera stricta*	Drummond's rockcress	Native
Brassicaceae	*Brassica nigra*	Black mustard	Cal-IPC Moderate
Brassicaceae	*Caulanthus coulteri*	Coulter's jewel flower	Native
Brassicaceae	*Descurainia pinnata* ssp. *brachycarpa*	Western tansymustard	Native
Brassicaceae	*Descurainia sophia*	Herb sophia	Cal-IPC Limited
Brassicaceae	*Draba verna*	Whitlow grass	Non-native
Brassicaceae	*Erysimum capitatum* var. *capitatum*	Sanddune wallflower	Native
Brassicaceae	*Hirschfeldia incana*	Summer mustard	Cal-IPC Moderate
Brassicaceae	*Lepidium nitidum*	Shining pepper grass	Native
Brassicaceae	*Nasturtium officinale*	Watercress	Native
Brassicaceae	*Sisymbrium altissimum*	Tumble mustard	Non-native
Brassicaceae	*Sisymbrium irio*	London rocket	Cal-IPC Limited

Family [a]	Scientific Name [a]	Common Name [a]	Status [b, c] (Federal/State/CRPR/Forest Service)
Brassicaceae	*Sisymbrium orientale*	Indian hedge mustard	Non-native
Brassicaceae	*Streptanthus tortuosus*	Jewelweed	Native
Brassicaceae	*Thysanocarpus curvipes*	Common fringe pod	Native
Brassicaceae	*Thysanocarpus laciniatus*	Narrow leaved lacepod	Native
Brassicaceae	*Tropidocarpum gracile*	Slender tropidocarpum	Native
Cactaceae	*Opuntia basilaris* var. *basilaris*	Beavertail cactus	Native
Caprifoliaceae	*Lonicera interrupta*	Chaparral honeysuckle	Native
Caryophyllaceae	*Herniaria hirsuta*	Herniaria	Non-native
Caryophyllaceae	*Silene gallica*	Common catchfly	Non-native
Caryophyllaceae	*Silene laciniata* ssp. *californica*	California Indian pink	Native
Caryophyllaceae	*Stellaria media*	Chickweed	Non-native
Chenopodiaceae	*Chenopodium atrovirens*	Dark green goosefoot	Native
Chenopodiaceae	*Chenopodium berlandieri*	Pit seed goosefoot	Native
Chenopodiaceae	*Chenopodium californicum*	California goosefoot	Native
Chenopodiaceae	*Chenopodium fremontii*	Fremont's goosefoot	Native
Chenopodiaceae	*Chenopodium pratericola*	Meadow goosefoot	Native
Chenopodiaceae	*Salsola tragus*	Russian thistle	Cal-IPC Limited
Comandraceae	*Comandra umbellata*	Bastard toadflax	Native
Convolvulaceae	*Calystegia longipes*	Piute morning glory	Native
Convolvulaceae	*Cuscuta californica*	California dodder	Native
Crassulaceae	*Dudleya abramsii* ssp. *calcicola*	Limestone dudleya	—/—/4.3/—
Crassulaceae	*Sedella pumila*	Sierra mock stonecrop	Native
Cucurbitaceae	*Cucurbita palmata*	Coyote melon	Native
Cucurbitaceae	*Marah horrida*	Sierra manroot	Native
Cupressaceae	*Calocedrus decurrens*	Incense cedar	Native
Cupressaceae	*Hesperocyparis nevadensis*	Piute cypress	—/—/1B.2/SCC
Cupressaceae	*Juniperus californica*	California juniper	Native
Cyperaceae	*Carex alma*	Sedge	Native
Cyperaceae	*Carex nudata*	Torrent sedge	Native
Cyperaceae	*Carex praegracilis*	Field sedge	Native

Family [a]	**Scientific Name** [a]	**Common Name** [a]	**Status** [b, c] **(Federal/State/CRPR/Forest Service)**
Cyperaceae	*Carex senta*	Rough sedge	Native
Cyperaceae	*Eleocharis parishii*	Parish's spike rush	Native
Dennstaedtiaceae	*Pteridium aquilinum*	Western brackenfern	Native
Dryopteridaceae	*Dryopteris arguta*	California wood fern	Native
Ephedraceae	*Ephedra nevadensis*	Nevada ephedra	Native
Ephedraceae	*Ephedra viridis*	Green ephedra	Native
Equisetaceae	*Equisetum arvense*	Common horsetail	Native
Ericaceae	*Arctostaphylos glauca*	Big berry manzanita	Native
Ericaceae	*Arctostaphylos patula*	Green leaf manzanita	Native
Ericaceae	*Arctostaphylos viscida*	Whiteleaf manzanita	Native
Euphorbiaceae	*Croton setiger*	Turkey mullein	Native
Euphorbiaceae	*Euphorbia albomarginata*	Rattlesnake sandmat	Native
Fabaceae	*Acmispon argophyllus*	Silverleaf trefoil	Native
Fabaceae	*Acmispon glaber*	Deerweed	Native
Fabaceae	*Acmispon grandiflorus*	Large leaved lotus	Native
Fabaceae	*Acmispon strigosus*	Strigose lotus	Native
Fabaceae	*Albizia julibrissin*	Silktree	Non-native
Fabaceae	*Astragalus purshii* var. *tinctus*	Pursh's milk vetch	Native
Fabaceae	*Lupinus adsurgens*	Drew's silky lupine	Native
Fabaceae	*Lupinus andersonii*	Anderson's lupine	Native
Fabaceae	*Lupinus benthamii*	Spider lupine	Native
Fabaceae	*Lupinus bicolor*	Lupine	Native
Fabaceae	*Lupinus cocinnus*	Bajada lupine	Native
Fabaceae	*Lupinus excubitus*	Grape lupine	Native
Fabaceae	*Lupinus stiversii*	Harlequin lupine	Native
Fabaceae	*Melilotus albus*	White sweetclover	Non-native
Fabaceae	*Robinia pseudoacacia*	Black locust	Cal-IPC Limited
Fabaceae	*Trifolium hirtum*	Rose clover	Cal-IPC Limited
Fabaceae	*Trifolium microcephalum*	Hairy clover	Native
Fabaceae	*Trifolium willdenovii*	Tomcat clover	Native
Fagaceae	*Quercus chrysolepis*	Gold cup live oak	Native

Family [a]	Scientific Name [a]	Common Name [a]	Status [b, c] (Federal/State/CRPR/Forest Service)
Fagaceae	*Quercus garryana*	Oregon oak	Native
Fagaceae	*Quercus kelloggii*	California black oak	Native
Fagaceae	*Quercus wislizeni*	Interior live oak	Native
Garryaceae	*Garrya flavescens*	Ashy silk tassel	Native
Gerinaceae	*Erodium cicutarium*	Coastal heron's bill	Cal-IPC Limited
Grimmiaceae	*Grimmia* sp.	Grimmia moss	Native
Grossulariaceae	*Ribes cereum*	Wax currant	Native
Grossulariaceae	*Ribes roezlii*	Sierra gooseberry	Native
Hydrophyllaceae	*Emmenanthe penduliflora*	Whispering bells	Native
Hydrophyllaceae	*Nemophila pulchella*	Eastwood's nemophila	Native
Hydrophyllaceae	*Phacelia cicutaria* var. *hispida*	Caterpillar phacelia	Native
Hydrophyllaceae	*Phacelia distans*	Common phacelia	Native
Hydrophyllaceae	*Phacelia egena*	Rock phacelia	Native
Hydrophyllaceae	*Phacelia exilis*	Transverse Range phacelia	—/—/4.3/—
Hydrophyllaceae	*Phacelia mutabilis*	Changeable phacelia	Native
Hydrophyllaceae	*Phacelia ramosissima*	Branching phacelia	Native
Hydrophyllaceae	*Phacelia tanacetifolia*	Tansy leafed phacelia	Native
Hydrophyllaceae	*Pholistoma auritum* var. *auritum*	Blue fiestaflower	Native
Juncaceae	*Juncus balticus*	Wire rush	Native
Juncaceae	*Juncus bufonius*	Common toad rush	Native
Juncaceae	*Juncus mexicanus*	Mexican rush	Native
Juncaceae	*Juncus rugulosus*	Wrinkled rush	Native
Lamiaceae	*Lamium amplexicaule*	Henbit	Non-native
Lamiaceae	*Marrubium vulgare*	White horehound	Cal-IPC Limited
Lamiaceae	*Monardella breweri*	Brewer's monardella	Native
Lamiaceae	*Salvia columbariae*	Chia sage	Native
Lamiaceae	*Stachys albens*	Cobwebby hedge nettle	Native
Lamiaceae	*Trichostema lanceolatum*	Vinegarweed	Native
Liliaceae	*Calochortus invenustus*	Plain mariposa	Native
Liliaceae	*Calochortus venustus*	Butterfly mariposa lily	Native

Family [a]	Scientific Name [a]	Common Name [a]	Status [b, c] (Federal/State/CRPR/Forest Service)
Loasaceae	*Mentzelia albicaulis*	White stemmed blazing star	Native
Loasaceae	*Mentzelia veatchiana*	Veatch's blazingstar	Native
Lythraceae	*Lythrum californicum*	Common loosestrife	Native
Malvaceae	*Fremontodendron californicum*	California fremontia	Native
Malvaceae	*Malacothamnus fremontii*	Fremont's bush mallow	Native
Malvaceae	*Malacothamnus orbiculatus*	Tehachapi bush mallow	Native
Montiaceae	*Calandrinia menziesii*	Calandrinia	Native
Montiaceae	*Calyptridium monandrum*	Common pussypaws	Native
Montiaceae	*Claytonia exigua*	Little spring beauty	Native
Montiaceae	*Claytonia parviflora* ssp. *parviflora*	Miner's lettuce	Native
Montiaceae	*Claytonia perfoliata*	Miner's lettuce	Native
Myrtaceae	*Eucalyptus sideroxylon*	Red ironbark	Non-native
Namaceae	*Eriodictyon californicum*	Yerba santa	Native
Nyctaginaceae	*Mirabilis laevis*	Desert wishbone bush	Native
Oleaceae	*Forestiera pubescens*	Desert olive	Native
Oleaceae	*Fraxinus latifolia*	Oregon ash	Native
Oleaceae	*Fraxinus velutina*	Arizona ash	Native
Onagraceae	*Camissonia campestris*	Field primrose	Native
Onagraceae	*Camissonia contorta*	Contorted sun cup	Native
Onagraceae	*Clarkia speciosa* ssp. *polyantha*	Red spot clarkia	Native
Onagraceae	*Clarkia unguiculata*	Woodland clarkia	Native
Onagraceae	*Clarkia xantiana* ssp. *parviflora*	Kern Canyon clarkia	—/—/4.2/—
Onagraceae	*Clarkia xantiana* ssp. *xantiana*	Xantus' clarkia	Native
Onagraceae	*Epilobium brachycarpum*	Willow herb	Native
Onagraceae	*Epilobium canum* ssp. *latifolium*	California fuchsia	Native
Onagraceae	*Epilobium ciliatum*	Slender willow herb	Native
Onagraceae	*Oenothera californica* ssp. *californica*	California evening primrose	Native

Family [a]	**Scientific Name** [a]	**Common Name** [a]	**Status** [b, c] **(Federal/State/CRPR/Forest Service)**
Onagraceae	*Oenothera elata*	Evening primrose	Native
Orobanchaceae	*Castilleja applegatei*	Wavy leaf paintbrush	Native
Orobanchaceae	*Castilleja exserta*	Owl's clover	Native
Orobanchaceae	*Castilleja minor*	Lesser paintbrush	Native
Orobanchaceae	*Castilleja subinclusa* ssp. *subinclusa*	Long leaf paintbrush	Native
Orobanchaceae	*Pedicularis semibarbata*	Pine woods lousewort	Native
Papaveraceae	*Argemone munita*	Prickly poppy	Native
Papaveraceae	*Ehrendorferia chrysantha*	Golden eardrops	Native
Papaveraceae	*Eschscholzia caespitosa*	Tufted eschscholzia	Native
Papaveraceae	*Eschscholzia californica*	California poppy	Native
Papaveraceae	*Eschscholzia minutiflora*	Coville's poppy	Native
Papaveraceae	*Platystemon californicus*	Creamcups	Native
Phrymaceae	*Diplacus aurantiacus*	Sticky monkey-flower	Native
Phrymaceae	*Diplacus calycinus*	Rock Bush Monkeyflower	Native
Phrymaceae	*Erythranthe cardinalis*	Cardinal monkey flower	Native
Phrymaceae	*Erythranthe discolor*	Two-colored monkeyflower	—/—/4.2/—
Phrymaceae	*Erythranthe floribunda*	Many-flowered monkeyflower	Native
Phrymaceae	*Erythranthe guttata*	Seep monkeyflower	Native
Phrymaceae	*Mimetanthe pilosa*	Snouted monkey flower	Native
Pinaceae	*Pinus jeffreyi*	Jeffrey pine	Native
Pinaceae	*Pinus monophylla*	Single leaf pinyon	Native
Pinaceae	*Pinus sabiniana*	Gray pine	Native
Plantaginaceae	*Collinsia torreyi*	Torrey's collinsia	Native
Plantaginaceae	*Keckiella breviflora*	Gaping keckiella	Native
Plantaginaceae	*Penstemon grinnellii* var. *scrophularioides*	Grinnell's beardtongue	Native
Plantaginaceae	*Penstemon laetus* var. *laetus*	Mountain blue penstemon	Native
Plantaginaceae	*Penstemon speciosus*	Showy penstemon	Native
Plantaginaceae	*Plantago ovata*	Desert plantain	Native

Family [a]	**Scientific Name** [a]	**Common Name** [a]	**Status** [b, c] **(Federal/State/CRPR/Forest Service)**
Plantaginaceae	*Veronica persica*	Bird's eye speedwell	Non-native
Platanaceae	*Platanus racemosa*	California sycamore	Native
Poaceae	*Agrostis exarata*	Spike bentgrass	Native
Poaceae	*Argopyron cristatum*	Crested wheatgrass	Non-native
Poaceae	*Avena barbata*	Slim oat	Cal-IPC Moderate
Poaceae	*Avena fatua*	Wildoats	Cal-IPC Moderate
Poaceae	*Bromus diandrus*	Ripgut brome	Cal-IPC Moderate
Poaceae	*Bromus hordeaceus*	Soft chess	Cal-IPC Limited
Poaceae	*Bromus madritensis* ssp. *rubens*	Red brome	Cal-IPC High
Poaceae	*Bromus sitchensis* var. *carinatus*	California brome	Native
Poaceae	*Bromus tectorum*	Cheatgrass	Cal-IPC High
Poaceae	*Deschampsia danthonioides*	Annual hairgrass	Native
Poaceae	*Distichlis spicata*	Salt grass	Native
Poaceae	*Elymus elymoides*	Squirreltail	Native
Poaceae	*Elymus glaucus*	Blue wildrye	Native
Poaceae	*Elymus triticoides*	Beardless wild rye	Native
Poaceae	*Festuca microstachys*	Small fescue	Native
Poaceae	*Festuca myuros*	Rattail sixweeks grass	Cal-IPC Moderate
Poaceae	*Hordeum murinum*	Foxtail	Cal-IPC Moderate
Poaceae	*Melica californica*	California melicgrass	Native
Poaceae	*Melica imperfecta*	California melic	Native
Poaceae	*Melica stricta*	Nodding melic	Native
Poaceae	*Muhlenbergia rigens*	Deergrass	Native
Poaceae	*Poa bulbosa*	Bulbous blue grass	Non-native
Poaceae	*Poa secunda*	Pine bluegrass	Native
Poaceae	*Polypogon monspeliensis*	Annual beard grass	Cal-IPC Limited
Poaceae	*Schismus arabicus*	Arabian schismus	Cal-IPC Limited
Poaceae	*Setaria pumila*	Yellow bristlegrass	Non-native
Poaceae	*Stipa occidentalis*	Western needlegrass	Native
Poaceae	*Stipa speciosa*	Desert needle grass	Native

Family [a]	**Scientific Name** [a]	**Common Name** [a]	**Status** [b, c] **(Federal/State/CRPR/Forest Service)**
Polemoniaceae	*Allophyllum gilioides*	Dense false gilia	Native
Polemoniaceae	*Eriastrum tracyi*	Tracy's eriastrum	—/SR/3.2/SCC
Polemoniaceae	*Gilia brecciarum* ssp. *neglecta*	Nevada gilia	Native
Polemoniaceae	*Gilia cana*	Showy gilia	Native
Polemoniaceae	*Gilia capitata* ssp. *abrotanifolia*	Ball gilia	Native
Polemoniaceae	*Gilia leptantha* ssp. *purpusii*	Purpus' gilia	Native
Polemoniaceae	*Gilia ocroleuca*	Volcanic gilia	Native
Polemoniaceae	*Gilia tricolor*	Bird's eyes	Native
Polemoniaceae	*Leptosiphon bicolor*	True babystars	Native
Polemoniaceae	*Leptosiphon nudatus*	Tehachapi linanthus	Native
Polemoniaceae	*Linanthus dichotomus*	Evening snow	Native
Polemoniaceae	*Phlox diffusa*	Spreading phlox	Native
Polygonaceae	*Centrostegia thurberi*	Thurber spiny herb	Native
Polygonaceae	*Chorizanthe membranacea*	Pink spineflower	Native
Polygonaceae	*Chorizanthe xanti*	Riverside spineflower	Native
Polygonaceae	*Eriogonum baileyi*	Bailey's buckwheat	Native
Polygonaceae	*Eriogonum fasciculatum*	California buckwheat	Native
Polygonaceae	*Eriogonum gracillimum*	Rose and white buckwheat	Native
Polygonaceae	*Eriogonum nudum* var. *pubiflorum*	Hairy flowered buckwheat	Native
Polygonaceae	*Eriogonum nudum* var. *westonii*	Weston's buckwheat	Native
Polygonaceae	*Eriogonum roseum*	Wand buckwheat	Native
Polygonaceae	*Eriogonum saxatile*	Rock buckwheat	Native
Polygonaceae	*Eriogonum wrightii* var. *subscaposum*	Wright's buckwheat	Native
Polygonaceae	*Eriogonum wrightii* var. *trachygonum*	Wright's buckwheat	Native
Polygonaceae	*Fallopia convolvulus*	Black bindweed	Non-native
Polygonaceae	*Persicaria punctata*	Dotted smartweed	Native
Polygonaceae	*Rumex crispus*	Curly dock	Cal-IPC Limited

Family [a]	Scientific Name [a]	Common Name [a]	Status [b, c] (Federal/State/CRPR/Forest Service)
Pottiaceae	*Didymodon vinealis*	Didymon moss	Native
Pteridaceae	*Adiantum capillus-veneris*	Venus hair	Native
Pteridaceae	*Myriopteris covillei*	Coville's lip fern	Native
Pteridaceae	*Pellaea mucronata*	Bird's foot fern	Native
Pteridaceae	*Pentagramma triangularis*	Gold back fern	Native
Ranunculaceae	*Clematis ligusticifolia*	Creek clematis	Native
Ranunculaceae	*Delphinium hansenii* ssp. *kernense*	Kern larkspur	Native
Ranunculaceae	*Delphinium purpusii*	Rose-flowered larkspur (=Kern County larkspur)	—/—/1B.3/SCC
Ranunculaceae	*Ranunculus testiculatus*	Tubercled crowfoot	Non-native
Ranunculaceae	*Thalictrum fendleri*	Fendler's meadow rue	Native
Rhamnaceae	*Ceanothus cuneatus* var. *cuneatus*	Buckbrush	Native
Rhamnaceae	*Ceanothus leucodermis*	Chaparral whitethorn	Native
Rhamnaceae	*Frangula californica*	California coffeeberry	Native
Rhamnaceae	*Rhamnus crocea*	Red berry	Native
Rhamnaceae	*Rhamnus ilicifolia*	Evergreen buckthorn	Native
Rosaceae	*Adenostoma fasciculatum*	Chamise	Native
Rosaceae	*Cercocarpus betuloides* var. *betuloides*	Birch-leaf mountain mahogany	Native
Rosaceae	*Chamaebatia foliolosa*	Sierran mountain misery	Native
Rosaceae	*Prunus andersonii*	Desert peach	Native
Rosaceae	*Pyracantha coccinea*	Scarlet firethorn	Cal-IPC Limited
Rosaceae	*Rosa woodsii*	Woods' rose	Native
Rosaceae	*Rubus armeniacus*	Himalayan blackberry	Cal-IPC High
Rosaceae	*Rubus parviflorus*	Thimbleberry	Native
Rubiaceae	*Galium aparine*	Cleavers	Native
Rubiaceae	*Galium bolanderi*	Bolander's bedstraw	Native
Rubiaceae	*Galium nuttallii*	Climbing bedstraw	Native
Rutaceae	*Ruta graveolens*	Common rue	Non-native
Salicaceae	*Populus fremontii*	Fremont cottonwood	Native
Salicaceae	*Populus trichocarpa*	Black cottonwood	Native

Family [a]	**Scientific Name** [a]	**Common Name** [a]	**Status** [b, c] **(Federal/State/CRPR/Forest Service)**
Salicaceae	*Salix exigua*	Narrowleaf willow	Native
Salicaceae	*Salix geyeriana*	Geyer's willow	Native
Salicaceae	*Salix laevigata*	Polished willow	Native
Salicaceae	*Salix lasiolepis*	Arroyo willow	Native
Salicaceae	*Salix melanopsis*	Dusky willow	Native
Sapindaceae	*Aesculus californica*	Buckeye	Native
Saxifragaceae	*Lithophragma parviflorum*	Pink woodland star	Native
Scrophularaceae	*Scrophularia californica*	California bee plant	Native
Scrophularaceae	*Verbascum thapsus*	Wooly mullein	Cal-IPC Limited
Selaginellaceae	*Selaginella* sp.	Unknown spikemoss	Native
Simaroubaceae	*Ailanthus altissima*	Tree of heaven	Cal-IPC Moderate
Solanaceae	*Datura wrightii*	Jimsonweed	Native
Solanaceae	*Nicotiana attenuata*	Coyote tobacco	Native
Solanaceae	*Solanum umbelliferum*	Blue witch	Native
Solanaceae	*Solanum xanti*	Nightshade	Native
Themidaceae	*Brodiaea terrestris* ssp. *kernensis*	Kern dwarf brodiaea	Native
Themidaceae	*Dichelostemma volubile*	Twining brodiaea	Native
Themidaceae	*Dipterostemon capitatum* ssp*. capitatum*	Bluedicks	Native
Typhaceae	*Typha latifolia*	Broadleaf cattail	Native
Ulmaceae	*Ulmus parviflora*	Chinese elm	Non-native
Urticaceae	*Urtica dioica*	Stinging nettle	Native
Verbanaceae	*Verbena lasiostachys* var. *lasiostachys*	Vervain	Native
Viburnaceae	*Sambucus mexicana*	Blue elderberry	Native
Viscaceae	*Arceuthobium campylopodum*	Pine dwarf mistletoe	Native
Viscaceae	*Phoradendron leucarpum*	American mistletoe	Native
Vitaceae	*Parthenocissus inserta*	Woodbine	Non-native

Family [a]	**Scientific Name** [a]	**Common Name** [a]	**Status** [b, c] **(Federal/State/CRPR/Forest Service)**
Vitaceae	*Vitis californica*	California wild grape	Native
Zygophyllaceae	*Tribulus terrestris*	Puncture vine	Cal-IPC Limited

Cal-IPC = California Invasive Plant Council; CRPR = California Rare Plant Rank; SCC = designated as Forest Service species of conservation concern

Notes:

[a] Calflora, 2024

[b] CNDDB, 2024

[c] Status:

Federal
— = No federal status

State
SE = California listed as endangered
SR = California listed as rare
— = No California status

CRPR List Ranks
List 1B = Plants rare, threatened, or endangered in California and elsewhere
List 2B = Plants rare, threatened, or endangered in California, but more common elsewhere
List 3 = More information needed about this plant, a review list
List 4 = Plants of limited distribution, a watch list

CRPR Threat Ranks
.2 = Fairly threatened in California (moderate degree/immediacy of threat
.3 = Not very threatened in California (low degree/immediacy of threat or no current threat known)

Cal-IPC Rating Definitions:

High = These species have 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 = These species have 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 = These species are 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.

7.6.1.2. Vegetation Communities

Across the Project botanical study sites, vegetation communities were placed into a total of 19 vegetation alliances as defined by the Classification and Assessment with Landsat of Visible Ecological Groupings (CALVEG) system used by the Forest Service (Forest Service, 2009). These alliances include four tree, nine shrub, and one herbaceous-dominated communities, as well as five non-vegetated land cover types (Table 7.6-2). Detailed results and descriptions of CALVEG vegetation alliances in the survey area are included in *BOT-1 General Botanical Resources Technical Memorandum* (Appendix E.2). The most abundant study site CALVEG alliances include Riparian Mixed Hardwood (NR) (232 acres), Rivers and Streams (W1) (182 acres), and Wedgeleaf Ceanothus (CL) (88 acres) (Figure 7.6-2).

Table 7.6-2. CALVEG Vegetation Alliances Mapped in Project Study Sites

Vegetation Alliance	Abbreviation	Acres Mapped
Rabbitbrush	BR	3.36
Chamise	CA	32.39
Wedgeleaf Ceanothus	CL	87.98
Lower Montane Mixed Chaparral	CQ	5.40
Scrub Oak	CS	1.10
Ephedra	FD	1.85
Annual Grasses and Forbs	HG	62.03
Urban-related Bare Soil	IB	0.28
Scalebroom	LS	1.48
Baccharis (Riparian)	ML	1.50
Riparian Mixed Hardwood	NR	232.48
Gray Pine	PD	35.75
Willow	QO	1.44
Interior Live Oak	QW	50.56
Buckwheat	SB	31.09
Urban or Developed	UB	5.10
Rivers and Streams	W1	181.68
Reservoirs	W3	2.45
Exposed Non-Water Features	W9	29.28

CALVEG = Classification and Assessment with Landsat of Visible Ecological Groupings

CALVEG = Classification and Assessment with Landsat of Visible Ecological Grouping

Figure 7.6-2a. Mapped CALVEG Vegetation Alliances Ground-Truthed During Botanical Field Surveys (Sheet 1 of 6).

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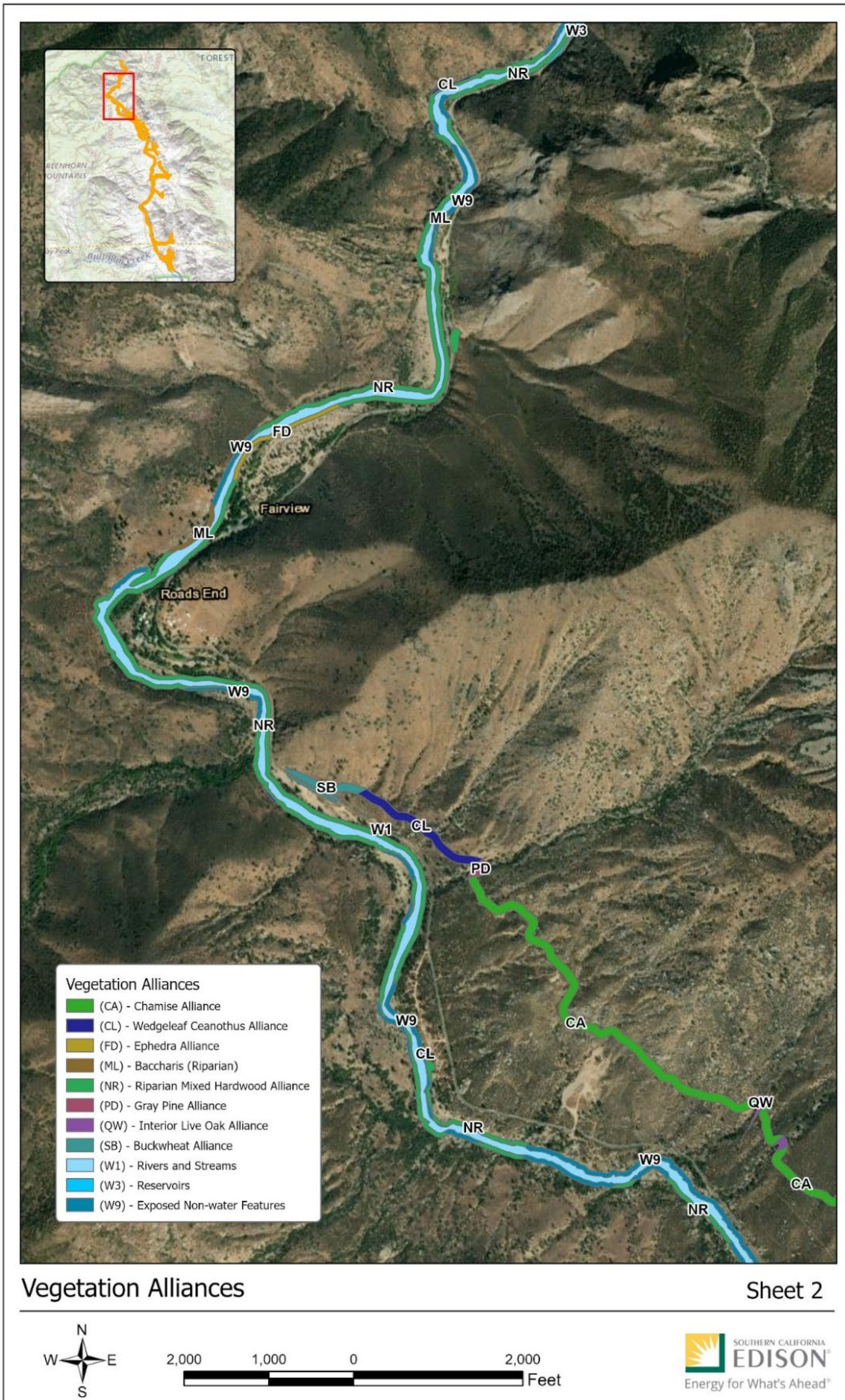

CALVEG = Classification and Assessment with Landsat of Visible Ecological Grouping

Figure 7.6-2b. Mapped CALVEG Vegetation Alliances Ground-Truthed During Botanical Field Surveys (Sheet 2 of 6).

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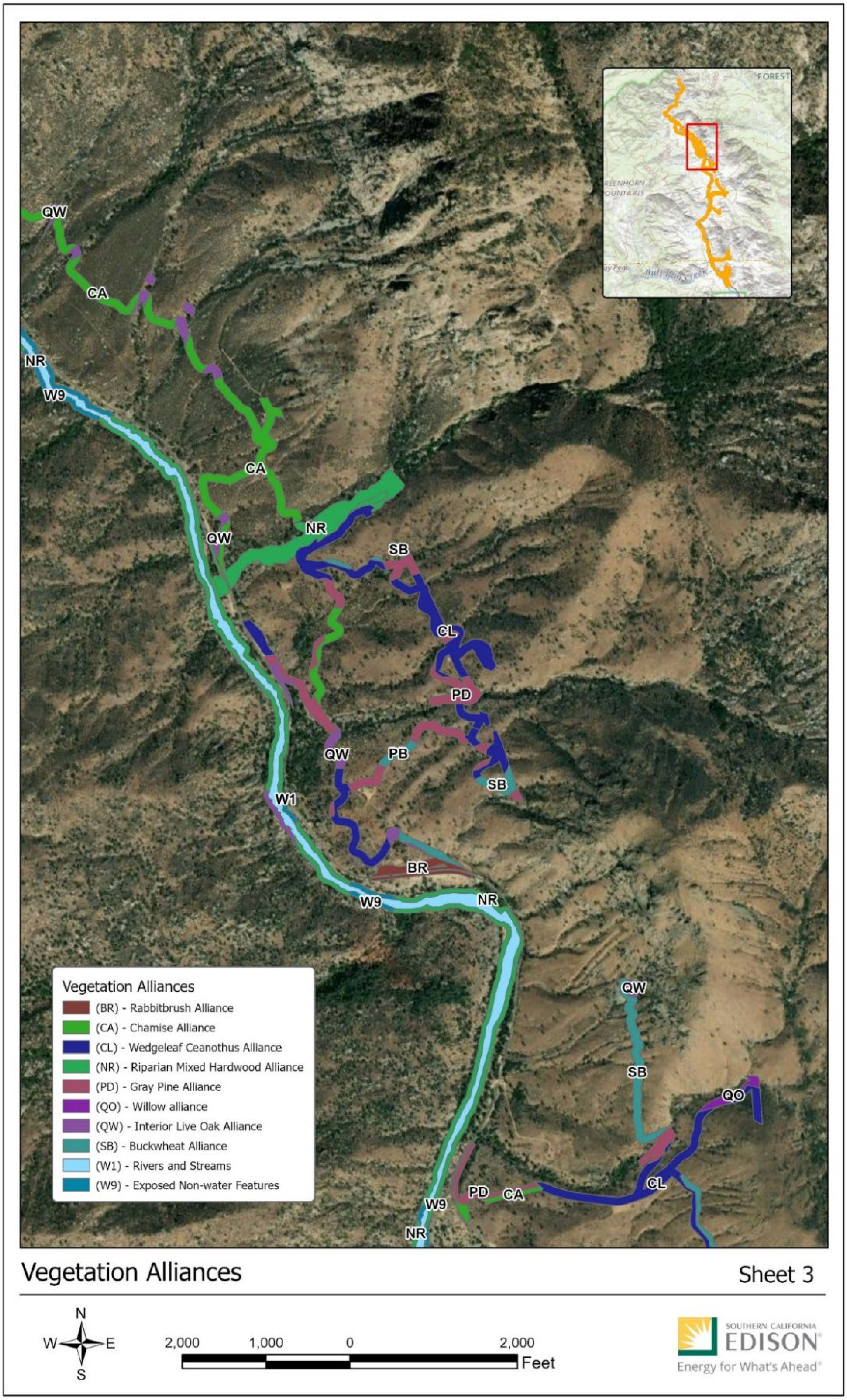

CALVEG = Classification and Assessment with Landsat of Visible Ecological Grouping

Figure 7.6-2c. Mapped CALVEG Vegetation Alliances Ground-Truthed During Botanical Field Surveys (Sheet 3 of 6).

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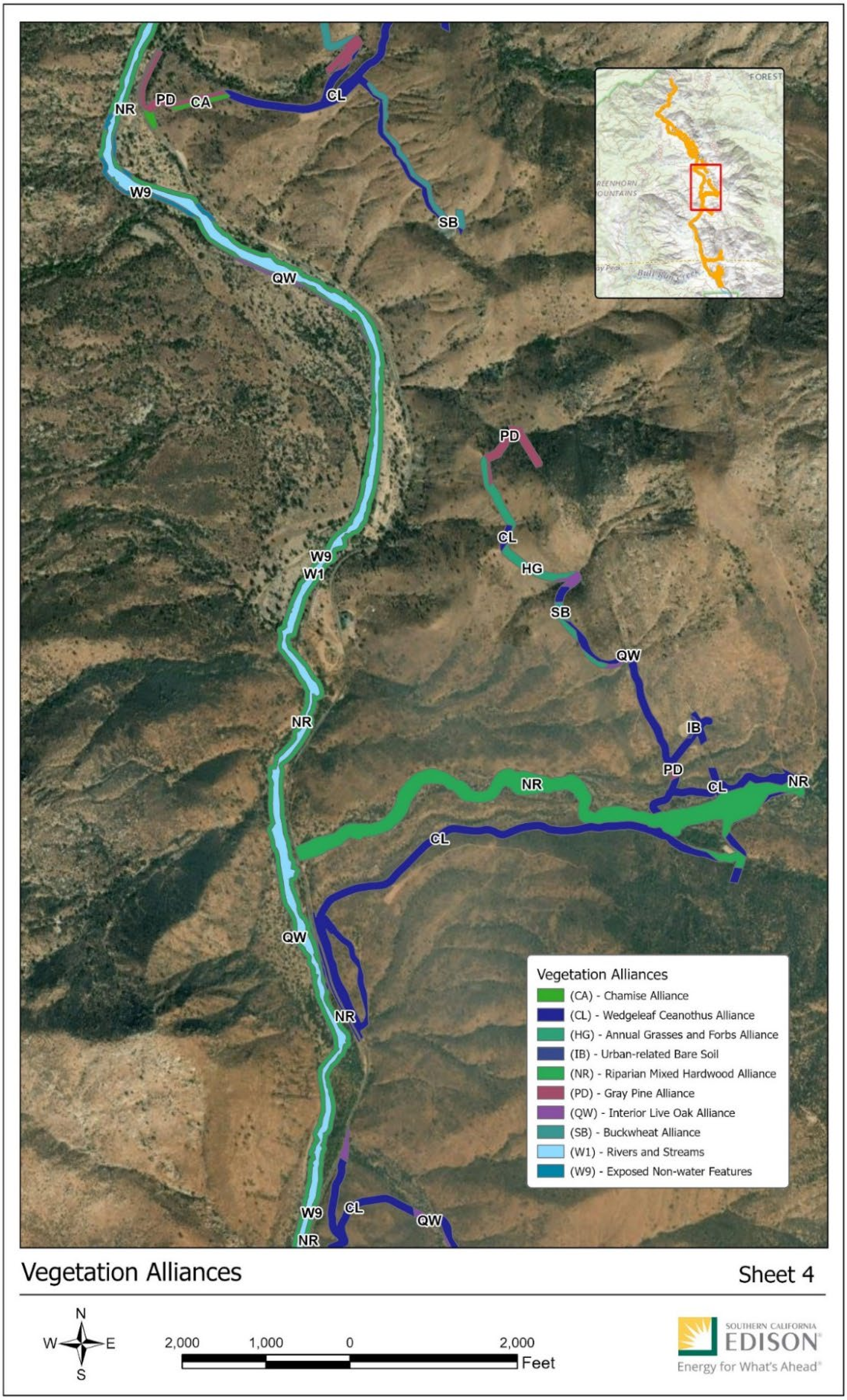

CALVEG = Classification and Assessment with Landsat of Visible Ecological Grouping

Figure 7.6-2d. Mapped CALVEG Vegetation Alliances Ground-Truthed During Botanical Field Surveys (Sheet 4 of 6).

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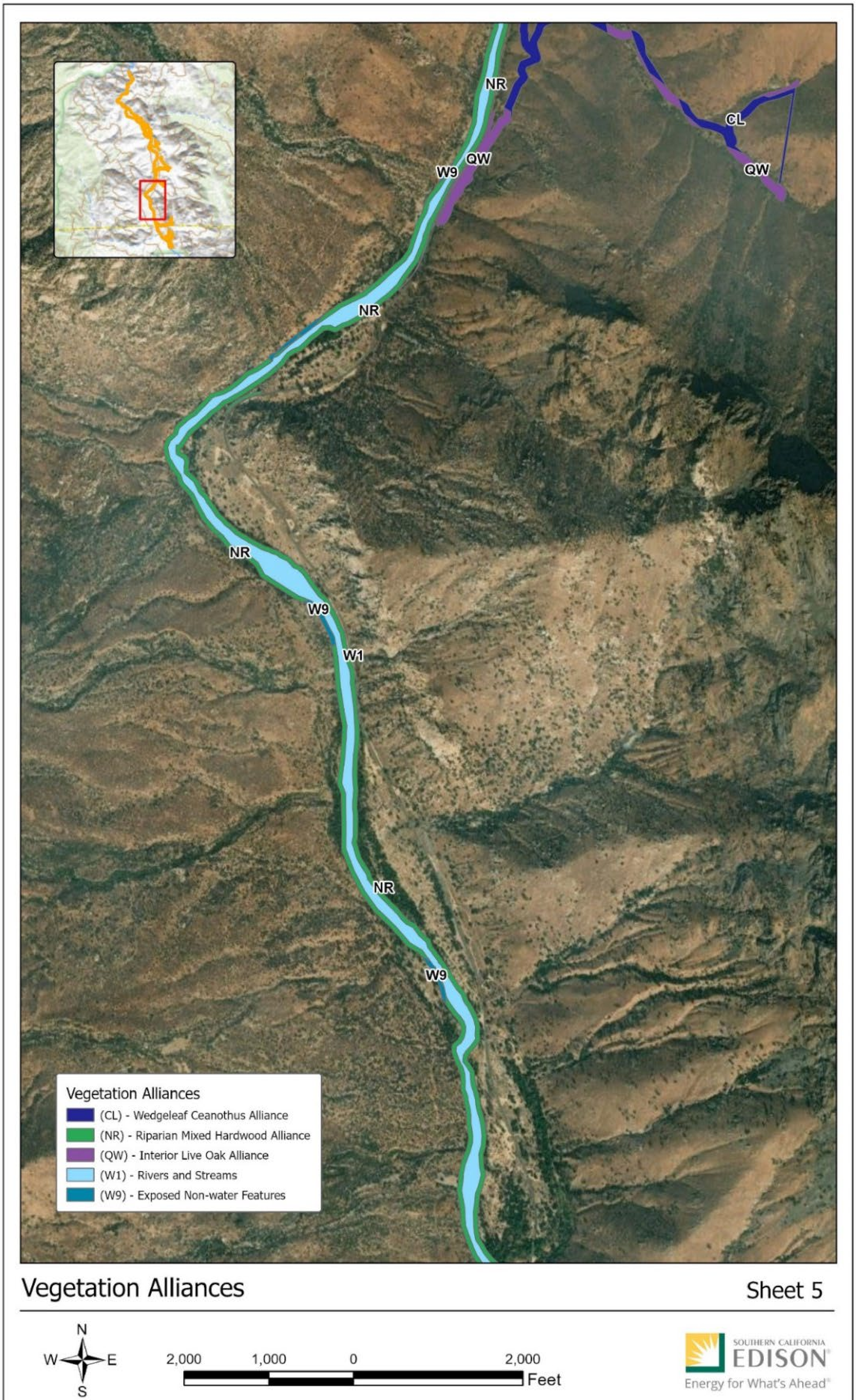

CALVEG = Classification and Assessment with Landsat of Visible Ecological Grouping

Figure 7.6-2e. Mapped CALVEG Vegetation Alliances Ground-Truthed During Botanical Field Surveys (Sheet 5 of 6).

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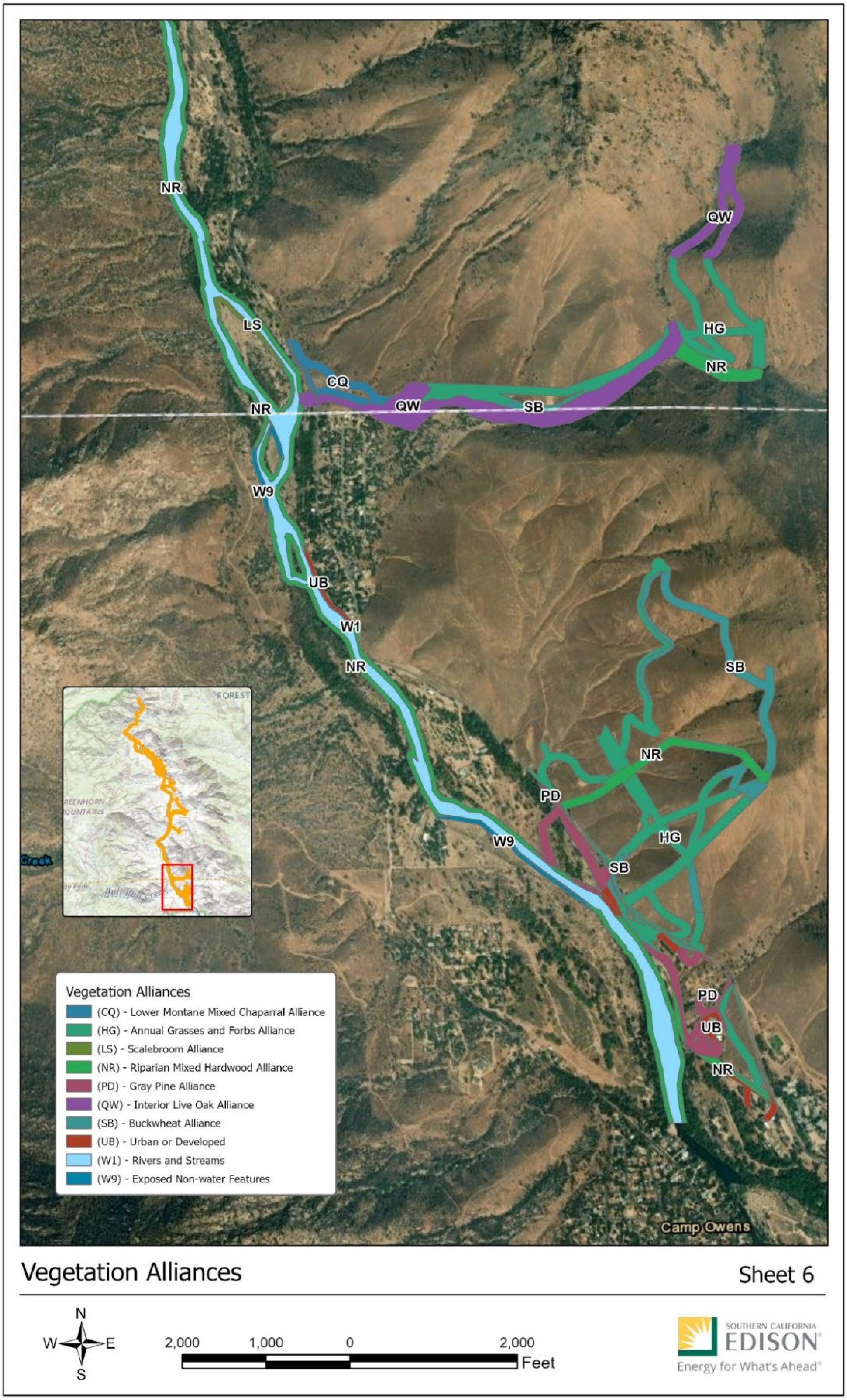

CALVEG = Classification and Assessment with Landsat of Visible Ecological Grouping

Figure 7.6-2f. Mapped CALVEG Vegetation Alliances Ground-Truthed During Botanical Field Surveys (Sheet 6 of 6).

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Sensitive Natural Communities

No sensitive natural communities, as classified by Holland (1986), were documented in the CNDDB within the FERC Project Boundary (CDFW, 2024). However, two communities documented near the Project may potentially occur within the FERC Project Boundary: Great Valley Cottonwood Riparian Forest and Southern Interior Cypress Forest.

Great Valley Cottonwood Riparian Forest is known along the SFKR, from eastern Isabella Lake to Canebrake Creek. The riparian habitat (mapped as Riparian Mixed Hardwood Alliance; Figure 7.6-2) along the NFKR within the FERC Project Boundary may meet the classification for this natural community, but it has not been formally documented as such by the CNDDB (CDFW, 2024).

Southern Interior Cypress Forest is known from distinct groves in canyons, mountain slopes, and ephemeral channels near the Project (CDFW, 2024). Three small stands of Piute cypress (*Hesperocyparis nevadensis*) were documented within the Project study sites (Figure 7.6-3; Sheets a, e, and f). Fewer than 10 individual plants were present in each stand. No specific minimum size or quantity has been established for sensitive natural communities, but these stands may not be large enough to be considered Southern Interior Cypress Forest.

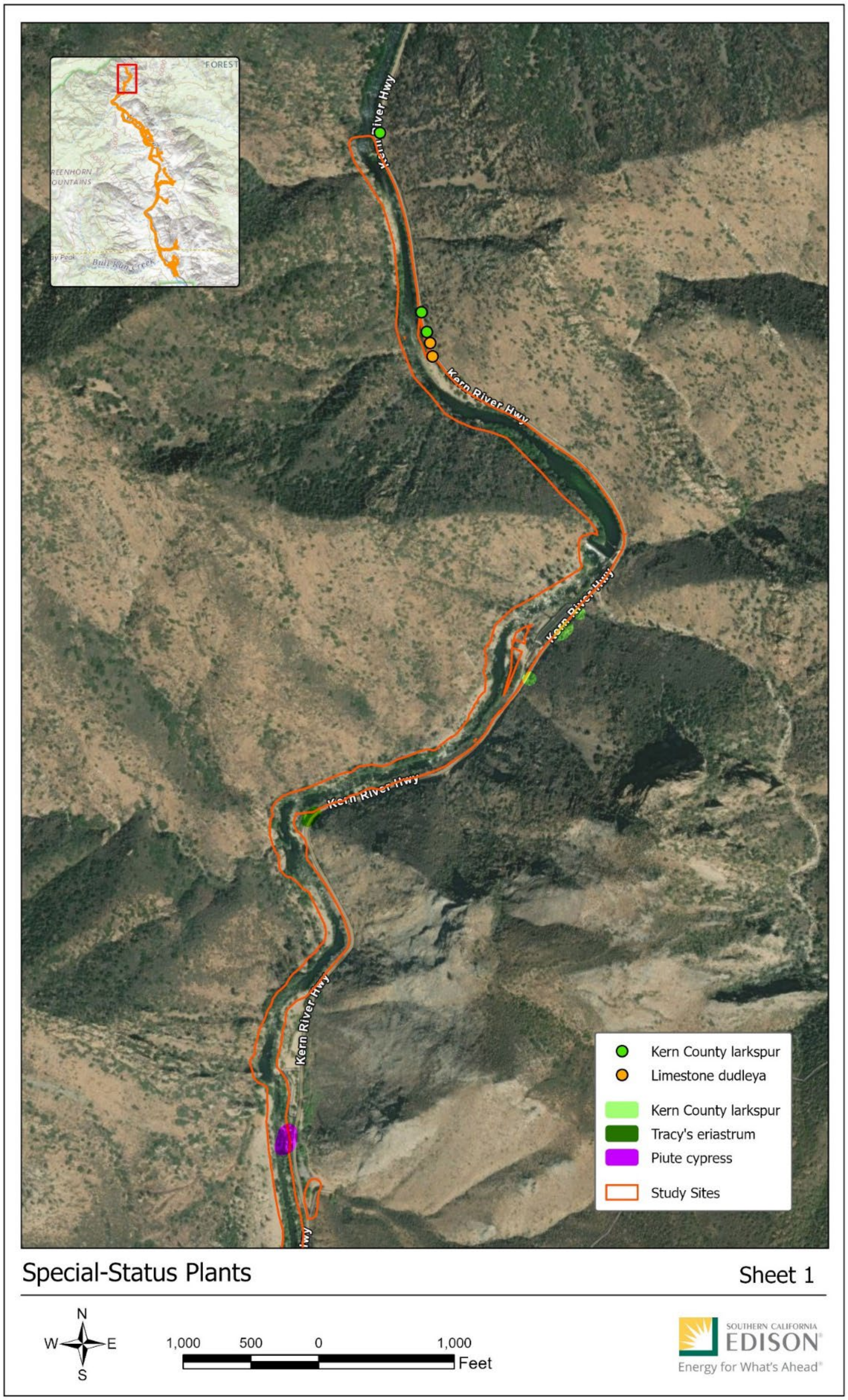


Figure 7.6-3a. Special-Status Plant Species Observed During Botanical Field Surveys (Sheet 1 of 6).

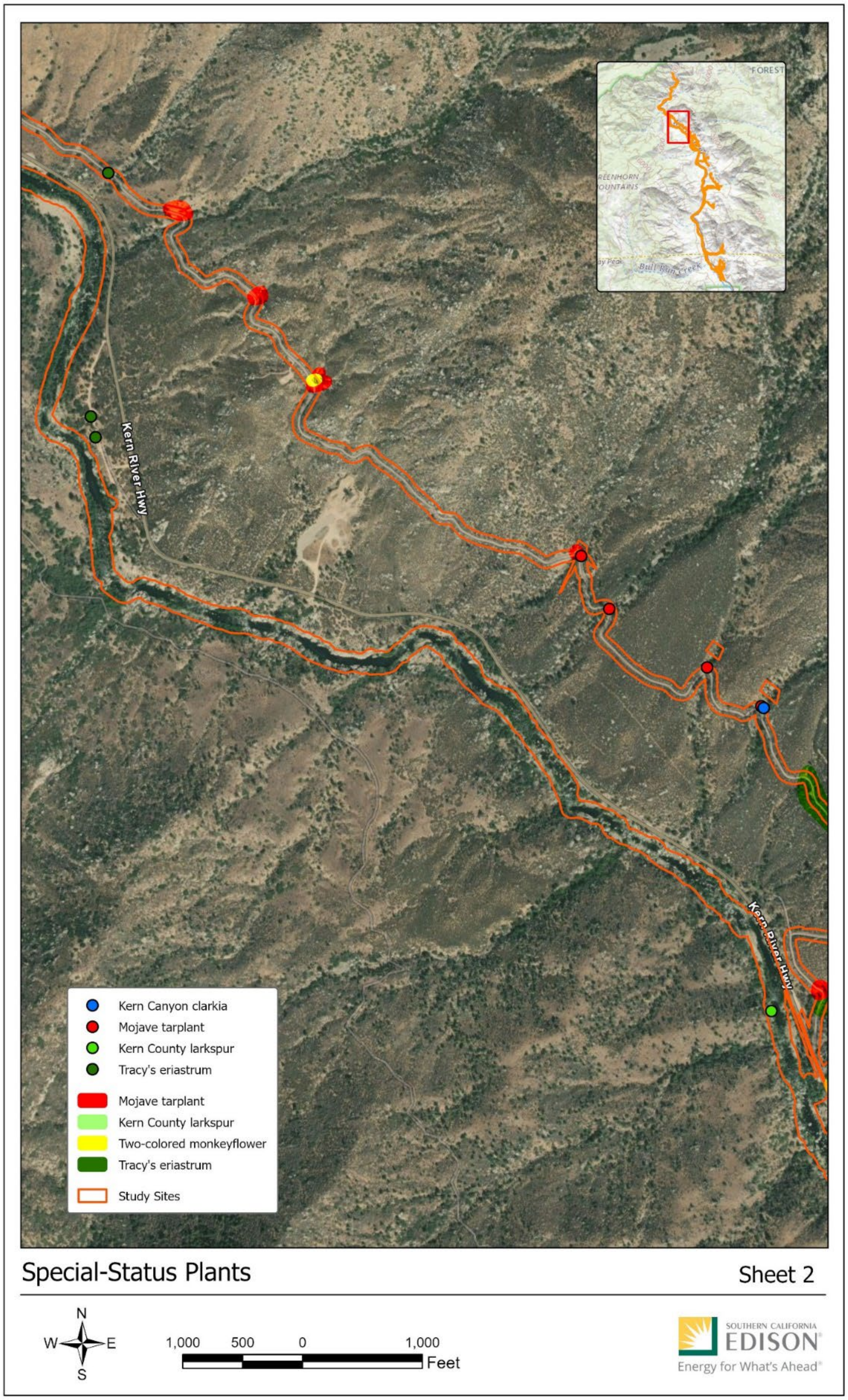


Figure 7.6-3b. Special-Status Plant Species Observed During Botanical Field Surveys (Sheet 2 of 6).

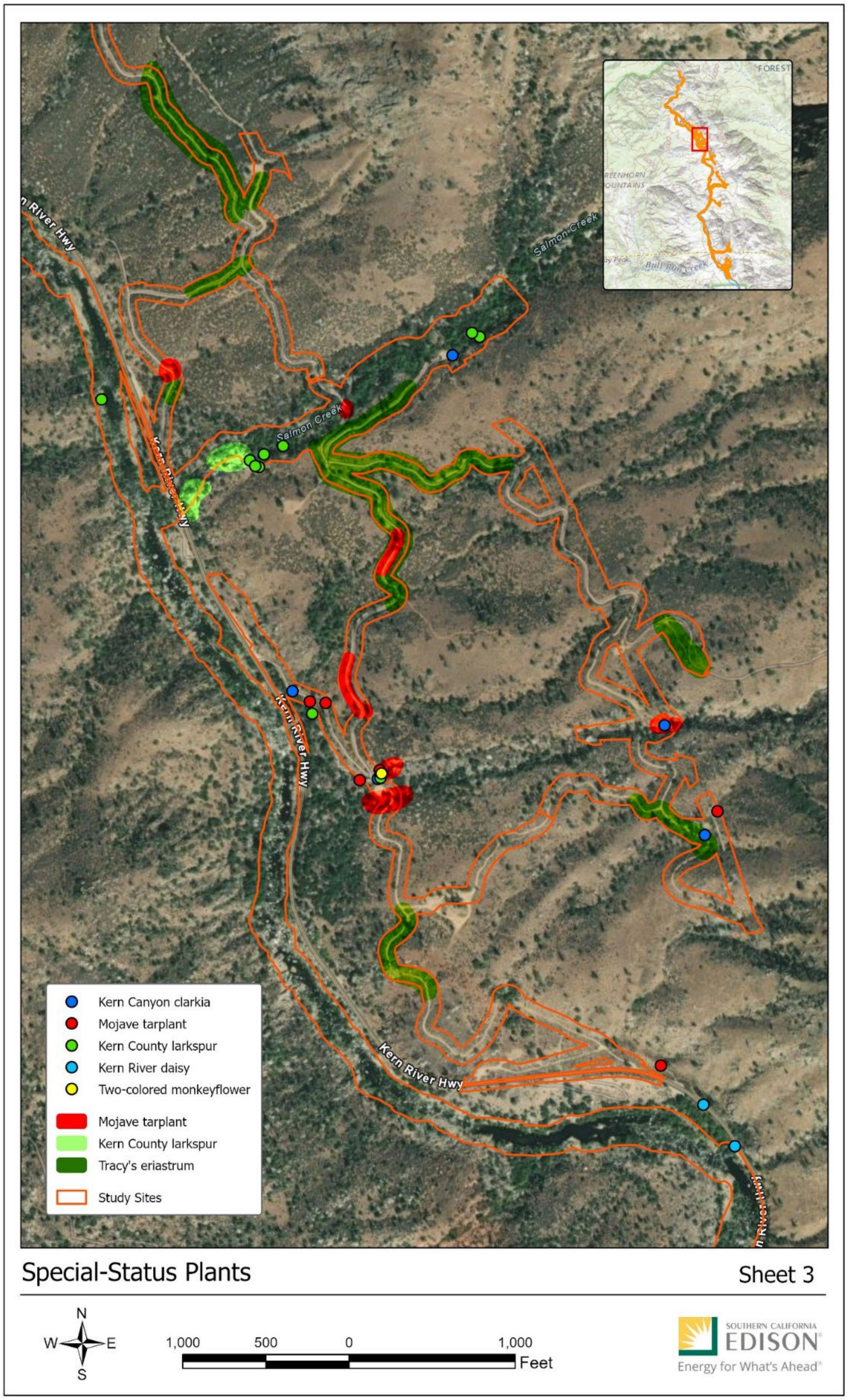


Figure 7.6-3c. Special-Status Plant Species Observed During Botanical Field Surveys (Sheet 3 of 6).

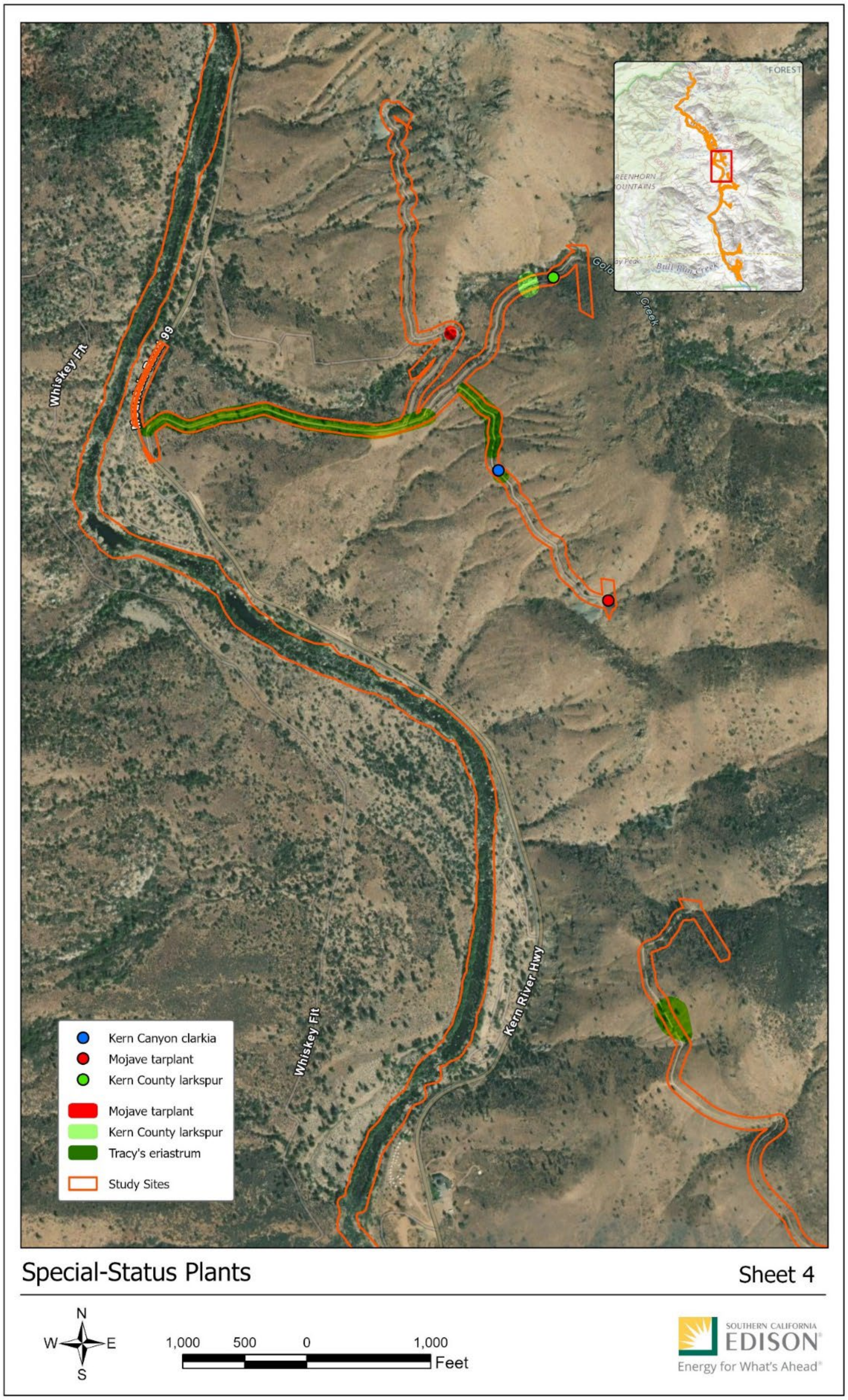


Figure 7.6-3d. Special-Status Plant Species Observed During Botanical Field Surveys (Sheet 4 of 6).

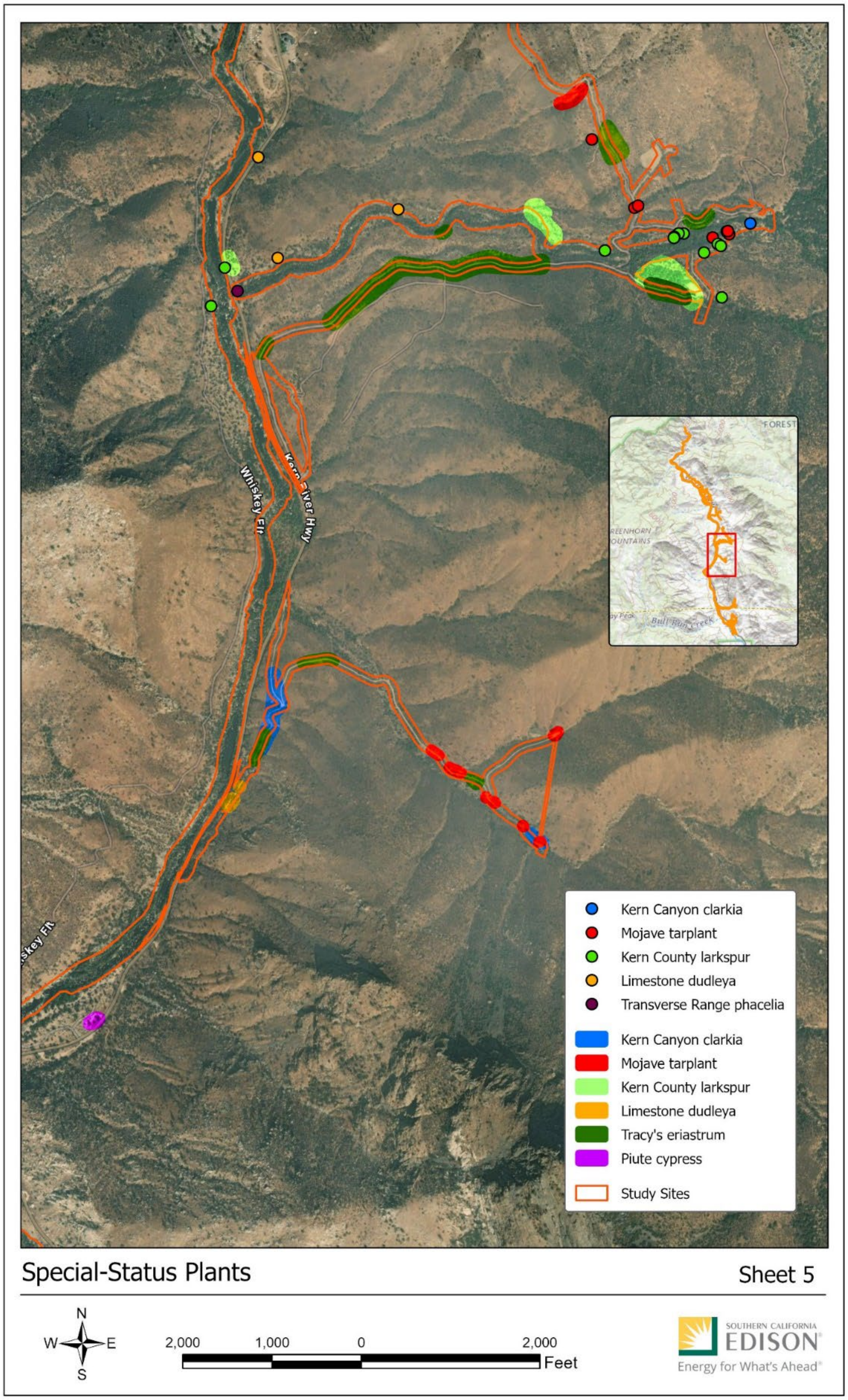


Figure 7.6-3e. Special-Status Plant Species Observed During Botanical Field Surveys (Sheet 5 of 6).

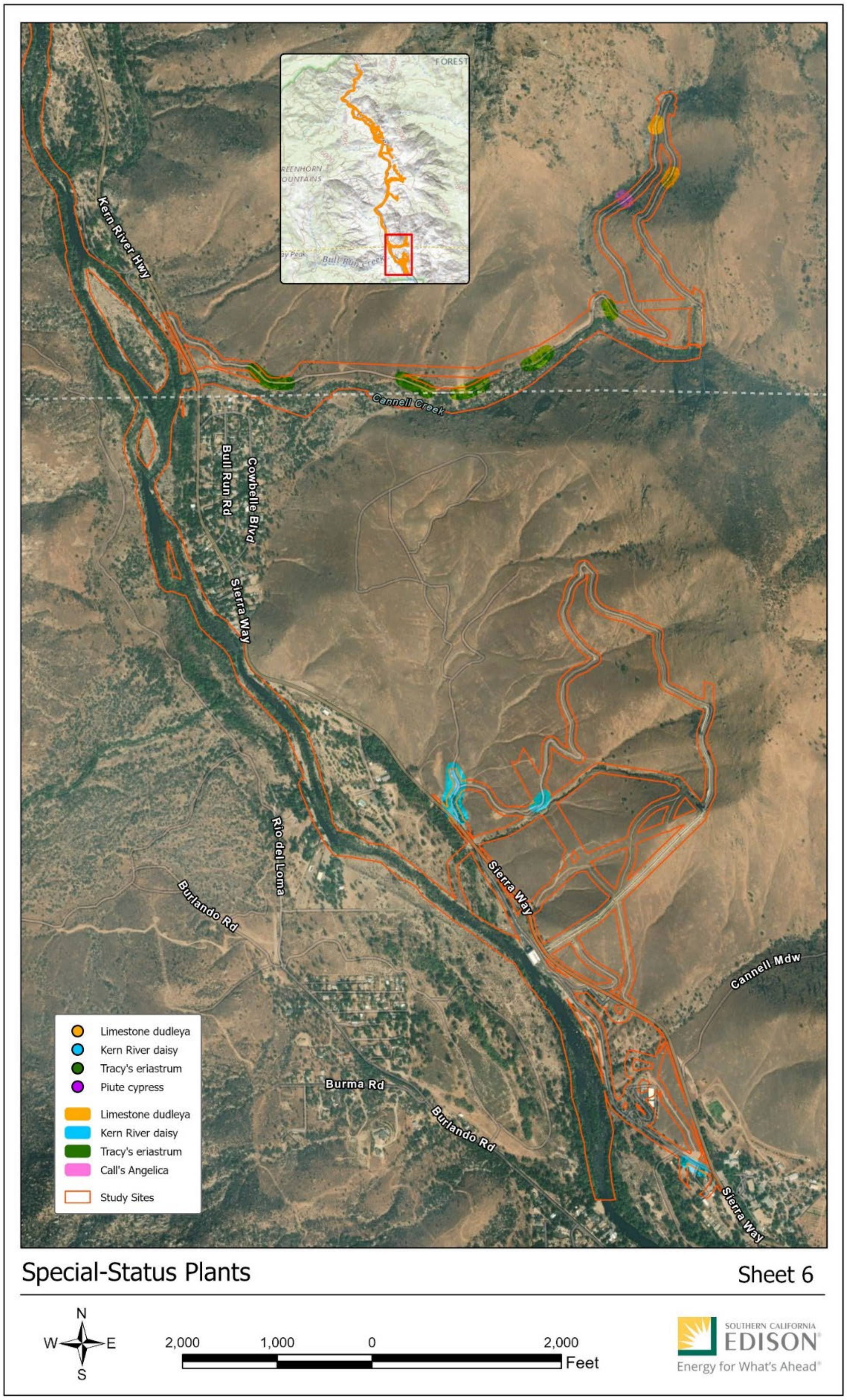


Figure 7.6-3f. Special-Status Plant Species Observed During Botanical Field Surveys (Sheet 6 of 6).

Riparian, Wetland, and Littoral Habitats

Riparian habitats include those found along the NFKR, Salmon Creek, Corral Creek, Cannell Creek (together, Project-affected reaches), and along one section of the upper Gold Ledge Creek. The following CALVEG vegetation alliances (Forest Service, 2009) found within the study sites are associated with riparian habitats:

- Baccharis (Riparian) (ML)
- Riparian Mixed Hardwood Alliance (NR)
- Willow Alliance (QO)
- Water (WA)
  - Rivers and Streams (natural, flowing surface waters) (W1)
  - Reservoirs (human-made lakes and ponds) (W3)
  - Exposed Non-Water Features (such as gravel and sand bars) (W9)

Most of the observed riparian habitats along Project-affected reaches are consistent with the vegetation mapped as Riparian Mixed Hardwood Alliance (NR). Typical riparian tree species in these habitats include white alder (*Alnus rhombifolia*), ash (*Fraxinus* spp.), Fremont cottonwood (*Populus fremontii*), and willow (*Salix* spp.). Baccharis alliances were additionally mapped at study sites where stands of mule fat (*Baccharis salicifolia*) were found along margins of the NFKR. One willow thicket containing multiple species (narrowleaf willow [*Salix exigua*], dusky willow [*Salix melanopsis*], and arroyo willow [*Salix lasiolepis*]) was found below Adit 13/14 at Gold Ledge Creek. Finally, riparian habitats included areas of open water, riparian-associated sand bars, gravel bars, boulder fields, and water impoundments along the NFKR.

No wetland habitats were found within the study sites. All water-associated habitats were dominated by lotic ecosystems with flowing water. Likely because of its minimal size, the impoundment behind the Fairview Dam is not substantial enough to limit water flow or provide for wetland-associated vegetation and wetland habitats.

No littoral habitats were found within the FERC Project Boundary.

7.6.1.3. Special-Status Plants

Ten special-status plant species were located across the Project study sites (Table 7.6-3). Special-status plant species ranged in abundance. Mojave tarplant (*Deinandra mohavensis*), Tracy's eriastrum (*Eriastrum tracyi*), and rose-flowered larkspur (=Kern County larkspur) (*Delphinium purpusii*) were observed at many study sites (Figure 7.6-3). Other plants such as Call's angelica (*Angelica callii*), two-colored monkeyflower (*Erythranthe discolor*), and Transverse Range phacelia (*Phacelia exilis*) were uncommonly observed.

Table 7.6-3. Special-Status Plants Within Project Study Sites

Common Name [a]	Scientific Name [a]	Status [b, c] Federal/State/CRPR/Forest Service
Call's angelica	*Angelica callii*	—/—/4.3/—
Kern Canyon clarkia	*Clarkia xantiana* ssp. *parviflora*	—/—/4.2/—
Kern River daisy	*Erigeron multiceps*	—/—/1B.2/SCC
Limestone dudleya	*Dudleya abramsii* ssp. *calcicola*	—/—/4.3/—
Mojave tarplant	*Deinandra mohavensis*	—/SE/1B.3/SCC
Piute cypress	*Hesperocyparis nevadensis*	—/—/1B.2/SCC
Rose-flowered larkspur (=Kern County larkspur)	*Delphinium purpusii*	—/—/1B.3/SCC
Tracy's eriastrum	*Eriastrum tracyi*	—/SR/3.2/SCC
Transverse Range phacelia	*Phacelia exilis*	—/—/4.2/—
Two-colored monkeyflower	*Erythranthe discolor*	—/—/4.2/—

CRPR = California Rare Plant Rank; SCC = designated as Forest Service species of conservation concern
Notes:
[a] Calflora, 2024
[b] CNDDB, 2024
[c] Status:

Federal
— = No federal status

State
SE = California listed as endangered
SR = California listed as rare
— = No California status

CRPR List Ranks
List 1B = Plants rare, threatened, or endangered in California and elsewhere
List 3 = More information needed about this plant, a review list
List 4 = Plants of limited distribution, a watch list

CRPR Threat Ranks
.2 = Fairly threatened in California (moderate degree/immediacy of threat)
.3 = Not very threatened in California (low degree/immediacy of threat or no current threat known)

7.6.1.4. Non-Native Invasive Plants

Three NNIPs with a California Invasive Plant Council (Cal-IPC; 2024) rating of high[30] were located across the study sites of the Project (Table 7.6-4). Red brome (*Bromus madritensis* ssp. *rubens*) and cheatgrass (*Bromus tectorum*) were ubiquitous across the Project, and no mapping data were collected for these species. Himalayan blackberry (*Rubus armeniacus*) was mapped where found (Figure 7.6-4). Other common NNIPs, which have a Cal-IPC rating of moderate or lower, found within the study sites include bull thistle (*Cirsium vulgare*), black mustard (*Brassica nigra*), summer mustard (*Hirschfeldia incana*), and several grasses (*Avena barbata*, *A. fatua*, *Bromus diandrus*, *Festuca myuros*, and *Hordeum murinum*). Several stands of tree of heaven (*Ailanthus altissima*), also with a Cal-IPC rating of moderate, were noted near areas of human habitation. Cheatgrass and red brome were minor (tree-dominated communities) to moderate (shrub-dominated communities) components of most terrestrial vegetation communities but were the dominant cover in the Annual Grasses and Forbs Alliance (HG) mapped on the study sites.

Table 7.6-4. Located California Invasive Plant Council Rated High [a] Non-Native Plants

Common Name [b]	Scientific Name [b]	Field Survey Results
Red brome	*Bromus madritensis* ssp. *rubens*	This species was present through the study area; specific location data were not collected.
Cheatgrass	*Bromus tectorum*	This species was present through the study area; specific location data were not collected.
Himalayan blackberry	*Rubus armeniacus*	Populations were documented at Salmon Creek, Corral Creek, and along Mountain Highway 99 near the Fairview Dam.

Cal-IPC = California Invasive Plant Council
Notes:
[a] Cal-IPC Rating: High = These species have 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.
[b] Calflora, 2024

[30] NNIPs with a Cal-IPC rating of high have 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.

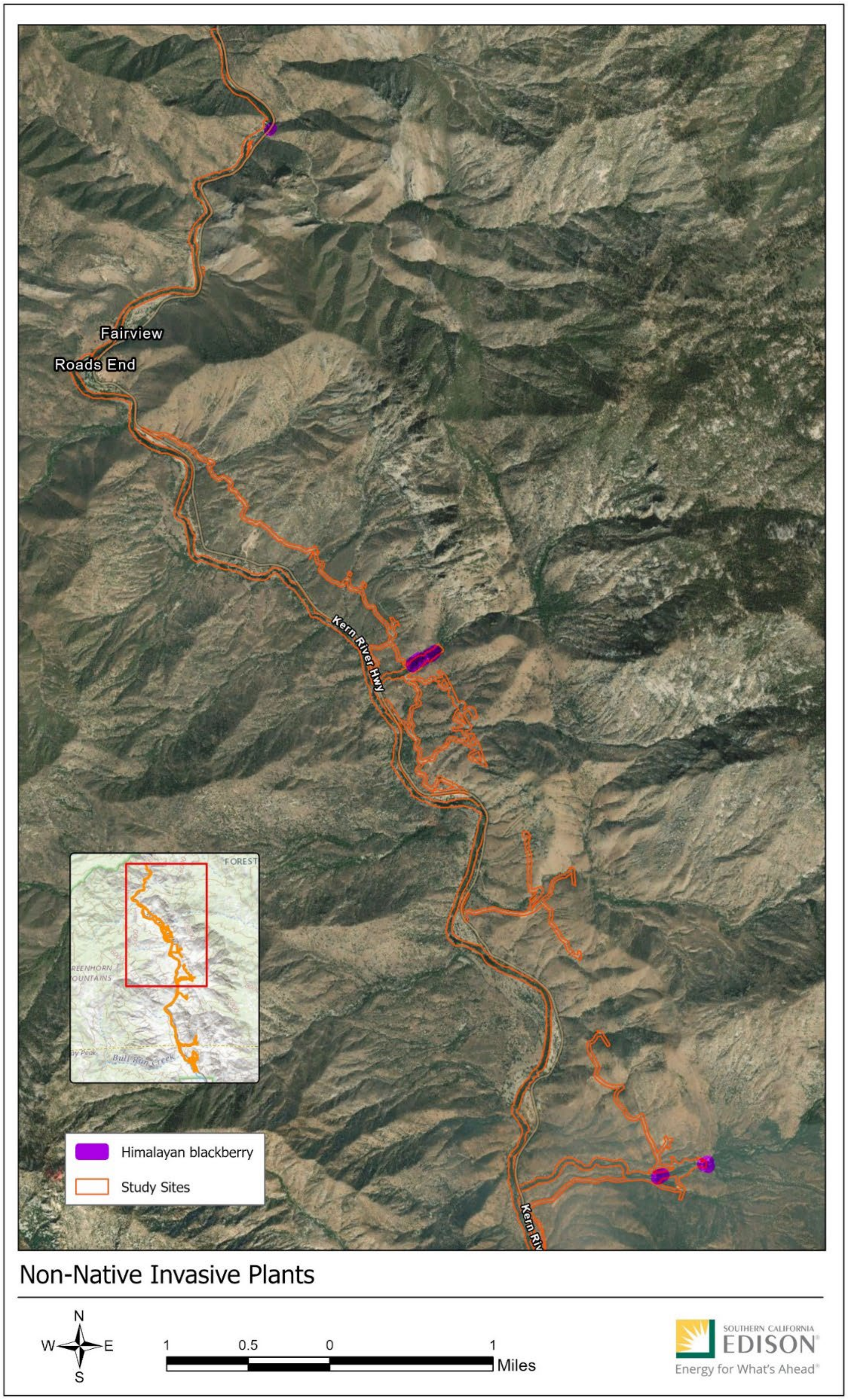


Figure 7.6-4. California Invasive Plant Council High Non-Native Invasive Plants Observed During Botanical Field Surveys.

7.6.1.5. Plant Gathering

Several plant taxa near the Project have potential uses by human communities. Fibers, foods, medicines, construction materials, fuels, and crafting supplies can be gathered from many of the plants found near the Project. Cultural associations with specific plants and their use near the Project range from prehistoric to modern contexts and span multiple distinct cultures. Plants occurring within the FERC Project Boundary may have one or more of the following human uses:

- Fiber and crafting: Example species include broadleaf cattail (*Typha latifolia*), rushes (*Juncus* spp.), sedge (*Cyperus* spp., *Carex* spp.), willow, white alder, and others.
- Food: Example species include California wild grape (*Vitis californica*), blackberry (*Rubus* spp.), miner's lettuce (*Claytonia perfoliata*), white horehound (*Marrubium vulgare*), gooseberry (*Ribes* spp.), oaks (*Quercus* spp.), pines (*Pinus* spp.), and others.
- Lumber for construction or fuel: Example species include cottonwoods (*Populus* spp.), manzanita (*Arctostaphylos* spp.), oaks, pines, and others.
- Medicine: Example species include yerba santa (*Eriodictyon californicum*), willow, ephedra (*Ephedra* spp.), Woods' rose (*Rosa woodsii*), and others.

7.6.2. Proposed Environmental Measures

SCE proposes to implement the following environmental measure related to botanical resources:

- Measure TB-1, *Vegetation Management Plan*

The proposed measure and key features are described below. Refer to Appendix E.1 for the complete description of measures SCE proposes to include in any new license issued for the Project.

7.6.3. Potential Project Effects

Under the No-Action Alternative, the Project would continue to operate under the terms and conditions of the current license, as described in Section 5.1. The No-Action Alternative is considered the environmental baseline for this analysis. Potential effects on botanical resources were identified in FERC's SD2 (FERC, 2022) and based on an evaluation of continued O&M activities described as part of the proposed Project (Section 5.2, *Proposed Action Alternative*). Potential effects identified in FERC's SD2 include the following:

- Effects of continued Project O&M on the following wetlands, riparian habitat, and sensitive natural communities: Great Valley Cottonwood Riparian Forest and Southern Interior Cypress Forest;

- Effects of continued Project O&M activities including Project-related recreation, vegetation management, and herbicide use on native vegetation and special-status plant species including those identified in SCE's PAD (SCE, 2021), as well as the Springville clarkia and Bakersfield cactus;

- Effects of continued Project O&M activities and Project-related recreation on the introduction and spread of NNIP species including potential effects of invasive plants on native plant communities, special-status species, and wildlife habitat; and

- Effects of continued Project O&M activities on wildlife hunting and plant gathering in Project-affected area.

The following sections describe the potential effects of the proposed Project, including proposed environmental measures, on botanical resources. Additional information on wildlife is included in Section 7.5, *Wildlife Resources*. Potential effects on wildlife hunting are described in Section 7.5.3.2. *Wildlife,* subsection *Game Species*. Unavoidable adverse effects on botanical resources are discussed at the end of this section and summarized in Section 10.0, *Conclusions and Recommendations*.

7.6.3.1. Effects of Project Operations and Maintenance on Botanical Resources

With the inclusion of the proposed environmental measures, the proposed Project would have a negligible to minor effect or beneficial effects on botanical resources.

Proposed Measure TB-1 would be developed in consultation with applicable resource agencies and include the following:

- Summaries of vegetation management locations and actions

- Summaries of special-status species known or potentially occurring within the FERC Project Boundary, including the following:

  - Measures to avoid effects on special-status species

  - Measures to minimize effects if they cannot be avoided

  - Measures to safeguard at-risk populations

- Summaries of NNIPs known at the Project, including the following:

  - NNIP targeting information

  - Summaries of current NNIP controls or limitations

  - Measures to control or limit spread of NNIPs

- Notification guidelines for listed or special-status plant species detections

A discussion of the potential effects on botanical resources; including vegetation communities (and sensitive natural communities), special-status plant species, NNIP species, and plant gathering activities; is presented below relative to ongoing and proposed changes in Project O&M and the components of the new environmental measure incorporated as part of Measure TB-1.

Vegetation Communities

Project O&M may have minor effects on vegetation communities, including Great Valley Cottonwood Riparian Forest, the four identified riparian CALVEG alliances, and the three identified riparian CALVEG sub alliances. Because Great Valley Cottonwood Riparian Forest is the only riparian sensitive natural community identified as potentially occurring in the Project and is likely contiguous with the communities mapped as Riparian Mixed Hardwood Alliance, Project effects on this sensitive natural community would be equivalent with riparian-associated communities broadly.

Low flows in the Fairview Dam Bypass Reach during late summer and fall may result in adverse effects (e.g., vegetation dieback, disease susceptibility) on riparian-associated communities. However, any effects would be minor, local, and short term because these communities are adapted to seasonally low flows typical of the dry climate and intermittent rainfall in the region (Henn et al., 2018). During peak flows, Project operations would result in insubstantial diversions of total flow in this reach and would have no adverse effect on riparian communities.

With the implementation of proposed Measure TB-1, vegetation management activities associated with Project O&M would have no effect on the health of riparian-associated communities. Most vegetation management activities would occur where vegetation encroaches into Project facilities. Such activities typically include tree or shrub trimming and do not occur on a scale large enough to alter riparian-associated communities. Additionally, most Project-affected reaches occur away from Project facilities, such as buildings or roads, and would not be affected by vegetation maintenance in their vicinity.

Project O&M activities would have, at most, a minor effect on terrestrial vegetation communities. These terrestrial communities are not dependent on flow levels within Project-affected reaches. Additionally, no Project activities (e.g., vegetation management) occur on the scale that would appreciably alter terrestrial vegetation communities. The majority of Project activities in or adjacent to terrestrial vegetation communities are limited to road repairs and maintenance with only proximal disturbance to terrestrial vegetation.

Special-Status Plant Species

With the implementation of proposed Measure TB-1, Project O&M activities would have no effect on the 10 special-status plant species located within the FERC Project Boundary. Measure TB-1 would protect special-status plant populations from herbicide application, mechanical damage, or seed-bank disturbance activities and provide relief from invasion pressure through NNIP prevention and removal. Proposed Measure TB-1 would also include annual environmental awareness trainings about special-status botanical species. The trainings would include a review of measures to protect special-status plant and their habitats during routine Project maintenance activities and photographs, habitat, and life history information for special-status plant species that are known to occur or may potentially occur in the FERC Project Boundary.

Threatened and Endangered Species

No ESA-listed plants were identified during field surveys, and no critical habitat occurs within the FERC Project Boundary.

If newly identified federally listed plants are identified at the Project during the new license period, Proposed Measure TB-1 would include general plant protection measures and notification to appropriate resource agencies of any new ESA-listed plant species detections. If new species are identified, proposed Measure TB-1 would also include annual environmental awareness trainings for newly detected species, including a review of measures to protect special-status plant species and their habitats during routine Project maintenance activities.

Non-Native Invasive Plants

Implementation of the requirements in proposed Measure TB-1 during Project O&M activities may provide beneficial effects for controlling the three NNIPs with a Cal-IPC rating of high identified as occurring within the Project study sites—cheatgrass, red brome and Himalayan blackberry—as well as other new occurrences of Cal-IPC species with high ratings or other non-native invasive species. Measure TB-1 would entail creating a species monitoring, removal, and containment strategy to alleviate the long-term invasion pressure faced by native species occurring within the FERC Project Boundary, as well as general environmental awareness trainings that review photographs and life history information for noxious weeds in the FERC Project Boundary.

Many NNIPs (e.g., red brome and cheatgrass) have become established or widespread within the FERC Project Boundary via a variety of non-Project vectors (e.g., vehicles, wind) and cannot be feasibly eradicated. However, incipient invasions of NNIPs within the FERC Project Boundary can be monitored and treated to reduce the potential for their establishment and spread. Measure TB-1 would include measures to reduce invasion pressure of novel NNIPs resulting from Project activities, allow for long-term monitoring for changes in target NNIP occurrence, and allow for NNIP removal where feasible. Reducing NNIPs through the implementation of proposed Measure TB-1 would benefit native plant communities (e.g., riparian habitats, sensitive natural communities) by promoting natural species assemblages.

Plant Gathering

Multiple species with potential for human use (e.g., for fiber, food, construction, medicine) are located within the FERC Project Boundary. Project O&M activities would have no effect on these species or access to them. Proposed Measure TB-1 would include protective measures for these areas, including avoidance from herbicide application.

Additionally, Forest Service roads within the vicinity of the Project, as well as Project roads, are open to the public and provide access to areas within the FERC Project Boundary where these plants may be gathered.

Unavoidable Adverse Effects

The proposed Project would not result in unavoidable adverse effects on botanical resources.

7.7. RECREATION RESOURCES

This section describes the recreation resources within FERC Project Boundary and lands surrounding the Project specifically along the Fairview Dam Bypass Reach. Section 7.7.1 discusses the affected environment and resource conditions under current Project O&M (i.e., baseline condition). Section 7.7.2 identifies environmental measures, management plans, and programs that are included in the proposed Project. Section 7.7.3 includes an analysis of ongoing or new environmental effects of O&M under the proposed Project, including potential effects from proposed measures. The full description of proposed measures is provided in Appendix E.1.

The descriptions within this section were developed using existing, relevant, and reasonably available information and include results from the following relicensing studies where additional information was collected to further describe the resource topic:

- REC-1 Whitewater Boating
- REC-2 Recreation Facilities Use Assessment
- REC-3 Recreation Facility Condition Assessment
- ANG-1 Enjoyable Angling Flows

The Technical Memoranda for these studies are provided in Appendix E.2.

Data and analysis associated with portions of the *REC-1 Whitewater Boating Study Plan* and *REC-2 Recreation Facilities Use Assessment Study Plan* are still ongoing. Information available from the completed portions of these studies, as of writing this DLA, have been included herein. A brief background and current status of these studies are described below.

- REC-1 Whitewater Boating: The FERC approved study plan (FERC, 2022 and 2024) follows the methods described in Whittaker et al. (2005), which identifies a phased approach to investigate flow-dependent recreation opportunities. The phased approach includes: (1) a Level 1 Desktop Review (phase completed, refer to *REC-1 Whitewater Boating Study: Interim Technical Memorandum* dated October 2023 and *REC-1 Whitewater Boating Study: Level 1 Structured Interview Analysis Technical Memorandum* dated March 2024 [Appendix E.2]); (2) a Level 2 Limited Reconnaissance Site Review (phase completed, refer to *REC-1 Whitewater Boating Technical Memorandum* dated October 2023 [Appendix E.2]); and (3) a Level 3 Intensive Study (ongoing). Preliminary results from Level 3 Single Flow Survey are provided in the *Addendum to REC-1 Whitewater Boating Interim Technical Memorandum: Level 3 Single Flow Survey Results* dated March 2024 [Appendix E.2]). Outstanding study elements include providing enhanced boating flows targeting 200 to 600 cfs, conducting Level 3 focus groups, and conducting a flow comparison survey. Data from completed study components regarding Level 3 data collection will be included as part of the USR and FLA.

- REC-2 Recreation Facilities Use Assessment: The goal of this study is to assess recreation use within the FERC Project Boundary and along the Fairview Dam Bypass Reach, as well as those sites included in the approximately 1.9-mile reach upstream of the Project to Johnsondale Bridge. This year-long REC-2 Study includes an on-site intercept survey (i.e., in person) and online survey to collect visitor information, vehicle spot counts, and calibration counts at recreation sites to estimate types and amounts of visitor use. Data collected are provided in the Technical Memorandum appended to this DLA (*REC-2 Recreation Facilities Use Assessment Technical Memorandum* provided in Appendix E.2) and summarized below. As directed by FERC staff in their May 30, 2024 Determination on Requests for Study Modifications and New Studies (FERC, 2024), pending SQF approval, data collection will be ongoing for 1-year to collect use information via trail cameras at water access points to capture: (1) use-estimates including percent capacity at all river access locations; (2) activity-type estimates, specifically commercial vs. non-commercial boaters; and (3) the type of watercrafts used. SCE has initiated consultation with the SQF to discuss installation locations of trail cameras at water access locations. Results from the additional data collected via trail cameras will be provided as an addendum to the Final Technical Memorandum.

Key results from completed study components and analyses are included herein. Placeholders are noted where additional data collection and final data analyses are pending.

Resource information pertinent to the overall recreation setting and other recreation opportunities, including whitewater boating use, are summarized herein and include references to the Water Resources, Land Use Management and Resources, and Aesthetic Resource areas discussed in Exhibit E, Sections 7.3, 7.8, and 7.9, respectively.

The affected environment section is broken into land-based recreation (Section 7.7.1.1) and river-based recreation (Section 7.7.1.2), followed by a summary of regional recreation plans and programs (Section 7.7.1.3). Land-based recreation is divided into Project recreation facility and non-Project recreation facilities with the following three topics discussed: (1) recreation user experience and feedback; (2) estimated annual recreation days (RD); and (3) parking utilization. Whitewater boating and angling are discussed within the river-based recreation section.

License Article 426 of the current KR3 FERC license is a typical land use article, however it does not require a Shoreline Management Plan since the Project is run-of-river and does not impound a reservoir with shoreline.

7.7.1. Affected Environment

Approximately 95 percent of the lands within the NFKR watershed is in public ownership under National Park Service (Sequoia National Park) and Forest Service (SQF) management. This region that generally stretches from Lake Isabella in the south to Sequoia National Park to the north is known for its beauty and diversity of landscapes (e.g., river canyon, forests, mountains) and recreational opportunities (e.g., boating, fishing, swimming, camping, hiking, picnicking, wildlife viewing). Its proximity to major population centers in southern California (including Los Angeles north to Kernville and beyond) make it an attractive destination for local and regional residents, as well as out-of-state tourists and international travelers. The region's appeal is furthered enhanced by the large number of Forest Service and National Park Service sites and use areas, as well as the river itself which provides important river-based recreational opportunities (e.g., whitewater boating, angling) in the region. These federal sites and use areas in Sequoia National Park and SQF likely account for more than 2 million recreational visits per year to the region (Forest Service, 2024; NPS, 2024).

The Project, located primarily on SQF lands in the Kern River Ranger District, is easily accessible via Mountain Highway 99, a two-lane winding road adjacent to the eastern side of the NFKR. The western riverbank and hillside are composed primarily of SQF lands with minimal development. Just south of the Project, the town of Kernville serves as the largest residential community in the vicinity with residential and commercial developments along both sides of the river. Several unincorporated residential areas (including Fairview, Riverkern, and Camp Owens) are located along the northern and southern ends of the Project (Figure 7.7-1).

The NFKR from the headwaters down to the Kern/Tulare County line is included in the National Wild and Scenic Rivers System; the section of the NFKR in the vicinity of the Project is classified as a Recreational River Segment. Additional information is summarized below in Section 7.7.1.3 and in Section 7.8, *Land Use Management and Resources*. Refer to Section 7.9, *Aesthetic Resources*, for additional information related to the natural environmental setting of the NFKR and the key aesthetic features within the Fairview Dam Bypass Reach.

Abundant recreation occurs throughout the NFKR corridor and within the region. Due to the scenic nature of the area and presence of the river, the area draws recreationists for a variety of land-based as well as river-based recreation activities. According to the Kernville Chamber of Commerce, Kernville attracts numerous visitors such as families and adventure seekers looking for opportunities for camping, hiking, on-water activities such as whitewater rafting, kayaking, tubing, mountain biking, rock climbing and other recreational activities (Kernville Chamber of Commerce, 2024). The area is also a gateway to Giant Sequoia groves within the Giant Sequoia National Monument and the Sequoia National Park. As noted in Table 7.7-1, the most popular activities recorded as part of the REC-2 Study within the vicinity of the Project were camping, fishing, and hiking/walking/trail use.

Table 7.7-1. Respondents Primary Recreation Activity

Primary Activity	Count	%
Biking	17	1.0%
Camping	640	37.6%
Fishing	355	20.9%

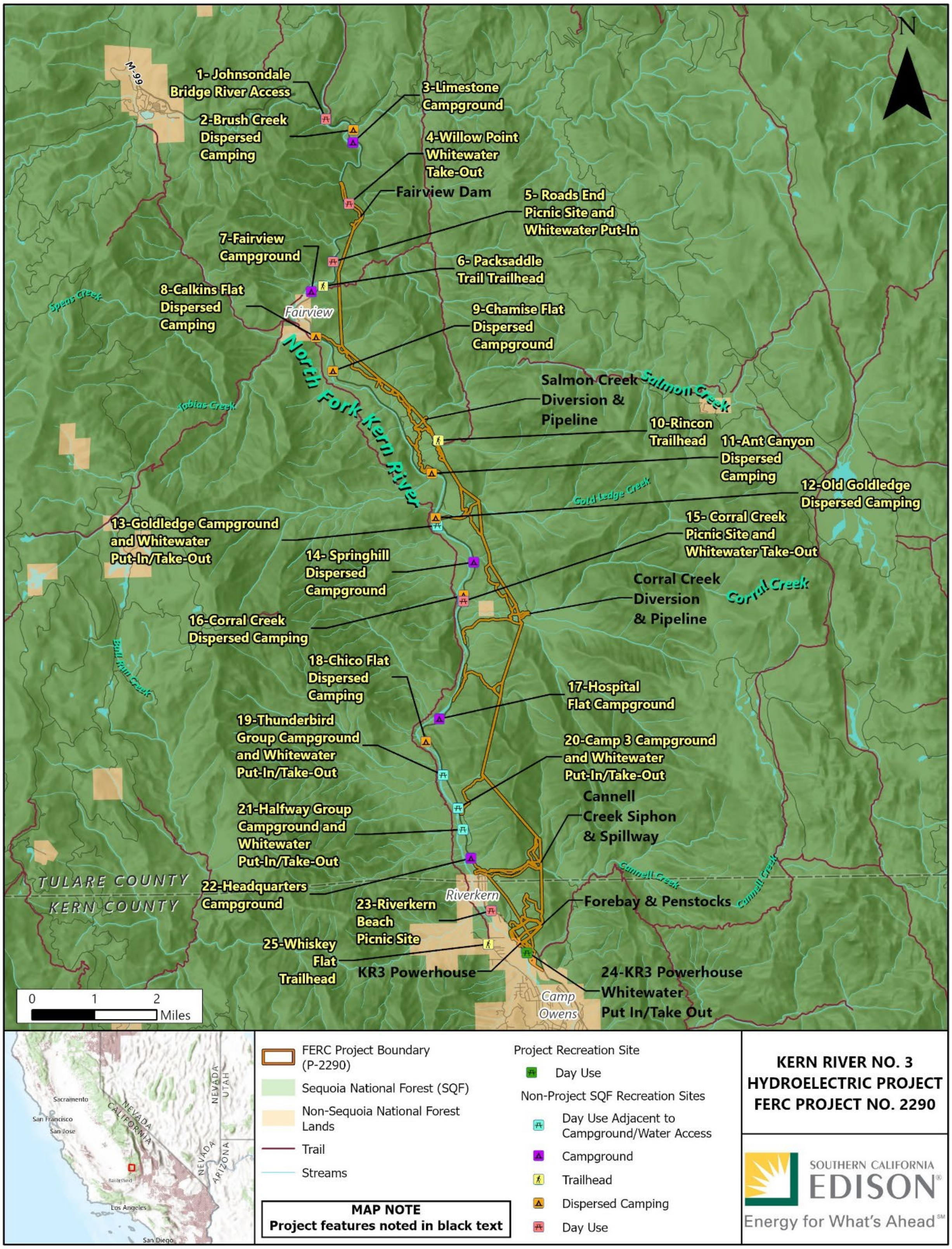
Primary Activity	Count	%
Other [a]	51	3.0%
Photography/Painting	24	1.4%
Picnicking	64	3.8%
Relaxing	153	9.0%
Scenic Driving	26	1.5%
Hiking/Walking/Trail Use	240	14.1%
Viewing Scenery	92	5.4%
Viewing Wildlife	11	0.6%
Whitewater Boating/Rafting	27	1.6%
Total Responses	**1,700**	**100.0**
No Answer	39	

Notes: Refer to Question 16a (Table 5.1-15) in the REC-2 Technical Memorandum (Appendix E.2) for additional information.
[a] Restroom, hunting, swimming, checking their vehicle, just a quick stop/visiting, trash removal, being lost and recycling

General Demographics

Based on the data collected during the REC-2 Study[31], the vast majority of recreationists visiting the vicinity of the Project were from California (68.7 percent), with international visitors being the next popular at 22.9 percent (REC-2, Table 5.1-2). The remaining 8 percent of recreationalists visiting the vicinity of the Project encompassed numerous other states. For the recreationalists that traveled within California, the majority (50.3 percent) noted they traveled greater than 100 miles during their current trip (REC-2, Table 5.1-3). The average group size was calculated to be approximately 3 people per group with the majority of the visitors (approximately 80 percent) over the age of 18 (REC-2, Table 5.1-5).

[31] For additional information regarding survey responses, refer to the *REC-2 Recreation Facilities Use Assessment Technical Memorandum* in Appendix E.2. Table numbers from the REC-2 Technical Memorandum are included for reference throughout the text.



FERC = Federal Energy Regulatory Commission; KR3 = Kern River No. 3; SQF = Sequoia National Forest

Figure 7.7-1. Recreation Sites Included in the REC-2 Study.

Recreational opportunities and recreation sites are numerous throughout the NFKR corridor and along the Fairview Dam Bypass Reach[32]. Within the vicinity of the Project, there are Forest Service-owned and maintained DCGs (fee-based), dispersed camping areas (non-fee), day use areas (non-fee) in addition to a network of parking areas/trailheads for hiking and biking that lead into the SQF.

There is one SCE-owned and maintained recreation site located near the KR3 Powerhouse. Facility locations are described below in Table 7.7-2 and depicted on Figure 7.7-1.

Table 7.7-2. Recreation Sites Included in the REC-2 Study

Site ID Number	Site Name	Site Type	Owned & Maintained	Site in Relation to FERC Project Boundary and FERC License
1	Johnsondale Bridge River Access	Day Use with Whitewater Put-in/Take-out access	SQF	Outside (and upstream) of Project Boundary; not part of FERC license
2	Brush Creek Dispersed Camping	Dispersed Camping with Whitewater Put-in/Take-out access	SQF	Outside (and upstream) of Project Boundary; not part of FERC license
3	Limestone Campground	Developed Campground	SQF	Outside (and upstream of) Project Boundary; not part of FERC license
4	Willow Point Whitewater Take-out	Day Use with Whitewater Take-out access	SQF	Inside Project Boundary, upstream of Fairview Dam; not part of FERC license
5	Roads End Picnic Site and Whitewater Put-in	Day Use with Whitewater Put-in access	SQF	Outside of Project Boundary, along Fairview Dam Bypass Reach; not part of FERC license
6	Packsaddle Trailhead	Trailhead	SQF	Outside of Project Boundary, along Fairview Dam Bypass Reach; not part of FERC license
7	Fairview Campground	Developed Campground	SQF	Outside of Project Boundary, along Fairview Dam Bypass Reach; not part of FERC license
8	Calkins Flat Dispersed Camping	Dispersed Camping with Whitewater Put-in/Take-out access	SQF	Outside of Project Boundary, along Fairview Dam Bypass Reach; not part of FERC license

[32] Fairview Dam Bypass Reach extends along the NFKR from Fairview Dam down to the KR3 Powerhouse.

Site ID Number	Site Name	Site Type	Owned & Maintained	Site in Relation to FERC Project Boundary and FERC License
9	Chamise Dispersed Camping	Dispersed Camping	SQF	Outside of Project Boundary, along Fairview Dam Bypass Reach; not part of FERC license
10	Rincon Trailhead	Trailhead	SQF	Outside of Project Boundary, along Fairview Dam Bypass Reach; not part of FERC license
11	Ant Canyon Dispersed Camping	Dispersed Camping with Whitewater Put-in/Take-out access	SQF	Outside of Project Boundary, along Fairview Dam Bypass Reach; not part of FERC license
12	Old Goldledge Dispersed Camping	Dispersed Camping	SQF	Outside of Project Boundary, along Fairview Dam Bypass Reach; not part of FERC license
13	Goldledge Campground and Whitewater Put-in/Take-out	Day Use with Whitewater Put-in/Take-out access and Adjacent Developed Campground	SQF	Outside of Project Boundary, along Fairview Dam Bypass Reach; not part of FERC license
14	Springhill Dispersed Camping	Dispersed Camping	SQF	Outside of Project Boundary, along Fairview Dam Bypass Reach; not part of FERC license
15	Corral Creek Picnic Site and Whitewater Take-out	Day Use with Whitewater Put-in/Take-out access	SQF	Outside of Project Boundary, along Fairview Dam Bypass Reach; not part of FERC license
16	Corral Creek Dispersed Camping	Dispersed Camping	SQF	Outside of Project Boundary, along Fairview Dam Bypass Reach; not part of FERC license
17	Hospital Flat Campground	Developed Campground	SQF	Outside of Project Boundary, along Fairview Dam Bypass Reach; not part of FERC license
18	Chico Flat Dispersed Camping	Dispersed Camping	SQF	Outside of Project Boundary, along Fairview Dam Bypass Reach; not part of FERC license
19	Thunderbird Group Campground and with Whitewater Put-in/Take-Out	Day Use with Whitewater Put-in/Take-out and Adjacent Developed Campground	SQF	Outside of Project Boundary, along Fairview Dam Bypass Reach; not part of FERC license

Site ID Number	Site Name	Site Type	Owned & Maintained	Site in Relation to FERC Project Boundary and FERC License
20	Camp 3 Campground and Whitewater Put-in/Take-Out	Day Use with Whitewater Put-in/Take-out and Adjacent Developed Campground	SQF	Outside of Project Boundary, along Fairview Dam Bypass Reach; not part of FERC license
21	Halfway Group Campground and Whitewater Put-in/Take-out	Day Use with Whitewater Put-in/Take-out and Adjacent Developed Campground	SQF	Outside of Project Boundary, along Fairview Dam Bypass Reach; not part of FERC license
22	Headquarters Campground	Developed Campground	SQF	Outside of Project Boundary, along Fairview Dam Bypass Reach; not part of FERC license
23	Riverkern Beach Picnic Site	Day Use with Whitewater Put-in/Take-out access	SQF	Outside of Project Boundary, along Fairview Dam Bypass Reach; not part of FERC license
24	KR3 Powerhouse Whitewater Put-in/Take-out	Day Use with Whitewater Put-in/Take-out access	SCE	Inside of Project Boundary, downstream of KR3 Powerhouse;
25	Whiskey Flat Trailhead	Trailhead	SQF	Outside of Project Boundary, along Fairview Dam Bypass Reach; not part of FERC license

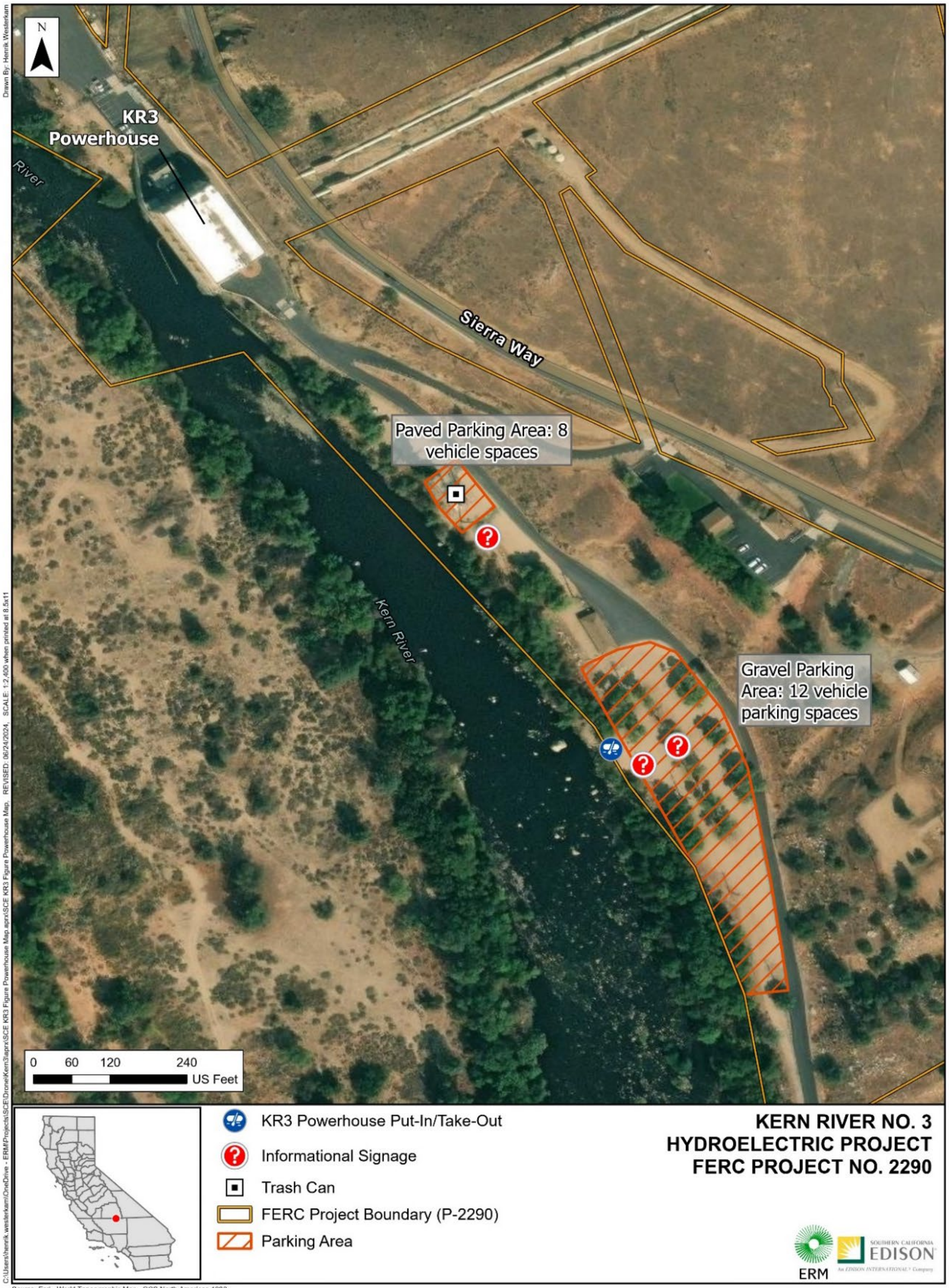
FERC = Federal Energy Regulatory Commission; KR3 = Kern River No. 3; SCE = Southern California Edison; SQF = Sequoia National Forest

7.7.1.1. Land-Based Recreation

<u>Project Recreation Facility</u>

The single Project recreation facility, KR3 Powerhouse Whitewater Put-in/Take-out (site 24), is located approximately 250 yards downstream of the KR3 Powerhouse. The facility is owned and maintained by SCE. The site consists of a carry-in boat launch, loading area, and an open gravel and paved parking area (Figure 7.7-2). At the northern portion of the site is a small-paved area that can accommodate approximately eight vehicles and includes a trash receptacle. At the southern end of the site is a large gravel and native earthen area that accommodates parking for approximately 12 vehicles. This area is also used by commercial outfitters to stage their large vans or and buses for commercial whitewater trips (put-in and take-out).

The launch is accessible to the public without a permit, though commercial operators are required to obtain a permit, at no cost, from SCE for use of the site to minimize congestion (additional information provided below under *Whitewater Boating Use Numbers, SCE Commercial Use Numbers* in Section 7.7.1.2). There is a FERC Part 8 sign, which includes Project information, ownership, and operating hours.



FERC = Federal Energy Regulatory Commission; KR3 = Kern River No. 3

Figure 7.7-2. KR3 Powerhouse Whitewater Put-in/Take-out Recreation Facility Layout.

Recreation User Experience and Feedback[33]

During the study period, 84 visitor surveys were completed at the Project recreation site. For additional information regarding all survey responses, refer to the REC-2 Technical Memorandum in Appendix E.2. Tables from the REC-2 Technical Memorandum are included for reference in the summary of responses discussed below.

Current Trip Information and Experience: Based on feedback from 84 respondents regarding their current trip, 44 percent utilized the site on the weekend (Saturday or Sunday), and 26 percent and 30 percent visited on holidays[34] and weekdays, respectively (REC-2, Table 5.1-11). When choosing a site to recreate at, this location was noted as being the primary destination of visitors by approximately 74 percent of respondents (REC-2, Table 5.1-12) and the majority of the respondents (64 percent) noted that fishing was their primary recreation activity at this location (REC-2, Table 5.1-15).

Flows in NFKR: Respondents were asked if the flows in the NFKR affected their ability to participate in a water-related activity. Only 67 respondents answered this question where approximately 75 percent of respondents indicated there was no effect on their ability to participate in a flow-related activity due to flows in the NFKR at the time of their visit (REC-2, Table 5.1-17).

Overall Satisfaction: Respondents were asked how they would rate their overall satisfaction or dissatisfaction with their recreation experience that day on a scale of 1 to 5. Respondents were also given a list of categories and asked to rate the importance of each to the overall quality of their recreation experience on this trip on a scale of 1 to 5. The average ratings for this site ranged from a low of 4.0 (“satisfied”) for adequacy of site access for persons with disabilities up to 4.8 for their overall satisfaction of the trip (Table 7.7-3 and REC-2, Table 5.1-21).

Table 7.7-3. Satisfaction and Importance Ratings at KR3 Powerhouse Whitewater Put-in/Take-out

Category	Mean Satisfaction Rating [a]	Mean Overall Importance Rating
1. Overall satisfaction of your trip	4.8	4.9
2. Satisfaction of primary activity, as listed above in Q16	4.3	4.4
3. Cost of facility access fees	4.4	4.9
4. River access	4.5	4.2
5. Number of people encountered/crowdedness	4.5	4.5
6. Available parking when you arrived	4.5	4.3

[33] For additional information regarding all survey responses, refer to the REC-2 Technical Memorandum in Appendix E.2. Table numbers from the REC-2 Technical Memorandum are included for reference throughout the text.

[34] Holidays include 3 days: Saturday and Sunday and either the Friday before or the Monday after the holiday.

Category	Mean Satisfaction Rating [a]	Mean Overall Importance Rating
7. Feeling of safety	4.6	4.6
8. Adequacy of site access for persons with disabilities	4.0	4.2
9. Scenery at this site/area	4.7	4.5
10. Maintenance (physical condition) of facilities	4.2	4.2
11. Cleanliness of facilities	4.5	4.5
12. Access to restroom/shower/drinking water	4.0	4.1
13. Informational/educational opportunities	4.3	4.2
14. Flows in the river	4.4	4.3

Note:
[a] Respondents rated their overall satisfaction or dissatisfaction with their recreation experience that day on a scale of 1 to 5, with 1 = very dissatisfied, 2=dissatisfied, 3= neutral, 4=satisfied, and 5 = very satisfied.

<u>Recommended Improvements</u>: Respondents were also asked to provide any recommendations or improvements to the Project recreation site. The most frequent recommendations included the addition of restrooms/sanitation, trash cans/maintenance/cleaning, and benches/tables/grills (REC-2, Tables 5.1-41 and 5.1-42). When asked to provide any additional comments about the Project recreation site, 16 respondents included a comment about additional signs/information/warnings (REC-2, Table 5.1-43).

Recreation Day Estimates

Recreation use is estimated based on the average numbers of vehicles and people that visit a recreation site during a specific period of time (i.e., day type, month, season). Recreation use is presented as a RD, which is defined by FERC as each visit by a person to the study site for recreational purposes during any portion of a 24-hour period.

During the study period (April 1, 2023 to March 31, 2024), 280 visitors were observed recreating at the KR3 Powerhouse Whitewater Put-in/Take-out. Based on these observations, approximately 10,900 RDs were estimated for this site. The season with the highest number of RDs was summer at 3,700 RDs, followed by fall (3,300 RDs), spring (2,600 RDs), and winter (1,100 RDs). The most RDs, by day type, were recorded on weekends with 4,900 RDs (Table 7.7-4).

<u>Table 7.7-4. Estimated Recreation Days: KR3 Powerhouse Whitewater Put-in/Take-out</u>

Day Type	Estimated RDs			
	Spring	Summer	Fall	Winter
Total Weekday	500	800	2,100	600
Total Weekend	2,100	1,400	1,100	300

Day Type	Estimated RDs			
Total Holiday	NA	1,500	100	200
Total Season	**2,600**	**3,700**	**3,300**	**1,100**
Total Annual	**10,700**			

NA = not applicable; RD = Recreation Day

Parking Utilization (Density)

During the REC-2 Study, the maximum parking utilization on non-peak weekends at the KR3 Powerhouse Whitewater Put-in/Take-out was estimated to be 24 percent. Parking utilization on peak holiday weekends was estimated to be 22 percent (REC-2, Table 5.2-2).

Non-Project Recreation Facilities

The non-Project Forest Service recreation facilities located in the approximately 1.9-mile reach upstream of the Project include sites 1-4, and the sites downstream of Fairview Dam along the Fairview Dam Bypass Reach include sites 5-23 and site 25. Table 7.7-5 provides a summary of each non-Project recreation site and the associated number of campsites and/or vehicle parking spaces. For more detailed information regarding non-Project recreation sites, see REC-2 Technical Memorandum in Appendix E.2.

Table 7.7-5. Parking Capacity: Non-Project Recreation Facilities

Facility Type [a]	Sites 1 through 3		Sites 4 through 23 and Site 25	
	# of Sites (Site #)	**Total Spaces (vehicles or campsites)**	**# of Sites (Site #)**	**Total Spaces (vehicles or campsites)**
Day Use	1 site (Site 1)	14 vehicle spaces	4 sites (Sites 4, 5, 15, and 23)	91 vehicle spaces
Developed Campgrounds	1 site (Site 3)	19 single sites	3 sites (Sites 7, 17, and 22)	131 single sites; 5 ADA sites, and 1 group site available
Dispersed Camping Areas	1 site (Site 2)	107 vehicle spaces	7 sites (Sites 8, 9, 11, 12, 14, 16, and 18)	347 vehicle spaces
Day Use and Adjacent Developed Campground	NA	NA	4 sites (Sites 13, 19, 20, and 21)	64 vehicle parking spaces; 89 single sites, 2 ADA sites, and 7 group sites
Trailheads	NA	NA	3 trailheads (Sites 6, 10, and 25)	27 vehicle spaces

ADA = Americans with Disabilities Act; NA = not applicable

Note:
[a] Sites 1-3 are upstream of the FERC Project Boundary; Site 4 is upstream of Fairview Dam, but within the FERC Project Boundary; Sites 5-23 and 25 are outside of the FERC Project Boundary, but located within the Fairview Dam Bypass Reach.

Recreation User Experience and Feedback

During the study period over 1,600 visitor intercept surveys and online visitor surveys were completed, throughout the vicinity of the Project. Refer to other resource sections for a summary of information pertaining to aesthetics (Section 7.9, *Aesthetic Resources*) and angling (Section 7.7.1.2 below) with additional information provided in the respective Technical Memorandums in Appendix E.2. The REC-2 Technical Memorandum (Appendix E.2) contains detailed information on all recreation sites within the study area.

Current Trip Information and Experience: Based on feedback from respondents regarding their current trip, for respondents arriving at study sites 1-3, 44 percent indicated arriving on a weekend, followed by weekdays (37 percent), and the remaining 19 percent arrived on a holiday. At study sites 4-23 and site 25, 39 percent of respondents indicated arriving on a weekday, followed by weekends (33 percent), and the remaining 28 percent arrived on a holiday (REC-2, Table 5.1-11).

Flows in NFKR**:** Respondents were asked if the flows in the NFKR affected their ability to participate in a water-related activity on the current trip. Approximately 1,200 of the 1,600 respondents surveyed answered this question and their responses are summarized below in Table 7.7-6 (REC-2, Table 5.1-17). Overall, the majority (67 percent) of survey respondents did not find that flows in the NFKR affected their water-related activity or respondents did not participate in a water-related activity.

Table 7.7-6. Effect of NFKR Flows on Water-Related Activity

Respondent Question: If you participated in a water-related activity, did the flows in the NFKR affect your ability to participate?

Facility Type and Site # [a]	No Effect	No Water Related Activity	Yes, Flows Too High	Yes, Flows Too Low	Yes Other
Sites 1 through 3					
Day Use, Dispersed Camping and Developed Camping	68.1%	21.3%	8.5%	2.1%	0%
Sites 4 through 23 and Site 25					
Day Use (Sites 4, 5, 15, and 23)	70.5%	21.7%	5.4%	2.4%	0%
Developed Campgrounds (Sites 7, 17, and 22)	60.7%	22.5%	11.2%	4.5%	1%
Dispersed Camping Areas (Sites 8, 9, 11, 12, 14, 16, and 18)	69.9%	20.8%	6.0%	2.4%	1%

Respondent Question: If you participated in a water-related activity, did the flows in the NFKR affect your ability to participate?

Facility Type and Site # [a]	No Effect	No Water Related Activity	Yes, Flows Too High	Yes, Flows Too Low	Yes Other
Day Use and Adjacent Developed Campground (Sites 13, 19, 20, and 21)	66.3%	14.4%	12.3%	5.3%	1.6%
Trailheads (Sites 6, 10, and 25)	58.6%	37.1%	2.1%	1.4%	0.7%

NFKR = North Fork Kern River
Note:
[a] Sites 1-3 are upstream of the FERC Project Boundary; Site 4 is upstream of Fairview Dam, but within the FERC Project Boundary; Sites 5-23 and 25 are outside of the FERC Project Boundary, but located within the Fairview Dam Bypass Reach.

Overall Satisfaction: Respondents were asked how they would rate their overall satisfaction or dissatisfaction with their recreation experience that day on a scale of 1 to 5 (Table 7.7-7). Respondents were also given a list of categories and asked to rate the importance of each to the overall quality of their recreation experience on this trip, with 1 being unimportant and 5 being very important. The mean overall satisfaction rating was 4.3 and the mean importance rating for all experience categories was above 4.0 (“satisfied”), indicating that all categories are important or very important to the respondents (REC-2, Table 5.1-20 and Table 5.1-21).

Table 7.7-7. Average Trip Satisfaction and Importance to Overall Quality of Recreation Experience

	Sites 1 -3		Sites 4-23 and 25	
Category	Mean Overall Satisfaction Rating [a,c]	Mean Overall Importance Rating [b,c]	Mean Overall Satisfaction Rating [a,c]	Mean Overall Importance Rating [b,c]
1. Overall satisfaction of your trip	4.8	4.8	4.7	4.7
2. Satisfaction of primary activity, as listed above in Q16	4.4	4.4	4.3	4.3
3. Cost of facility access fees	4.4	4.4	4.4	4.4
4. River access	4.3	4.3	4.2	4.2
5. Number of people encountered/crowdedness	4.4	4.4	4.3	4.3
6. Available parking when you arrived	4.5	4.5	4.4	4.4
7. Feeling of safety	4.5	4.5	4.5	4.6
8. Adequacy of site access for persons with disabilities	3.9	4.0	3.8	4.0
9. Scenery at this site/area	4.7	4.6	4.6	4.6

	Sites 1 -3		Sites 4-23 and 25	
Category	Mean Overall Satisfaction Rating [a,c]	Mean Overall Importance Rating [b,c]	Mean Overall Satisfaction Rating [a,c]	Mean Overall Importance Rating [b,c]
10. Maintenance (physical condition) of facilities	4.1	4.2	4.1	4.1
11. Cleanliness of facilities	4.2	4.4	4.2	4.3
12. Access to restroom/shower/drinking water	4.1	4.2	3.9	4.0
13. Informational/educational opportunities	4.2	4.1	4.2	4.1
14. Flows in the river	4.1	4.0	4.1	4.1

Notes:
[a] Respondents rated their overall satisfaction or dissatisfaction with their recreation experience that day on a scale of 1 to 5, with 1 = very dissatisfied, 2=dissatisfied, 3= neutral, 4=satisfied, and 5 = very satisfied.
[b] Respondents rated the importance of each category to the overall quality of their recreation experience that day on a scale of 1 to 5, with 1 being unimportant and 5 being very important.
[c] Sites 1-3 are upstream of the FERC Project Boundary; Site 4 is upstream of Fairview Dam, but within the FERC Project Boundary; Sites 5-23 and 25 are outside of the FERC Project Boundary, but located within the Fairview Dam Bypass Reach.

A summary of the overall satisfaction of the respondent's trip as well as the adequacy of the site access for persons with disabilities ratings are provided in Table 7.7-8 and grouped by recreation facility type.

Table 7.7-8. Respondent Accessibility Feedback and Overall Satisfaction, by Non-Project Recreation Facility Type

Facility Type and Site # [a]	Respondent Adequacy of Site Access for persons with Disabilities	Overall Satisfaction of Trip
Sites 1 through 3		
Day Use, Dispersed Camping and Developed Camping	3.9	4.8
Sites 4 through 23 and Site 25		
Day Use (Sites 4, 5, 15, and 23)	3.7	4.7
Developed Campgrounds (Sites 7, 17, and 22)	4.0	4.7
Dispersed Camping Areas (Sites 8, 9, 11, 12, 14, 16, and 18)	3.9	4.7
Day Use Adjacent to Developed Campground(s) (Sites 13, 19, 20, and 21)	3.8	4.6

Facility Type and Site # [a]	Respondent Adequacy of Site Access for persons with Disabilities	Overall Satisfaction of Trip
Trailheads (Sites 6, 10, and 25)	3.6	4.6

Note:
[a] Sites 1-3 are upstream of the FERC Project Boundary; Site 4 is upstream of Fairview Dam, but within the FERC Project Boundary; Sites 5-23 and 25 are outside of the FERC Project Boundary, but located within the Fairview Dam Bypass Reach.

Recreation Day Estimates

As part of this year-long study, over 10,500 recreationists were observed partaking in various recreation activities within the study area based on spot count data (Figure 7.7-1, Table 7.7-2). Of those observed, there were a total of 1,076 visitors recreating at the three non-Project recreation sites above the Project Boundary (sites 1-3) and 9,546 visitors recreating at non-Project recreation sites within the FERC Project Boundary and along the Fairview Dam Bypass Reach (sites 4-23, and 25).

The estimated RDs by season and type of day (weekday, weekend, holiday), are provided in Table 7.7-9. During the study period, there was an estimated total of approximately 32,000 RDs at study sites above the Project Boundary. The season with the highest number of RDs was summer at 15,000 days, followed by spring (7,200 days), fall (6,100 days), and winter (3,500 days). The most RDs, by day type, were recorded on weekdays with 15,000 days.

At non-Project study sites within the FERC Project Boundary and along the Fairview Dam Bypass Reach, the estimated total RDs for the study period was 107,000 RDs. Most RDs were estimated for the day use component of dispersed camping areas (33,000 days) and for day use sites (26,000 days). The season with the highest use was summer at approximately 72,000 RDs. The most RDs, by day type, were recorded on weekends with approximately 46,000 RDs.

SCE has consulted with the SQF to obtain available recreation use records for the Forest Service owned and maintained[35] DCGs within the study area. As of the filing of this DLA, the SQF indicated that they have not been able to obtain this data. If data becomes available, SCE will provide a supplement to the REC-2 Technical Memorandum.

[35] Developed campgrounds are operated through a third-party concessionaire on behalf of the SQF and collect recreation use and capacity data for the sites.

Table 7.7-9. Estimated Recreation Days: Non-Project Recreation Facilities

Day Type	Sites 1 through 3 [a]	Study Sites 4-23 and 25 [a]							
		Day Use	Dispersed Camping		Day Use Adjacent to Developed Campground		Trail-head	Total
			Day Use	Camping Use	Day Use	Camping Use		
Total Weekday	3,900	1,200	2,600	300	600	25	1,100	**9,700**
Total Weekend	3,300	1,000	3,500	600	700	17	700	**9,800**
Total Spring	**7,200**	**2,200**	**6,100**	**900**	**1,300**	**42**	**1,800**	**19,600**
Total Weekday	7,000	6,800	3,500	1,800	4,200	1,000	1,700	**26,000**
Total Weekend	4,400	5,500	9,100	5,000	9,000	2,600	800	**36,400**
Total Holiday	3,700	5,300	8,200	2,900	2,500	1,00	1,300	**24,900**
Total Summer	**15,100**	**17,600**	**20,800**	**9,700**	**15,700**	**4,600**	**3,800**	**87,300**
Total Weekday	2,200	1,900	1,800	800	1,200	58	800	**8,800**
Total Weekend	2,900	1,500	1,800	600	700	53	900	**8,800**
Total Holiday	1,000	200	200	68	55	5	300	**1,800**
Total Fall	**6,100**	**3,600**	**3,800**	**1,700**	**2,000**	**100**	**2,000**	**19,200**
Total Weekday	2,000	1,600	1,600	400	900	2	800	**7,300**
Total Weekend	700	500	500	100	500	2	500	**2,800**
Total Holiday	700	400	400	100	300	1	500	**2,400**
Total Winter	**3,400**	**2,500**	**2,500**	**600**	**1,700**	**5**	**1,800**	**12,500**
Total Annual	**31,800**	**25,900**	**33,200**	**12,900**	**20,700**	**4,800**	**9,400**	**138,600**

Note:
[a] Sites 1-3 are upstream of the FERC Project Boundary; Site 4 is upstream of Fairview Dam, but within the FERC Project Boundary; Sites 5-23 and 25 are outside of the FERC Project Boundary, but located within the Fairview Dam Bypass Reach.

Parking Utilization (Density)

During the study period, the maximum parking utilization on non-peak weekends was estimated to be highest at the Whiskey Flat Trailhead (site 25) (66 percent), followed by the Johnsondale Bridge River Access (site 1) (55 percent). During peak (holiday) weekends, parking capacity was highest at the Whiskey Flat Trailhead (site 25) at 98 percent followed by the Camp 3 Campground (site 20) at 76 percent, Johnsondale Bridge River Access (site 1) at 67 percent, and the Corral Creek Picnic Site and Whitewater Take-out (site 15) at 64 percent (REC-2, Table 5.2-2 and Table 5.2-3).

<u>Projected Recreation Day Estimates 2023 through 2070</u>

The estimated current (2023) and projected (2070) recreation use within the vicinity of the Project over the Project's maximum license term.

Estimates of future recreation use in the vicinity of the Project were determined by projecting the 2023 RD estimates in 10-year intervals for the next 50 years (2070) (Table 7.7-10). The projected RDs were weighted by the proportion of surveys that were completed in Kern and Tulare Counties. The current recreation use is estimated to be approximately 150,000 RDs in 2023 with an estimated projection of approximately 204,900 annual RDs in 2070. This is an increase of approximately 54,900 RDs, or an approximately 37 percent increase over the next 50 years (REC-2, Table 5.3-3).

<u>Table 7.7-10. Estimated Future Recreation Days at Project and Non-Project Sites, 2023–2070</u>

Year	Study Sites 1 through 3 [a,b]	Study Sites 4 through 25 [a,b]							
		Day Use	Dispersed Camping		Day Use Adjacent to Developed Campground				Total
			Day Use	Camping Use	Day Use	Camping Use	Trail-head	KR3 PH	
2023	32,000	26,000	33,000	13,000	21,000	4,800	9,200	11,000	150,000
2030	33,500	27,200	34,600	13,600	22,000	5,000	9,600	11,500	157,100
2040	35,800	29,100	36,900	14,600	23,500	5,400	10,300	12,300	167,900
2050	38,300	31,100	39,500	15,600	25,100	5,700	11,000	13,200	179,500
2060	40,900	33,200	42,200	16,600	26,800	6,100	11,800	14,100	191,800
2070	43,700	35,500	45,100	17,800	28,700	6,600	12,600	15,100	204,900

KR3 PH = KR3 Powerhouse Whitewater Put-in/Take-out
Notes:
[a] Numbers have been rounded to the nearest hundredth.
[b] Sites 1-3 are upstream of the FERC Project Boundary; Site 4 is upstream of Fairview Dam, but within the FERC Project Boundary; Sites 5-23 and 25 are outside of the FERC Project Boundary, but located within the Fairview Dam Bypass Reach.

Future recreation needs within the vicinity of the Project can be assessed in part by comparing the recreation use estimates and parking utilization percentages determined for 2023 to the projected growth rate of Kern and Tulare Counties in which the Project is located. Assuming recreation use would increase at the same rate as population growth, RDs within the vicinity of the Project would increase by approximately 54,900. With this estimated increase, parking utilization and campground utilization at recreation sites in the vicinity of the Project would mostly remain under capacity. Exceptions to this are the Whiskey Flat Trailhead in 2040, 2050, 2060, and 2070, and the day use parking area adjacent to Camp 3 Campground in 2070. In 2070, the parking utilization on non-peak weekends at the Project's KR3 Powerhouse Whitewater Put-in/Take-out is expected to be approximately 33 percent, not including the additional informal parking that is available in the large gravel and native earthen area at the southern end of the site.

7.7.1.2. River-Based Recreation

This section includes a discussion of river-based recreation in the vicinity of the Project that may be affected by the Project, specifically whitewater boating and angling.

<u>Whitewater Boating</u>

Data collection efforts regarding whitewater boating opportunities and flow preferences as part of REC-1 Study Plan and additional use-estimates and activity type-estimates at river access locations as part of REC-2 Study Plan are ongoing for the next year and the results will be provided as an addendum to the Technical Memorandum.

Whitewater Boating River Segments

The NFKR is a popular whitewater destination offering seasonal whitewater boating opportunities. The whitewater boating opportunities on the Kern River are described in numerous whitewater guidebooks (Holbek and Stanley, 1988; Cassidy and Calhoun, 1990; Penny, 1991) as well as online sources such as American Whitewater River Information pages (American Whitewater, 2023a through e), the Upper Kern River Rafting Guide (Kern River Outfitters, 2023), and commercial whitewater outfitter websites. Most paper guidebooks and even online sources list the whitewater opportunities in the approximately 16-mile Fairview Dam Bypass Reach as a single or, at the most, two whitewater segments breaking down the bypass further in the narrative description based on specific rapids and difficulty. These guidebooks provide a broad overview of whitewater boating in the bypass reach but lack the detail describing the variety of whitewater boating opportunities between the different whitewater segments, the river access, whitewater difficulty, and flow preferences unique to each segment. The Upper Kern River Rafting Guide divides the upper Kern from Johnsondale Bridge into seven distinct segments with detailed descriptions of rapids and locations in each segment (Kern River Outfitters, 2023).

The REC-1 Study divided the Fairview Dam Bypass Reach into eight whitewater segments and identified a ninth segment downstream of the bypass reach from the KR3

Powerhouse to Riverside Park in Kernville (Table 7.7-11 and Figure 7.7-3). Delineation into these river segments was based in part on whitewater difficulty, river access, whitewater boating community use patterns, and commonly used place names. Dividing the Fairview Dam Bypass Reach based in part on whitewater difficulty and community use patterns allowed for more detailed segment specific analysis of flow preferences.

SQF manages the developed, dispersed and day-use recreation facilities throughout the Fairview Dam Bypass Reach that support various types of recreation, including river and boating access (see 7.7.1.1 Land-Based Recreation). Seven of the whitewater segments in the Fairview Dam Bypass Reach have river access at a Forest Service dispersed or developed recreation facility. The proximity of Mountain Highway 99 to the NFKR corridor provides additional access to the river allowing boaters to combine or split river segments based on their personal preferences.

Access to the Lickety Split segment is provided at the KR3 Powerhouse Whitewater Put-in/Take-out. Commercial whitewater outfitters are required to obtain a permit from SCE to use this Project river access site (this is discussed in more detail below). Public access is allowed at this location without a permit.

Table 7.7-11. Whitewater Segments in the Fairview Dam Bypass Reach and Directly Downstream of KR3 Powerhouse

Whitewater Run Segment	Whitewater Difficulty [a]	Put-in	Take-out	RM Start [b]	RM End [b]	Length (miles)
Sidewinder / Bombs Away	IV – V	Below Fairview Dam	Roads End/ Calkins Put-in	18.5	18	0.5
Fairview	III	Roads End / Calkins Put In	Calkins Flat	18	15.7	2.3
Chamise Gorge	IV – V	Calkins Flat	Above Upper Salmon Rapid	15.7	13.2	2.5
Salmon Falls	VI	Below Lower Salmon Rapid	Ant Canyon	13.2	12.3	0.9
Gold Ledge	IV – V	Ant Canyon	Corral Creek	12.3	9.2	3.1
Thunder Run	V	Corral Creek	Thunderbird Access or Camp 3	9.2	5.7	3.5
Cable / Camp 3	IV	Camp 3	Riverkern Beach	5.7	3.9	1.8
Riverkern Beach	II	Riverkern Beach	KR3 Powerhouse	3.9	2.9	1
Lickety Split	II+–III	KR3 Powerhouse Whitewater Put-in/Take-out	Riverside Park, Kernville	2.9	1.1	1.8

KR3 = Kern River No. 3; NFKR = North Fork Kern River; RM = River Mile
Notes:
[a] Whitewater difficulty based on guidebooks and online sources using International Scale of Whitewater Difficulty. In focus group meetings, boaters that routinely paddle the individual river segments tended to downgrade the whitewater difficulty. Note that International Scale of Whitewater Difficulty is an objective

rating system based on river hazards and obstructions and does not change due to a person's familiarity or personal boating skills.

[b] River miles are calculated using National Hydrologic Database flowlines and upstream of the confluence of the NFKR and high watermark of Isabella Lake.

The whitewater difficulty across the nine whitewater segments ranges from Class II to VI, but can vary depending on river flow (Table 7.7-11). Individual boaters often combine one or more river segments into a single trip for a longer paddling opportunity and in some cases will paddle the entire length of the bypass reach plus the downstream Lickety Split run to Riverside Park in Kernville. Boaters may choose to combine river segments based on any number of factors including personal skill, overall skills in the group, whitewater difficulty, flow, weather and available time. Boaters may portage around a river segment on foot or using vehicles due to changes in whitewater difficulty, discharge and/or personal boating interest. In some cases, boaters may even choose to paddle river segments out of sequence longitudinally to focus on river segments with similar whitewater difficulty or to progress from easier to more difficult river segments. Some boaters do a bridge-to-bridge run, putting in at Johnsondale Bridge and taking out at Riverside Park in Kernville. A bridge-to-bridge involves portaging around Fairview Dam and for most boaters, Salmon Falls Rapid.

Commercial outfitters offer whitewater rafting trips to the public along the Fairview Dam Bypass Reach, on river segments above the Project on the NFKR, and on the lower Kern River below Lake Isabella. On the NFKR, commercial whitewater trips range in duration from approximately 1 hour on the Class II-III Lickety Split Run to multiday overnight trips with Class IV-V rapids on the Forks of the Kern above the Project. Commercial rafting trips occur on all whitewater segments in the Fairview Dam Bypass Reach with the exception of Sidewinder / Bomb's Away due to access restrictions and Salmon Falls due to the Class VI difficulty. Trips offered in the bypass reach are advertised as intermediate to advanced in difficulty while the Lickety Split segment is considered suitable for beginners. Trips can range from 1 to 2 hours, half-day, and full-day. The half-day and full-day trips typically combine multiple whitewater segments. These trips advertise Class III-IV rapids.

Commercial outfitters select segments for raft trips based in part on water levels, watercraft, customer skill level, and length of trip purchased by customers. Buses and trailers are used on Mountain Highway 99 to transport commercial customers to river access locations. Several commercial outfitters also offer kayak instruction on the Kern River ranging from beginner classes to advanced instruction. Scheduled group classes are offered as well as private instruction. Class lengths range from 1 to 5 days.

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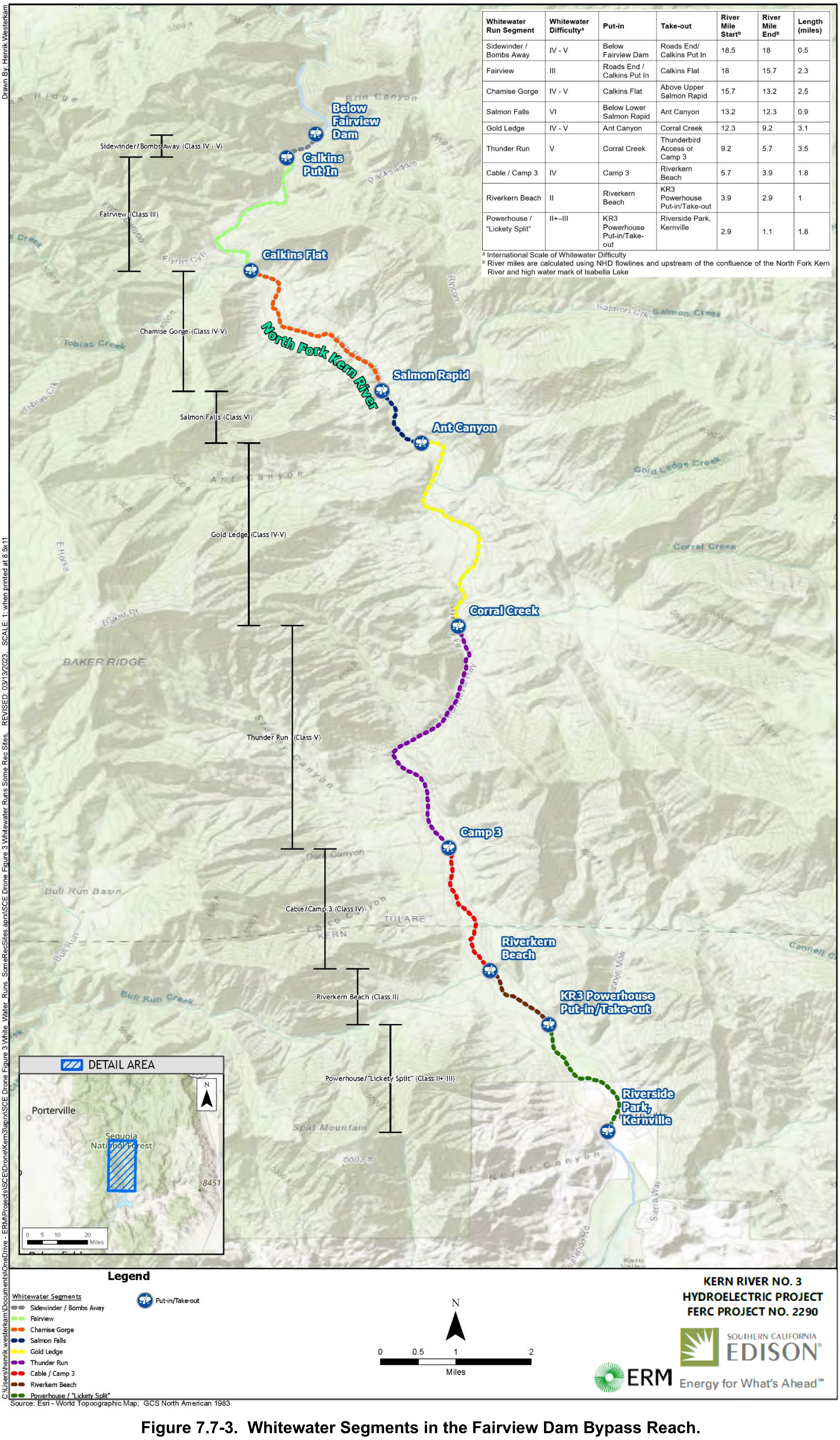

Whitewater Run Segment	Whitewater Difficulty[a]	Put-in	Take-out	River Mile Start[b]	River Mile End[b]	Length (miles)
Sidewinder / Bombs Away	IV - V	Below Fairview Dam	Roads End/ Calkins Put In	18.5	18	0.5
Fairview	III	Roads End / Calkins Put In	Calkins Flat	18	15.7	2.3
Chamise Gorge	IV - V	Calkins Flat	Above Upper Salmon Rapid	15.7	13.2	2.5
Salmon Falls	VI	Below Lower Salmon Rapid	Ant Canyon	13.2	12.3	0.9
Gold Ledge	IV - V	Ant Canyon	Corral Creek	12.3	9.2	3.1
Thunder Run	V	Corral Creek	Thunderbird Access or Camp 3	9.2	5.7	3.5
Cable / Camp 3	IV	Camp 3	Riverkern Beach	5.7	3.9	1.8
Riverkern Beach	II	Riverkern Beach	KR3 Powerhouse Put-in/Take-out	3.9	2.9	1
Powerhouse / "Lickety Split"	II+–III	KR3 Powerhouse Put-in/Take-out	Riverside Park, Kernville	2.9	1.1	1.8

[a] International Scale of Whitewater Difficulty
[b] River miles are calculated using NHD flowlines and upstream of the confluence of the North Fork Kern River and high water mark of Isabella Lake

Figure 7.7-3. Whitewater Segments in the Fairview Dam Bypass Reach.

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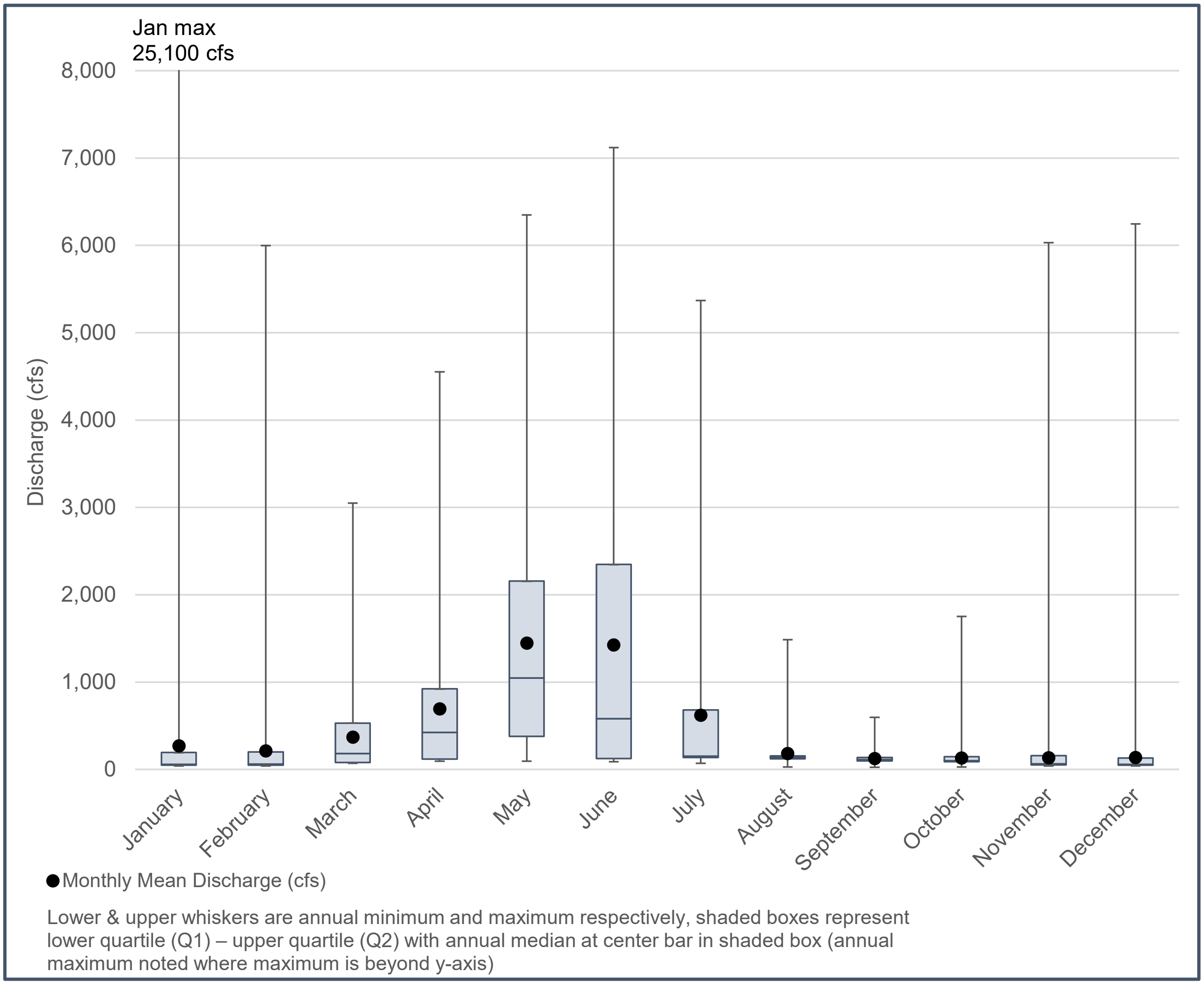
Hydrology Summary

The Project essentially has no storage and can divert up to approximately 600 cfs into the water conveyance system when sufficient inflows are available, once MIFs below the dam are met. Any additional inflows continue downstream along the Fairview Dam Bypass Reach.

The Fairview Dam Bypass Reach experiences a wide range of flows from the MIF requirements of 40 cfs to 130 cfs (refer to Section 5.1, *No-Action Alternative*, for the current MIF requirements) to the natural seasonal high flows that vary with snow pack run-off and rain events in the watershed. Refer to Exhibit B, Project Operations and Resource Utilization, for monthly flow duration curves depicting both inflows above Fairview Dam (unimpaired) and flows in the Fairview Dam Bypass Reach (regulated). Additional hydrology analyses are presented in Section 7.3, *Water Resources*. To support the recreation resources effects analysis, a summary of the historical hydrology data in the Fairview Dam Bypass Reach is presented below from 1997 to 2022.

Flows in the Fairview Dam Bypass Reach are typically highest in May and June, corresponding to snowmelt run-off patterns in the southern Sierra Nevada (Figure 7.7-4). Median flows are highest in May (Table 7.7-12), although the 75 percent quartile range is highest in June.

As directed in FERC's May 30, 2024 Determination on Requests for Study Modifications (FERC Accession No. 20240530-3030), SCE will conduct a supplemental hydrologic analysis over the period of record, excluding times when the Project was non-operational, to further describe the operational effects of the Project on whitewater boating flow opportunities in the Fairview Dam Bypass Reach. The results of the supplemental analysis will be incorporated into the FLA.



cfs = cubic feet per second

Figure 7.7-4. Monthly Discharge (cfs) Statistics in the Fairview Dam Bypass Reach on the North Fork Kern River, Water Years 1997–2022.

Table 7.7-12. Monthly Discharge (cfs) Statistics in the Fairview Dam Bypass Reach on the North Fork Kern River, Water Years 1997–2022

Month	Mean	Median	Minimum	First (Lower) Quartile	Third (Upper) Quartile	Maximum
January	271	60	41	51	194	25,100
February	214	62	42	48	202	5,997
March	370	182	72	80	530	3,048
April	693	425	96	120	923	4,552
May	1,448	1,049	96	379	2,156	6,350
June	1,427	583	88	127	2,347	7,120
July	620	152	71	137	680	5,370
August	183	140	29	121	156	1,486
September	126	113	26	97	137	596
October	133	100	27	90	145	1,752
November	135	65	40	52	158	6,030
December	137	60	40	50	133	6,245

cfs = cubic feet per second
Note: Data includes months and years when the Project was off-line (not generating) or had reduced generation capacity (only utilize one unit) due to extended maintenance outages. Refer to Table 2-1 in Exhibit B for additional information.

FERC License Requirements for Whitewater Boating Opportunities

In accordance with the current FERC License Article 422, as amended[36], SCE provides supplemental whitewater boating opportunities through alterations in Project operations, as outlined in Table 7.7-13. License Article 422 states:

"Beginning no later than 10 a.m. and ending no earlier than 5 p.m. of each day that whitewater flows are scheduled, the Licensee must release the minimum whitewater flows described below into the Project bypass reach. The use of water under the regime below must be based on the previous days average inflow to the project, from April 1 through Jury 31, measured by adding the preliminary canal gauge 11185500 data below the

[36] Order Issuing New License. 1996 (77 FERC ¶ 61,313) (FERC Accession No. 19961230-0057);
Order on Rehearing 1997 (81 FERC ¶ 61,162) (FERC Accession No. 19971106-0219);
Southern California Edison (2002), Settlement Agreement Regarding the Kern River No. 3 Hydroelectric Project, File Code 1950/2770, filed December 30, 2002. FERC Accession No. 20030106-0377;
Order Amending License to Include U.S. Forest Service Revised Final Terms and Conditions Pursuant to Section 4(e) of the Federal Power Act, May 12, 2004. (107 FERC ¶ 62,136). FERC Accession No. 20040512-3014; and
Order Amending License Article 422 and to Include U.S. Forest Service Section 4(e) Condition 6(f) January 30, 2019. (166 FERC ¶ 62,049), FERC Accession No. 20190130-3082.

diversion to the preliminary river gauge 11186000 data below Fairview Dam. In the event that actual inflows to the Project on a whitewater release day are insufficient to both allow the continuous 300-cfs diversion to the Project powerhouse and meet the minimum whitewater release, then the whitewater release may be reduced in order to allow the continuous 300 cfs diversion to the Project powerhouse."

Table 7.7-13. Whitewater Recreation Flow Release Schedule

Dates	Boating Days	River Flow Fairview Dam (cfs)	Minimum Whitewater Release (cfs)
April 1 up to the weekend prior to Memorial Day Weekend	Fridays and Weekends	1,000 to 1,300 More than 1,700	700 1,400
Weekend prior to Memorial Day Weekend until July 4	Daily	1,000 to 1,300 More than 1,700	700 1,400
July 5 up to July 31	Weekends	1,000 to 1,300 More than 1,700	700 1,400

cfs = cubic feet per second

Frequency of Whitewater Boating Opportunities

The number of days when SCE was required to provide a whitewater recreation flow in the Fairview Dam Bypass Reach pursuant to License Article 422 are summarized by month and year for the period 2005 through 2022 (Table 7.7-14). Table 7.7-15 summarizes the number of days by month and year when a whitewater boating opportunity occurred naturally[37]. Figure 7.7-5 depicts the total annual number of boating opportunities (naturally occurring and provided by SCE operations) in the Fairview Dam Bypass Reach as compared to natural inflows above Fairview Dam. As shown in Table 7.7-14, the highest number of naturally occurring whitewater boating opportunities in the Fairview Dam Bypass Reach occur in the months of March through July during the snowmelt run-off period, and whitewater boating opportunities associated with natural spill also occur in December, January and February during winter precipitation events.

The data presented in the tables and figure below highlights the naturally occurring whitewater boating opportunities and those created through alterations in Project operations over the past 18-year period (2005-2022):

- Total Whitewater Opportunities:
  - Naturally Occurring: 953 days
  - SCE required whitewater recreation flows: 190 days

[37] Boating opportunities in the Fairview Dam Bypass Reach ≥700 cfs between 10 a.m. and 5 p.m. as measured at SCE gage 401, Kern River near Kernville (U.S. Geological Survey gage 11186000), does not include Project created opportunity days, nor times when SCE was not diverting due to maintenance or other operational outages.

- Annual Variability:
  - In 11 out of 18 years, the number of naturally occurring whitewater opportunities exceeded those created through SCE required whitewater recreation flows.
  - In 9 of those years, the number of naturally occurring whitewater opportunities was at least twice as many as those created through SCE required whitewater recreation flows.
- Water Year Variability: the total number of whitewater opportunities occurring naturally (boating opportunities ≥700 cfs) and those created by SCE required whitewater recreation flows in the Fairview Dam Bypass Reach are similar (Figure 7.7-5) to the total number of whitewater opportunities ≥700 cfs for Fairview Dam inflows.
  - Wetter Years
    - Both inflows at Fairview Dam and flows in the Fairview Dam Bypass Reach typically have about 100 or more whitewater opportunity days (2005, 2006, 2010, 2011, 2017, and 2019, Figure 7.7-5).
    - Very few boating opportunities are created by changes in Project operations.
  - Drier Years
    - There are between 0 and 10 events annually when inflows are ≥700 cfs at Fairview Dam (2007, 2013, 2015, 2021, and 2022, Figure 7.7-5).
    - The limitation of whitewater boating opportunities ≥700 cfs in drought years is due to the lack of snowpack in the watershed, not Project operations diverting water from the Fairview Dam Bypass Reach.

Table 7.7-14. Annual Number of Boating Opportunity Days, Water Years 2005–2022

Year	Number of SCE Required Whitewater Recreation Flows (License Article 422)					Fairview Dam Bypass Reach ≥700 cfs (Jan-Dec) [a]	Fairview Dam Inflow ≥700 cfs (Jan-Dec) [b]
	April	May	June	July	Total		
2005 [c]	6	3	0	4	13	130	150
2006 [d]	5	0	0	5	10	105	130
2007 [d,e]	0	2	0	0	2	0	24
2008 [e]	6	4	12	0	22	57	89
2009 [f]	1	8	21	0	30	29	63

Year	Number of SCE Required Whitewater Recreation Flows (License Article 422)					Fairview Dam Bypass Reach ≥700 cfs (Jan-Dec) [a]	Fairview Dam Inflow ≥700 cfs (Jan-Dec) [b]
	April	May	June	July	Total		
2010 [f,g]	7	7	0	2	16	97	127
2011 [f,g]	2	0	0	2	4	157	191
2012	1	6	0	0	7	16	35
2013 [h]	0	0	0	0	0	0	0
2014 [i]	0	0	0	0	0	14	14
2015	0	0	0	0	0	0	0
2016	3	13	15	0	31	12	54
2017	0	0	0	2	2	182	220
2018	3	3	2	0	8	15	72
2019	3	0	0	4	7	126	168
2020	0	12	0	0	12	13	32
2021	0	0	0	0	0	0	1
2022 [h]	0	0	0	0	0	0	9
Total	45	72	54	19	190	953	1379
Minimum	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Q1	0.0	0.0	0.0	0.0	1.0	3.0	16.5
Mean	2.4	3.8	2.8	1.0	10.0	52.9	76.6
Median	1.0	2.0	0.0	0.0	7.0	15.5	58.5
Q3	4.0	6.5	1.0	2.0	14.5	103.0	129.3
Maximum	8	14	21	5	31	182	220

cfs = cubic feet per second; SCE = Southern California Edison
Notes:
[a] Boating opportunities in the Fairview Dam Bypass Reach ≥700 cfs between 10 a.m. and 5 p.m. as measured at SCE gage 401, Kern River near Kernville (U.S. Geological Survey gage 11186000), not including SCE Required Whitewater Recreation Flows days. Refer to Table 7.7-13 for a monthly breakdown.

[b] Estimated from the summation of two gaging stations (SCE gage 401, Kern River near Kernville [U.S. Geological Survey gage 11186000], and SCE gage 402, Kern River No. 3 Conduit at Adit 6/7 [U.S. Geological Survey gage 11185500]).

Notes: Periods with reduced generation capacity due to extended maintenance outages are as follows:

[c] March and May 2005: Project was off-line intermittently to install new cooling water system.

[d] August 2006 to April 2007: Unit 2 was off-line for repairs.

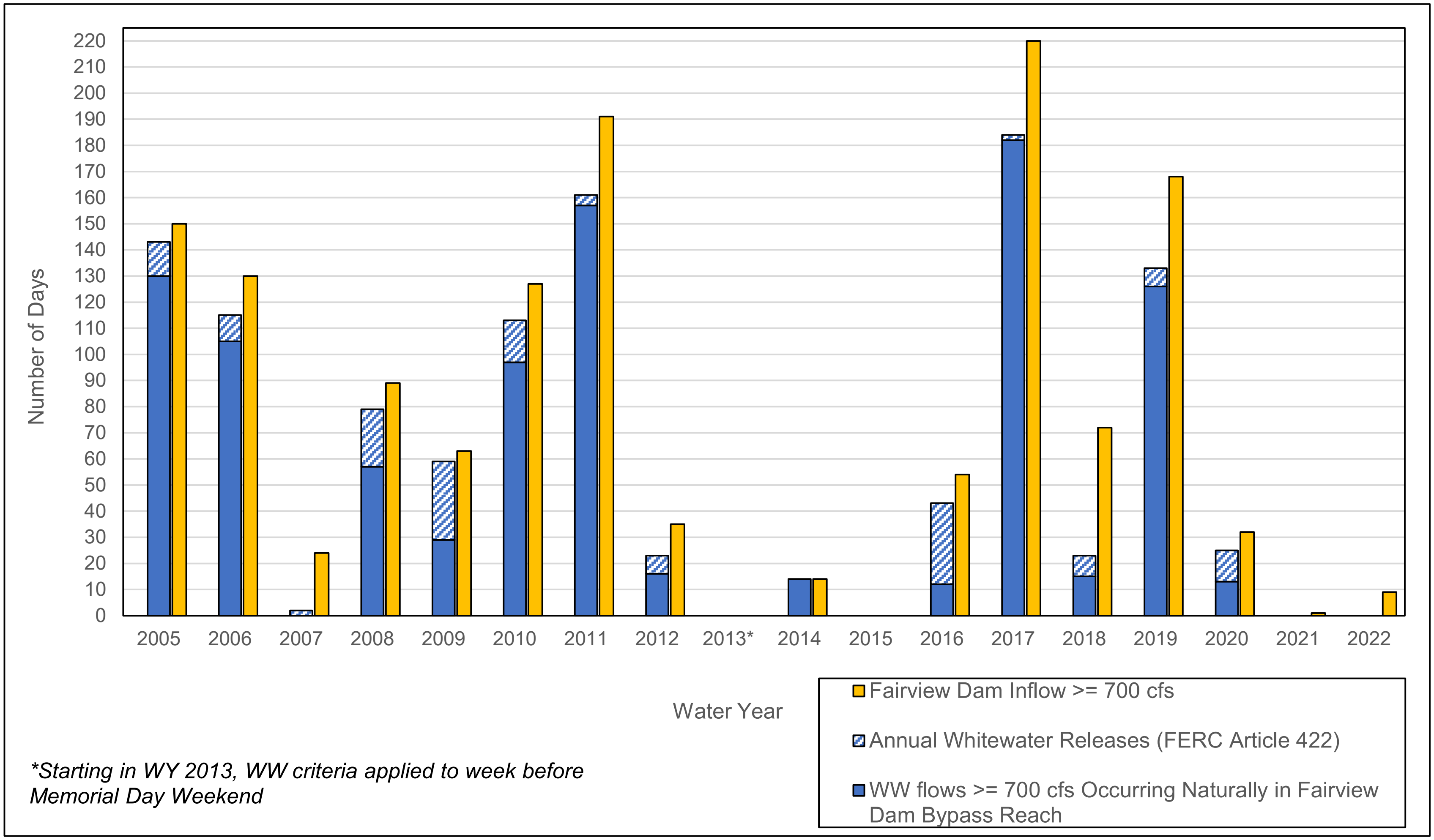
[e] August 2007 to March 2008: Unit 1 was off-line for repairs.

[f] July 2009 to May 2011: Unit 2 was off-line for repairs.

[g] September 2010 to February 2011: Project was off-line for automation upgrades.

[h] August 2013 to mid-December 2014: Project was off-line for upgrades and repairs at Fairview Dam and along water conveyance system.

[I] August 2022 to November 2022: Unit 1 was off-line for repairs.



cfs = cubic feet per second; FERC = Federal Energy Regulatory Commission; WW = whitewater; WY = water year

Figure 7.7-5. Annual Number of Boating Opportunities, Water Years 2005–2022.

Table 7.7-15. Number of Whitewater Opportunity Days (Flows >700 cfs) by Month Naturally Occurring in the Fairview Dam Bypass Reach, Water Years 2005–2022

Water Year	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual Total
2005 [a]	5	0	25	18	28	30	23	1	0	0	0	0	**130**
2006 [b]	1	1	0	22	31	30	20	0	0	0	0	0	**105**
2007 [b,c]	0	0	0	0	0	0	0	0	0	0	0	0	**0**
2008 [c]	1	1	0	12	27	16	0	0	0	0	0	0	**57**
2009 [d]	0	0	0	3	23	3	0	0	0	0	0	0	**29**
2010 [d,e]	0	0	2	14	24	30	22	0	0	5	0	0	**97**
2011 [d,e]	2	0	20	28	31	30	29	6	0	0	0	11	**157**
2012	0	0	0	9	7	0	0	0	0	0	0	0	**16**
2013 [f]	0	0	0	0	0	0	0	0	0	0	0	0	**0**
2014 [f]	0	0	0	0	14	0	0	0	0	0	0	0	**14**
2015	0	0	0	0	0	0	0	0	0	0	0	0	**0**
2016	0	0	0	0	7	5	0	0	0	0	0	0	**12**
2017	9	22	22	30	31	30	31	6	0	0	0	1	**182**
2018	0	0	2	8	5	0	0	0	0	0	0	0	**15**
2019	1	2	5	27	31	30	30	0	0	0	0	0	**126**
2020	0	0	0	2	11	0	0	0	0	0	0	0	**13**
2021	0	0	0	0	0	0	0	0	0	0	0	0	**0**
2022 [g]	0	0	0	0	0	0	0	0	0	0	0	0	**0**
Total	19	26	76	173	270	204	155	13	0	5	0	12	953
Min	0	0	0	0	0	0	0	0	0	0	0	0	0

Water Year	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual Total
Q1	0	0	0	0	1	0	0	0	0	0	0	0	3
Mean	1	1	4	10	15	11	9	1	0	0	0	1	53
Median	0	0	0	6	13	2	0	0	0	0	0	0	16
Q3	1	0	2	17	28	30	22	0	0	0	0	0	103
Max	9	22	25	30	31	30	31	6	0	5	0	11	182

cfs = cubic feet per second
Notes: Periods with reduced generation capacity due to extended maintenance outages are as follows:
[a] March and May 2005: Project was off-line intermittently to install new cooling water system.
[b] August 2006 to April 2007: Unit 2 was off-line for repairs.
[c] August 2007 to March 2008: Unit 1 was off-line for repairs.
[d] July 2009 to May 2011: Unit 2 was off-line for repairs.
[e] September 2010 to February 2011: Project was off-line for automation upgrades.
[f] August 2013 to mid-December 2014: Project was off-line for upgrades and repairs at Fairview Dam and along water conveyance system.
[g] August 2022 to November 2022: Unit 1 was off-line for repairs.

Upon completion of the REC-1 Whitewater Boating Study, the frequency analysis of whitewater boating opportunities (≥700 cfs) in the Fairview Dam Bypass Reach will be reanalyzed using the minimum acceptable boating flow preferences based on the results of the Level 3 Comparative Flow Survey.

Whitewater Boating Use Numbers

Non-Commercial Whitewater Use

The SQF requires non-commercial whitewater boaters on the NFKR to obtain a Kern River Use Permit. Permits are required for each watercraft, are free of charge, and valid from May 1 through the following April 30 (SQF, 2023). The Kern River Use Permit was suspended during the COVID-19 pandemic (personal communication, Bob Frenes, Assistant Recreation Officer on the Kernville Ranger District, SQF, August 17, 2023). In addition, non-commercial whitewater boaters are required to complete a daily river use manifest (Forest Service #13-2360-6) for each trip on the NFKR. Drop boxes referred to as “Iron Rangers” are located at developed river access sites. Daily manifest forms were not available in the Iron Rangers at river access sites during the May and August 2023 site visits or the Kernville District Ranger office. The SQF does not record the daily manifests or tabulate the number of non-commercial boaters using the NFKR. As a result, annual non-commercial whitewater use numbers are not available for the NFKR at this time.

Commercial Whitewater Use

The SQF manages commercial activities on the NFKR through Special Use Permits (SUPs). The SQF issues SUPs for commercial whitewater boating in 5-year increments. The SQF renewed three SUPs for a 5-year period starting in 2023 for the NFKR (personal communication, [Marie] Angie Attencio, Special Uses Permit Administrator, Kern River Ranger District, SQF, August 10, 2023). The number of whitewater SUPs issued on the NFKR has declined from five to three in the past decade.

Commercial whitewater outfitters report their annual number of passengers on the NFKR and the lower Kern River to the SQF. In the 19-year period from 2004 to 2023, commercial passenger numbers on the NFKR ranged from a low of 120 in 2015 to a high of 7,591 in 2023 (Figure 7.7-6). On the NFKR, the number of commercial passengers in a given year is reflective of the available water based on winter snow pack and spring snow melt conditions. WY 2015 was a drought year with a limited season for commercial rafting flows. On the other hand, WYs 2017 and 2023 were wetter years with prolonged run-off allowing commercial outfitters to offer trips well into the late summer season and early fall.

During low water conditions commercial outfitters substitute advertised trips for other river opportunities in the area typically on the lower Kern River below Lake Isabella. Flows suitable for commercial whitewater are more predictable on the lower Kern River due to the large volume of storage in Lake Isabella coupled with a water delivery schedule downstream via the lower Kern River for irrigating agricultural crops. Therefore, commercial outfitters will shift boating trips to the lower Kern River in drought years when fewer whitewater boating opportunities are available on the NFKR.

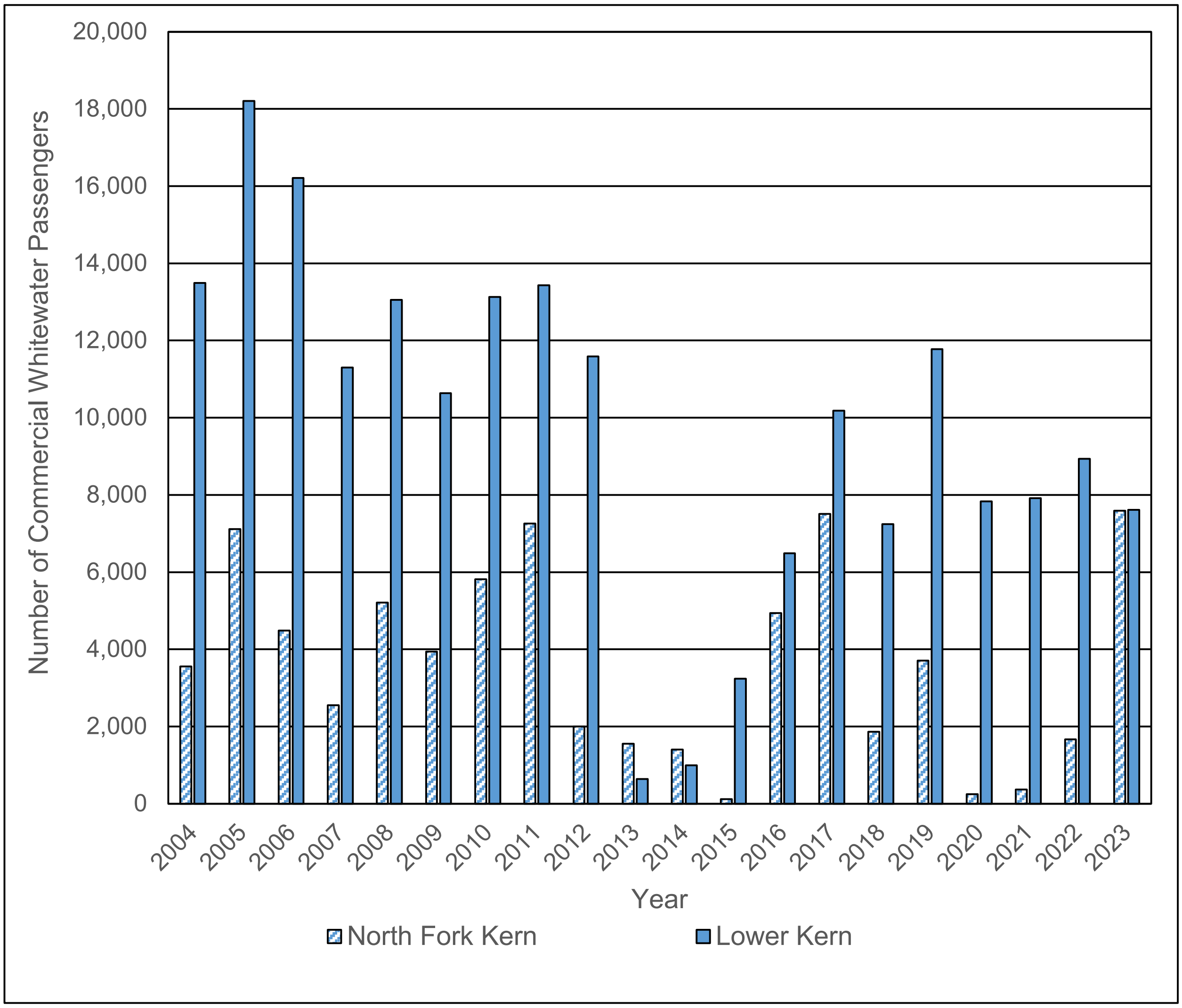


Figure 7.7-6. Annual Number of Commercial Whitewater Passengers Reported to SQF for the Lower Kern River and North Fork Kern River, 2004–2023.

SCE Commercial Use Numbers

SCE issues permits for commercial whitewater outfitters to use the KR3 Powerhouse Whitewater Put-in/take-out site. Commercial whitewater outfitters report their annual number of passengers launching at the KR3 Powerhouse Whitewater Put-in/Take-out site to SCE. In the 7-year period from 2017 to 2023, commercial passenger numbers ranged from a low of 1,780 in 2021 to a high of 38,569 in 2017 (Figure 7.7-7). The greatest number of commercial whitewater passenger trips typically occur in May, June, and July in most years with some opportunities in August in wetter years (Figure 7.7-8). In years with higher snowpack, the commercial whitewater season may extend into the early fall season. Discharge in water years 2017 and 2023 were two of the highest in the 25-year period from 1997 to 2023, allowing commercial outfitters to offer trips into September and even October in 2017.

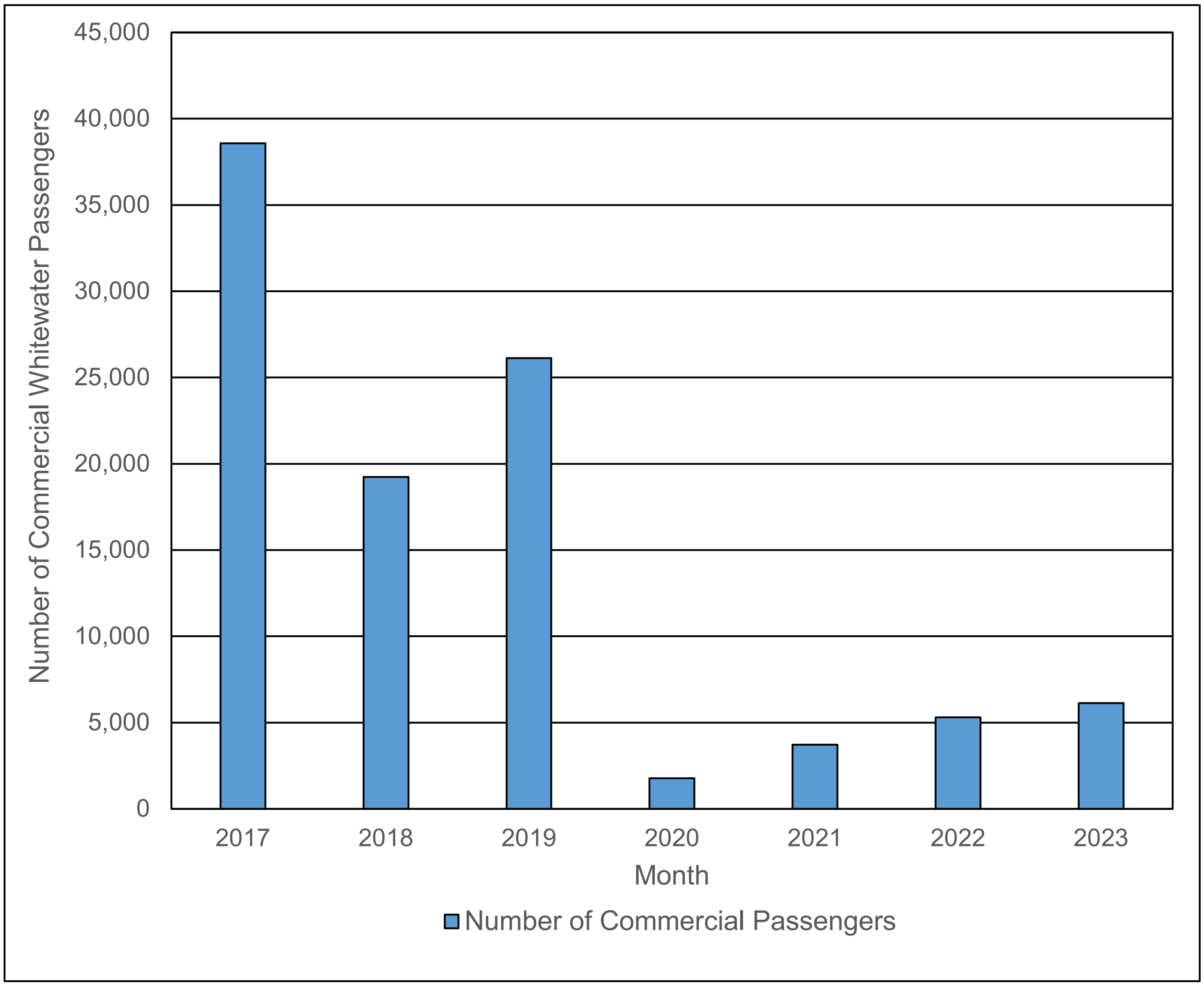


Figure 7.7-7. Annual Commercial Whitewater Passengers Launching at KR3 Powerhouse Whitewater Put-in/Take-out Site, 2017–2023.

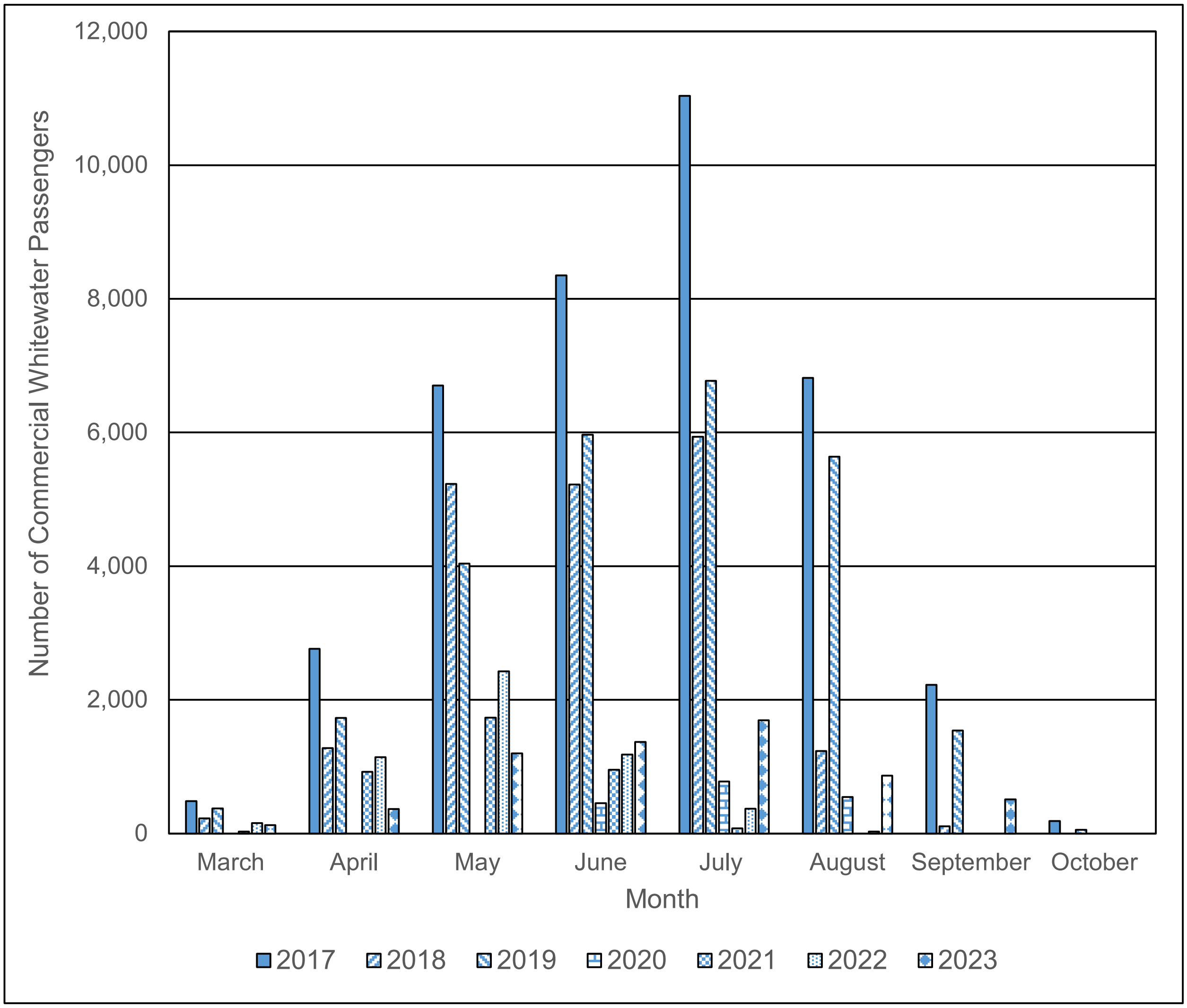


Figure 7.7-8. Monthly Commercial Whitewater Passengers Launching at KR3 Powerhouse Whitewater Put-in/Take-out Site, 2017–2023.

As directed by FERC staff in their May 30, 2024 Determination on Requests for Study Modifications and New Studies (FERC, 2024) data collection will be ongoing for another year specifically collecting one-year of use information via trail cameras at river access points (subject to approval by SQF) to capture: (1) use-estimates including percent capacity at all river access locations; (2) activity-type estimates, specifically commercial vs. non-commercial boating, including the type of watercrafts used. Results from the additional data collected via cameras will be provided as an addendum to the Final Technical Memorandum.

Boater User Experience and Feedback

Structured Interview respondents from the Level 1 Desktop Analysis identified a variety of watercraft used to boat on the NFKR with most respondents using more than one type (*REC-1 Whitewater Boating Level 1 Structured Interview Analysis Technical*

Memorandum, March 1, 2024 [Appendix E.2]). These watercraft include rafts, catarafts, shredders, open canoes, closed-deck canoes, hardshell kayaks, inflatable kayaks, pack rafts, river boards, and stand-up paddleboards. Other types of watercraft may be used intermittently but are less common.

Structured Interview responses indicate kayaks were the most prevalent watercraft used by 78 percent of respondents. Paddle rafts were used by 46 percent. Riverboards and packrafts were the least commonly used watercraft. Hardshell kayaks include low-volume play boats, medium volume half-slice river runners, and larger volume creek boats. Kayak choice is typically driven by individual whitewater skill, water level, river segment, and desired experience. Raft and cataraft lengths vary with water level and river segment.

Tubing is also popular on the Riverkern Beach and Lickety Split segments particularly in the summer months when flows are lower and water temperatures warmer. Some individuals tube other river segments in the bypass but this is less common due in part to the increased whitewater difficulty. Several Kernville retail shops rent tubes to the public and even provide shuttles to the river. Tubing is not recommended at higher flows. In 2023, tubing was not advised due to the high-water conditions.

The Structured Interview Questionnaire queried respondents on their recreation use patterns on the NFKR. More than half of respondents said they make more than 21 trips per year, and 8 percent of respondents said they make more than 100 trips per year (REC-1 [March 1, 2024], Figure 2-6[38]). One respondent said their number of trips fluctuated annually depending on the type of water year and availability of whitewater opportunities on the NFKR. For the majority of respondents using kayaks, inflatable kayaks, paddle rafts, and catarafts, trips are 3 to 4 hours long (REC-1 [March 1, 2024], Figure 2-7). Trips for some kayakers and paddle rafters are only 1 to 2 hours long, while trips for a smaller percentage (10 percent) of kayakers are 5 to 6 hours long. Respondents indicated that trips using stand up paddleboards and inner tubes were typically 1 to 2 hours long. Weekends are the most popular time to boat, followed by weekdays between 8 a.m. and 5 p.m. Holiday weekends and holidays were also popular. The least popular time to boat was weekdays after 5 p.m. (REC-1 [March 1, 2024], Figure 2-8).

As part of the Level 3 Intensive Study[39], a single flow survey was conducted in 2023 collecting 404 responses from 91 individual boaters providing feedback for all nine river segments at varying flows that ranged from 250 cfs up to 8,500 cfs. The highest number of respondent trips occurred downstream of the Project below the Fairview Dam Bypass Reach on the Lickety Split river segment, and the least were on the Sidewinder river segment (REC-1 [March 29, 2024]), Table 5.1-2). Respondent trips were highest for the Chamise river segment when discharge was less than 700 cfs. When flows were greater than 3,000 cfs, the majority of trips occurred on the Cable / Camp 3, Riverkern, and

[38] For additional information regarding all survey responses, refer to the *REC-1 Whitewater Boating Level 1 Structured Interview Analysis Technical Memorandum* (March 1, 2024) in Appendix E.2. Table numbers from the Technical Memorandum are included for reference.

[39] For additional information regarding single flow survey responses, refer to the *Addendum to REC-1 Whitewater Boating Interim Technical Memorandum: Level 3 Single Flow Survey Results (*March 29, 2024) in Appendix E.2. Table numbers from the Technical Memorandum are included for reference.

Lickety Split river segments. Single flow survey respondents used a variety of watercraft types, but kayaks were the predominant watercraft used by respondents, comprising 81 percent of the single flow survey trips (REC-1 [March 29, 2024]), Figure 5.1-6 and Table 5.1-3). Kayaks were almost exclusively used when discharge was less than 700 cfs.

In the Level 2 Limited Reconnaissance site visit (August 25, 2023) and the Level 3 Intensive study enhanced (controlled) flow opportunity focus groups (April 11-13, 2024), boaters expressed their dislike for the current license condition (License Article 422) in which specific flow targets are met in the Fairview Dam Bypass Reach on specified days based on the previous day's preliminary average inflow to Fairview Dam. Under the current license requirement, the preliminary daily average triggering the requirement for passing a whitewater flow into the Fairview Dam Bypass Reach is not calculated until midnight the day of the potential whitewater flow opportunity. Boaters expressed that short notice in this system prevents boaters from planning trips in advance to boat river segments in the Fairview Dam Bypass Reach and that the lack of advance notice has a more pronounced effect on boaters traveling from further distances outside the NFKR watershed. At Level 2 and Level 3 focus group meetings, boaters indicated their preference for a more predictable schedule of whitewater flows in the bypass reach based on an annual calendar with specific dates for passing flows over Fairview Dam into the Fairview Dam Bypass Reach. Focus group participants explained that they routinely monitor the NFKR hydrology allowing them to predict flows in the Fairview Dam Bypass Reach based on inflows to Fairview Dam. Furthermore, boaters stated they enjoy a range of boating flows in the Fairview Dam Bypass Reach which offer a variety of whitewater opportunities. The boaters disapproved of a defined whitewater boating flow passing over Fairview Dam claiming that a specified flow limited the types of whitewater opportunities available in the Fairview Dam Bypass Reach.

<u>Angling</u>

The section of river from Johnsondale Bridge downstream to Isabella Lake, including its tributaries, offers year-round fishing opportunities and includes the approximately 16-mile Fairview Dam Bypass Reach. Angling opportunities along this section of the NFKR include bait, spin, and fly fishing for rainbow trout and brown trout. Fishing regulations also allow for use of spears and bows in the bypass reach.

The Fairview Dam Bypass Reach is easily accessible along Mountain Highway 99 and opportunities for angling can be accessed from developed recreation sites and dispersed river access locations (refer to Section 7.7.1.1, *Land-Based Recreation*, recreation opportunities discussions above for more information about the various recreation sites). In addition to developed access routes, much of the river along the NFKR has road shoulder pull-outs and social trails to the river.

Angler Preferences

Angling preferences were compiled from a survey of approximately 400 anglers in addition to focused interview responses, as described in the *ANG-1 Enjoyable Angling*

Flows Technical Memorandum (Appendix E.2). About 87 percent of angling visitors reported that they primarily fished for fun in the Fairview Dam Bypass Reach, while approximately 14 percent fished for subsistence (note: approximate percentages total to more than 100 percent due to rounding). For angling visitors in the Fairview Dam Bypass Reach, about 47 percent spin fish with bait, approximately 41 percent spin fish with lures, and about 11 percent fly fish. Fly fishing tends to be more popular in the spring and fall, while spin fishing tends to be more popular in the summer.

In addition to fishing method, use patterns in general tend to follow seasonal patterns. The Fairview Dam Bypass Reach provides fishing opportunities year-round, but there is a varying degree of challenging conditions throughout the year. High flows during spring run-off (April to June) create challenging fishing conditions (e.g., greater water volumes and speeds), although opportunities for angling remain good. Throughout the rest of the year, the river conditions are less challenging and provide good opportunities for spin and fly fishing. The quality of fishing conditions tends to be affected by water temperatures, time of day, and river features/structures (which are flow-dependent). Anglers report year-round use, with the winter season being the most popular (approximately 74 percent of the respondents), followed closely by fall, spring.

Based on interview and visitor intercept survey responses (see ANG-1 Technical Memorandum and REC-2 Technical Memorandum, Appendix E.2), many anglers prefer both developed access points (via campground or day use site) and undeveloped/informal locations at road shoulder pull-offs for fishing access. Generally, anglers will try to avoid crowded areas and many anglers will scout areas to fish once they arrive at the river. Preference is given to locations, developed or dispersed, where no one is camping or recreating. Whitewater boating access points (put-in, take-out) are sometimes also preferred if there are not many boaters in the area. A few preferred sections include Chamise Flat up to Fairview Dam, Hospital Flat, and between Goldledge Campground and Old Goldledge Campground. Interviewees also identified specific locations such as Road's End, McNally's, and locations above and below Ant Canyon dispersed area. Additional dispersed locations include sections within a few miles of either side of Headquarters Campground and Fairview Campground (Figure 7.7-1) and around the Salmon Falls Rapid (Figure 7.7-3).

Flow preferences for fishing varied across the interviewees depending on physical abilities, tackle, and angling experience. In general, flows between 150 and 800 cfs are preferred as they provide a range of opportunities to anglers with different experience levels and different methods of fishing. In this range, the upper threshold for angling flows was 700 to 800 cfs, which tended to be preferred by more advanced anglers, like fishing guides. Higher flows are still fishable, though more challenging; however, once flows reach 2,000 cfs and above the river generally becomes unfishable due to safety. At the low end of the range, interviewees identified 100 cfs as the minimum angling flow, but noted that water temperature was also a consideration at lower flows. While angling is possible at flows in the 40 to 50 cfs range, flows below 50 cfs are unfishable given the shallower water depths and typically higher water temperatures (particularly in summer) that are not conducive to fish activity. Several respondents commented that fish are active and anglers can access all areas of the river safely (i.e., wading) between 200 and 800 cfs. However, some individuals thought 400 to 500 cfs was too fast to wade and preferred 200 cfs. Survey results from the REC-2 visitor survey found that 84.3 percent of respondents indicated that river flows did not impact their angling experience along the Fairview Dam Bypass Reach.

Overall, a majority of angling visitors provided a positive rating for their most recent fishing experience in the Fairview Dam Bypass Reach with nearly 62 percent and 30 percent providing a rating of “very good” or “good,” respectively. Only about 3 percent of angling visitors gave their most recent angling experience a negative rating (combination of “poor” and “very poor” responses). The reason these visitors gave for their low rating included that the river flows were too low (5 responses) or too high/fast (3 responses), among other responses.

Resource Agency Angling Regulations

The SQF manages commercial activities on the NFKR through SUPs. SQF issued one SUP for commercial angling guides on the NFKR for 2023 (personal communication, Bob Frenes, Assistant Recreation Officer, Forest Service Kern River Ranger District, June 20, 2023; personal communication, [Marie] Angie Attencio, Special Uses Permit Administrator, Forest Service Kern River Ranger District, June 20, 2023).

CDFW manages fish and wildlife on the NFKR, including establishing the angling regulations. The NFKR from Isabella Lake upstream to Johnsondale Bridge is open to angling all year. The daily bag/possession limit for trout is five. Fishing regulations upstream of the Johnsondale Bridge are more restrictive, limiting anglers to artificial lures only and a daily bag/possession limit of two trout (CDFW, 2021).

CDFW stocks the NFKR above and below Fairview Dam with trout annually, generally between the months of March and July to support recreational fishing. Fish are planted upstream and downstream of Fairview Dam weekly during the summer and on alternate weeks during the winter. Between 2001 and 2023, an average of 27,100 nonnative rainbow trout were planted in the NFKR annually between Fairview Dam and the KR3 Powerhouse, and 11,600 were planted annually just upstream of Fairview Dam (CDFW, 2021; personal communication, William Branch, Senior Hatchery Supervisor, California Department of Fish and Wildlife, January 30, 2024). Refer to Section 7.4, *Fish and Aquatic Resources*, for additional information on fish assemblages and historical fish stocking practices.

7.7.1.3. Regional Recreation Plans and Programs

Sequoia National Forest Land and Resource Management Plan

The Land Management Plan (LMP) (Forest Service, 2023) was developed to provide direction and adaptive management for the resources in the vicinity of the Project.[40] The following forest-wide (REC-FW) desired conditions (DC), objectives (OBJ), goals (GOAL), and guidelines (GDL) were found to be relevant:

- Sites provide a variety of nature-based recreation opportunities year-round (REC-FW-DC 01, 03, 12).
- Sites accommodate diverse cultures (REC-FW-DC 02).
- Sites provide recreation opportunities with minimal impacts on sensitive environments (REC-FW-DC 05).
- Trail systems provide recreational opportunities compatible with other resources (REC-FW-DC 07, 13).
- Dispersed sites exist in areas outside of high visitation, which does not adversely impact resources (REC-FW-DC 09).
- Infrastructure meets the minimum needs of potential uses and mimics the area's natural landscape (REC-FW-GDL 02).

The recreation sites were found to align with the following Destination Recreation Area (MA-DRA) desired conditions (DC), objectives (OBJ), goals (GOAL), and guidelines (GDL):

- Sites have a developed footprint that is appropriate to the setting, visually appealing, and well maintained. (MA-DRA-DC 01).
- Sites provide scenic integrity with a natural-appearing landscape retained outside of the development footprint (MA-DRA-DC 02).
- Sites provide infrastructure and amenities that are consistent with user capacity (MA-DRA-DC 06).
- Sites provide traffic and parking that do not negatively impact the visitor experience (MA-DRA-DC 08).

Additionally, the recreation sites were found to align with the following General Recreation Area (MA-GRA) desired conditions (DC), objectives (OBJ), goals (GOAL), and guidelines (GDL):

[40] Objectives and goals of the LMP (Forest Service, 2023) are part of the 15-year plan that was released in 2023.

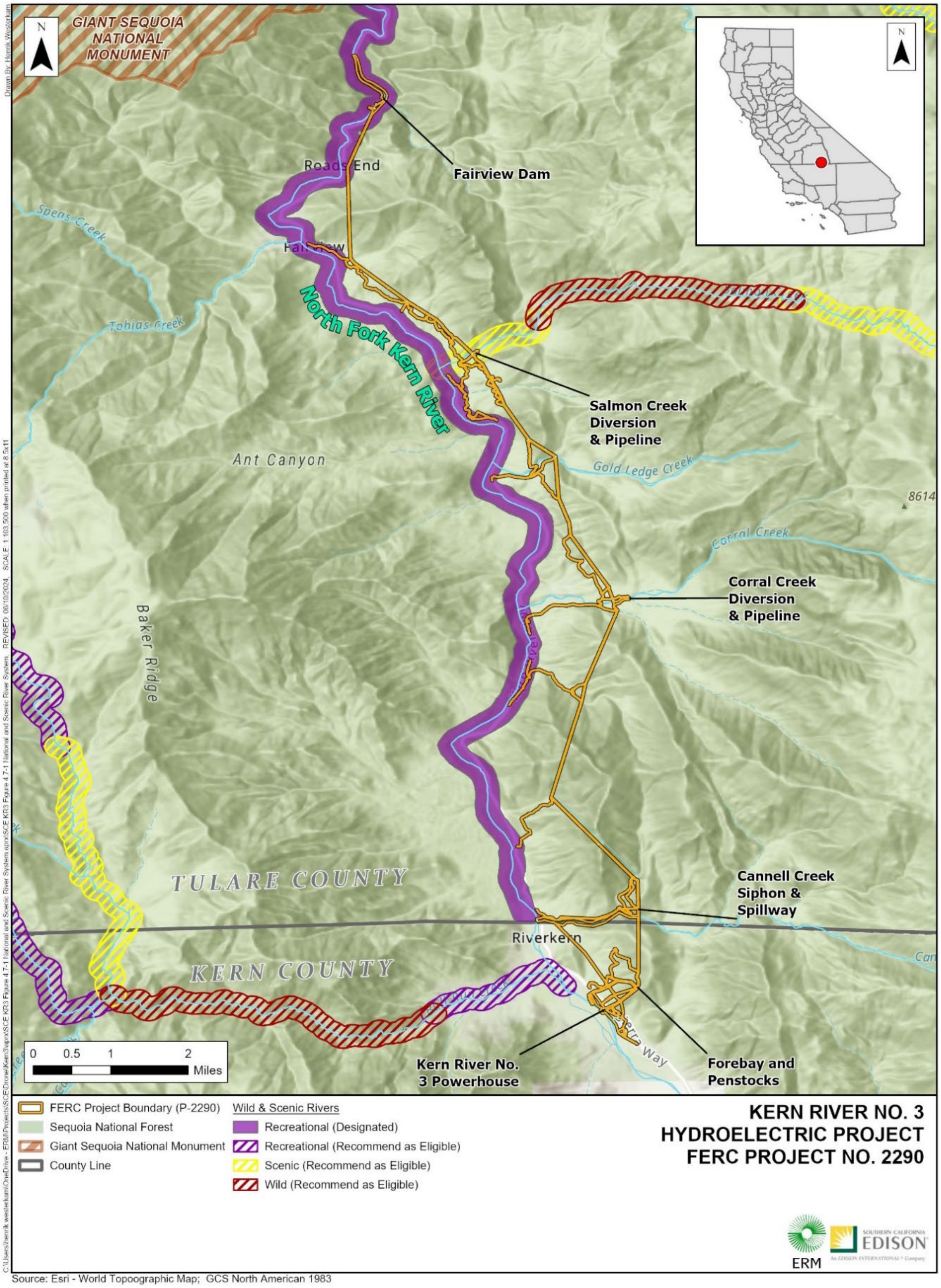
- Sites have limited amenities and minor developments (MA-GRA-DC 01).
- Sites provide scenic integrity, including a mosaic of vegetation, while retaining the natural character of landscapes (MA-GRA-DC 02, 07).
- Recreation opportunities are compatible with other resources and result in infrequent conflicts between different uses (MA-GRA-DC 03, 06).
- Roads and trails at the sites support recreation activities (MA-GRA-DC 08).
- Recreation sites provide opportunities for those seeking solitude, as well as high-use areas (MA-GRA-DC 09).

National Wild and Scenic Rivers and Wilderness Areas

In 1987, Congress designated 78.5 continuous miles of the NFKR from the Kern/Tulare County line up to the headwaters in Sequoia National Park as *Wild and Scenic River* (Pub. L. No. 100-174, 101 Stat. 924 [1987]; Forest Service, 2023). A portion of the Fairview Dam Bypass Reach (from Fairview Dam downstream to the Kern/Tulare County line) is included within the designated Wild and Scenic River area (Figure 7.7-9).

The NFKR within the Fairview Dam Bypass Reach is designated “Recreational” and is managed for more intensive recreation purposes (Forest Service, 1994). There is heavy concentrated use as Mountain Highway 99 runs adjacent to the river and there are numerous designated recreation sites and “informal” road should pull-offs from which the public may access the river.

Specific management direction for the designated Wild and Scenic River segment of the NFKR located within the Fairview Dam Bypass Reach is provided in the LMP (Forest Service, 2023). This management direction updates and augments the previous Comprehensive Management Plan (CMP) for the North and South Forks of the Kern Wild and Scenic River (Forest Service, 1994). As part of the updated LMP for the SQF, two additional tributaries to the NFKR within the Fairview Dam Bypass Reach (Salmon Creek and Bull Run Creek) were recommended as eligible for inclusion by the Forest Service (Forest Service, 2023). Bull Run Creek, located along the western side of the NFKR, is not within the FERC Project Boundary. A Project diversion dam, Salmon Creek Diversion, is located on Salmon Creek approximately 1 mile upstream from its confluence with the NFKR (Figure 7.7-9). Refer to Section 7.8, *Land Use and Management Resources,* for additional information about Wild and Scenic River Designations.



FERC = Federal Energy Regulatory Commission

Figure 7.7-9. Wild and Scenic Rivers in the Vicinity of the Project.

National Visitor Use Monitoring Program – Sequoia National Forest

The National Visitor Use Monitoring (NVUM) program under the SQF has two goals: (1) to produce estimates of the volume of recreation visitation to national forests and grasslands, and (2) to produce descriptive information about that visitation, including activity participation, demographics, visit duration, measures of satisfaction, and trip spending connected to the visit (Forest Service, 2024). The most recent visitor use report for the SQF was updated on January 28, 2024, and summarizes data collected during fiscal year 2016. The following is a summary of results of that report.

Total visits to the SQF[41] 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, totaling approximately 1.0 million visits[42]. The most frequented site or area associated with the SQF is general forest area (609,000 visits), followed by overnight use developed (223,000 visits), day use developed (approximately 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, relaxing, and driving for pleasure. The most commonly chosen main activity by survey participants was hiking/walking, followed by viewing natural features and relaxing.

Demographic data indicates that 92.1 percent of visits are White, followed by Hispanic/Latino (17.1 percent), American Indian/Alaska Native (6.9 percent), Asian (4.0 percent), Black/African American (1.3 percent), and Hawaiian/Pacific Islander (1.1 percent).[43] Age distribution estimates 19.6 percent of visits are by children under the age of 16, and 20.3 percent are over the age of 60. Most visits, an estimated 39.2 percent, were made by individuals that live within 50 miles and those that live more than 200 miles from the forest made up approximately 25.1 percent of visits.

California Statewide Comprehensive Outdoor Recreation Plan and Related Reports

According to the California Department of Parks and Recreation (DPR), the California Statewide Comprehensive Outdoor Recreation Plan (SCORP) "sets grant priorities for outdoor recreation access in California for the next 5 years" and the 2021-2025 edition "empowers local communities to create, expand, and improve close-to-home parks for all Californians" (CDPR, 2021). While the 2021–2025 California SCORP does not offer specific data regarding current and future recreation needs, it did identify five priorities

[41] The 2024 NVUM Report 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.
[42] The 2024 NVUM Report defines 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.
[43] Respondents could choose more than one racial group, so the total may be more than 100 percent.

based on key findings from 37 focus groups who shared their vision for parks and recreation:

- New park access
- Multi-use parks designed for all age groups in new or existing parks
- Health design goals for new or existing parks
- Safety and beautification for new or existing parks
- Preservation (place outdoor open space land under protection for public recreation)

As well as identified four keys to increase healthy park use:

- Provide access to a park
- Consider design
- Offer programs
- Market to the community

The following reports were essential elements used in the 2021-2025 SCORP development that may provide information relevant to the study area:

- Vision for Park Equity 2000-2020: Transforming Park Access with Data and Technology (CDPR, 2020)
- Designing Parks Using Community-Based Planning – Methods from California's Statewide Park Development and Community Revitalization Program Outdoor Recreation in California's Regions (CDPR, 2020)

The following general findings may be important in addressing current and future recreation needs in the vicinity of the Project (CDPR, 2020):

- By number, parks in California are mostly owned by city (9000), special district (1700) and county agencies (1200)
- By acres, parks and open spaces in California are mainly owned by federal (43,700,000) and state agencies (1,990,000)
- Over 61 percent of Californians live in census tracts (CTs) with less than 3 acres of parkland per 1,000 residents
- Nearly 8 million people, 21 percent of Californians, have no park within a 0.5 mile of their homes

- Land acquisition and construction prices have increased by approximately $1.5 million per project site over the past decade from 2010 to 2020

- Based on current projections, for each $600 million investment, an additional 1 million Californians would have new or expanded park access within 0.5 mile of their neighborhoods

7.7.2. Proposed Environmental Measures

SCE's proposed Project includes the following proposed environmental measures related to recreation resources:

- Measure RR-1, *Recreation Management Plan*

- Measure LU-1*, Roads and Facilities Management Plan*

- Measure WR-5, *Recreational Boating Flows*

- Measure WR-1, *Minimum Instream Flows*

The proposed measures and their key features related to recreation resources are described below. Refer to Appendix E.1 for the complete description of measures SCE proposes to include in the new license issued for the Project.

7.7.3. Potential Project Effects

Under the No-Action Alternative, the Project would continue to operate under the terms and conditions of the current license as described in Section 5.1. The No-Action Alternative is considered the environmental baseline for this analysis. Potential effects on recreation resources were identified in FERC's SD2 (FERC, 2022) and were based on an evaluation of continued O&M activities described as part of the proposed Project (Section 5.2, *Proposed Action Alternative*). Potential effects identified in FERC's SD2 include the following:

- Effects of continued project O&M on recreation access in the project-affected area and recreation resources, including effects on the quantity and timing of flow releases on whitewater recreation and boating in the Kern River.

The following sections describe the potential effects of the proposed Project, including proposed environmental measures, on recreation and management. Potential effects on the Wild and Scenic River Segments are discussed in Section 7.8, *Land Use Management and Resources*, and potential effects on fish habitat and fish resources are described in Section 7.4.3.1, *Effects of Project Operation and Maintenance on Fish and Aquatic Resources.* Unavoidable adverse effects on recreation resources are discussed at the end of this section and summarized in Section 10.0, *Conclusions and Recommendations*.

7.7.3.1. Effects of Project Operation and Maintenance on Land-Based Recreation

Project Recreation Facility

With the implementation of proposed Measures RR-1 and LU-1, proposed Project O&M activities (described in Section 5.1, *No-Action Alternative*, and Section 5.2, *Proposed Action Alternative*) would have no effect on land-based recreation access or use at the Project's KR3 Powerhouse Whitewater Put-in/Take-out facility.

The KR3 Powerhouse Whitewater Put-in/Take-out site is in good condition, and offers free day-use access to the river for activities such as fishing, whitewater boating (both put-in and take-out), and relaxing. Recreationalists have rated the site as "satisfactory." With an estimated annual usage of 11,000 RDs, the site operates under capacity during both peak and non-peak weekends. Current parking utilization is around 24 percent on non-peak weekends and 22 percent on peak weekends. Future projections indicate that by 2070, parking utilization will increase to approximately 33 percent on non-peak weekends.

Kern River No. 3 Powerhouse Access Road is paved and utilized by recreationalists to access the KR3 Powerhouse Whitewater Put-in/Take-out recreation facility (access to the powerhouse is behind a locked gate). As part of the proposed Project, SCE will continue to maintain this Project road (refer to Section 7.8, *Land Use Management and Resources*, for additional information).

Proposed Measure RR-1 will be developed and would include measures for the continued O&M of the Project recreation facility. The plan would also include provision for continued access for the general public, and for use by Commercial whitewater outfitters via permit system. Continued discussions with the SQF on measures related to recreational resources will occur once additional data collection has been completed, however any proposed changes are not expected to adversely affect the existing Project and non-Project recreational facility use and access.

Proposed Measure LU-1 will be developed and would include a description of maintenance requirements associated with Project roads. The plan would describe measures to reduce or eliminate potential effects caused by Project road maintenance activities by outlining procedures for maintenance of Project roads, drainage structures, stream crossings, and travel-way surfaces.

At this time, SCE is not aware of specific changes to Forest Service owned and managed recreation facilities that would impact public use and access to the KR3 Powerhouse Whitewater Put-in/Take-out facility. Additionally, under the proposed Project, no changes or alterations in the KR3 Powerhouse Whitewater Put-in/Take-out or access road are proposed. SCE will continue to operate, maintain, and provide access to the site. Therefore, implementation of SCE's proposed Project, including Measures RR-1 and LU-1, would have no adverse effect on land-based recreation.

<u>Access to Non-Project Recreation in Vicinity of Project</u>

With the implementation of the proposed Measure LU-1, proposed Project O&M activities (described in Section 5.1, *No-Action Alternative*, and Section 5.2, *Proposed Action Alternative*) would have no adverse effect on land-based recreation access or use in the vicinity of the Project.

In the vicinity of the Project, recreational use was estimated at about 140,000 RDs in 2023, with summer weekends seeing the highest usage at approximately 87,000 RDs. Recreation sites throughout the NFKR corridor near the Project are currently under capacity and the majority are expected to remain so over the next 50 years. Many Project roads within the FERC Project Boundary are maintained by SCE as they provide access to sections of the Project flowline. Most of these roads are not gated per the direction of the SQF (referred to as Shared Access Roads) as these are also utilized by recreationalists to access various parts of the SQF outside of the FERC Project Boundary. However, access to all river-adjacent non-Project recreation facilities is from Mountain Highway 99, a County-maintained road, outside of the FERC Project Boundary and not affected by SCE's O&M activities.

Proposed Measure LU-1 will be developed and would include a description of maintenance requirements associated with Project roads. The plan would describe measures to reduce or eliminate potential effects caused by Project road maintenance activities by outlining procedures for maintenance of Project roads, drainage structures, stream crossings, and travel-way surfaces. The proposed Project also includes an update to the inventory of Project and Shared Access Roads within the FERC Project Boundary, which is still in discussions with the SQF (refer to Section 7.8, *Land Use Management and Resources*, for additional information on Project roads).

Under the proposed Project, no changes or alterations in roads/road access are anticipated. With the exception of the proposed environmental measures, SCE proposes to continue to operate and maintain roads within the FERC Project Boundary. Therefore, implementation of SCE's proposed Measure LU-1 would have no adverse effect on non-Project land-based recreation.

7.7.3.2. Effects of Project Operations on River-Based Recreation Opportunities

The proposed Project would benefit river-based recreation opportunities within the Fairview Dam Bypass Reach as compared to the No-Action Alternative. Under the proposed Project, river-based recreation opportunities may be affected by changes in recreational boating flow releases. Potential effects to stream-based recreation opportunities that could occur as a result of these modifications are discussed below.

Whitewater Boating

Proposed Measure WR-5 should be considered an initial draft pending further refinement once additional data collection associated with the REC-1 and REC-2 Studies are completed and Stakeholders have an opportunity to review the new information.

Project operations have the potential to alter the volume of flows (up to approximately 600 cfs, the capacity of the flowline) in the Fairview Dam Bypass Reach, and to a lesser extent, the timing of flows in the river segment between the KR3 Powerhouse and Riverside Park in Kernville.

Naturally occurring whitewater boating opportunities would continue to occur in the Fairview Dam Bypass Reach when Fairview Dam inflows exceed the approximate 600 cfs capacity of the water conveyance system and additional flows above the MIF release continue downstream. Natural spill events typically occur during the spring snowmelt period extending into the summer season as well as during winter storm events. Approximately 33 percent of the years between 2005 and 2022 provided more than 100 natural spill events ≥ 700 cfs annually into the Fairview Dam Bypass Reach that lasted at least 7 hours between 10 am and 5 pm. In the focus group sessions associated with the Enhanced (Controlled) Flow Opportunities (Study REC-1), participants commented that they monitor the NFKR hydrology regularly to take advantage of whitewater boating opportunities in the Fairview Dam Bypass Reach. SCE's flow information website (https://www.sutronwin.com/scedison/tw/jsp/) provides tabular and graphic discharge data enabling boaters to monitor real-time Fairview Dam inflows and discharge in the Fairview Dam Bypass Reach. Natural spills into the Fairview Dam Bypass Reach during the snowmelt run-off period are typically predictable, long duration events, allowing boaters to plan trips in advance. Whitewater boating opportunities associated with natural spill flows during winter storm events are shorter in duration but typically forecasted in advance allowing boaters several days' notice. SCE would continue to provide real-time flow information allowing boaters to take advantage of whitewater boating opportunities associated with natural spill events in the Fairview Dam Bypass Reach.

As discussed above, the Fairview Dam Bypass Reach is a popular whitewater boating location for both commercial and non-commercial users. Naturally occurring boating opportunities are often dictated by the hydrograph, with higher flows associated with spring snowmelt periods (March–May); depending upon the water year type, naturally occurring whitewater boating opportunities can extend into June or July (Table 7.7-14 and 7.7-15), which was identified as the highest recreation use period.

SCE anticipates completing the remaining REC-1, *Whitewater Boating*, Level 3 study components in late summer or fall of 2024, with an updated Technical Memorandum as part of the USR that includes an analysis of the comparative flow survey in conjunction with an updated hydrology analysis. Additional recreation-use information requested by FERC will be collected into 2025 related to percent capacity at river access locations and activity type estimates, including commercial and non-commercial boating use, to provide additional insights for further development of Measure WR-5.

Proposed Measure WR-5 includes a 10-day Project shutdown (outage) for annual maintenance on a pre-determined date. The scheduled Project shutdown would provide predictability that boaters have stated they would prefer over the current boating flow release schedule. The early spring timing Project outage would allow boaters to take advantage of flows on the rising limb of spring recession flows. Actual flows in the bypass will be dependent on run-off patterns in the NFKR watershed which would provide the variability in flows that boaters have stated they would prefer (rather than a “fixed” flow or schedule). SCE’s proposed Measure WR-5 is a preliminary measure designed to address the need for a predictable schedule of whitewater boating opportunities requested by the community as well as provide a variable range of flows for whitewater boating based naturally occurring NFKR flows. Proposed Measure WR-5 would increase predictability of timing and duration of boating opportunities while also continuing to provide for naturally occurring boating opportunities.

Based on existing information, and with the inclusion of proposed Measure WR-5, the proposed Project is expected to benefit river-based recreation opportunities within the Fairview Dam Bypass Reach. Following completion of REC-1 and REC-2 Studies, any potential conflicts identified with other recreation and biological resources will be evaluated and addressed during refinement of Measure WR-5.

<u>Angling</u>

Angling, including subsistence fishing, is permitted throughout the vicinity of the Project along the NFKR, including the Fairview Dam Bypass Reach. CDFW manages fish and wildlife on the NFKR, including establishing angling regulations. CDFW regularly stocks the NFKR above and below Fairview Dam with trout, generally between the months of March and July to support recreational and subsistence fishing (additional information on fish stocking is included in Section 7.4.1.2, *Fish Populations*, subsection *Fish Stocking*).

As described above in *Whitewater Boating* in Section 7.7.1.2, and in Section 7.3, *Water Resources*, the NFKR offers a variable flow regime that is seasonally and annually influenced by precipitation levels (snow and rain). The variability in flow affects conditions that make angling more or less challenging throughout the year and from year to year. In the Fairview Dam Bypass Reach, typical high flows during spring run-off and lower flows in late fall and winter create challenging fishing conditions, although opportunities for angling remain good depending on angler skill level and angler preferences. Throughout the rest of the year (late-spring, summer, and early fall), the river conditions tend to be less challenging and provide a range of opportunities for spin and fly fishing.

Proposed Measure WR-1 would enhance current habitat conditions downstream of Fairview Dam for native fishes by shifting the timing of greater MIFs from the summer months of July and August to the spring months of May and June to align with the spring snowmelt and the natural hydrograph (Figure 7.3-10). This modified release schedule is intended to enhance water temperatures for native cyprinids, including hardhead, by slightly increasing water temperatures into more suitable ranges in the lower portions of the Fairview Dam Bypass Reach during the summer months. However, native cyprinids are generally not targeted by anglers. Rainbow trout, which are heavily stocked in the Fairview Dam Bypass Reach and targeted by anglers, generally prefer colder waters. Rainbow trout can tolerate water temperatures from 0°C to 27°C, although long-term exposure to water temperatures greater than 24°C can be lethal (Moyle, 2002).

The daily mean water temperatures upstream of Fairview Dam was frequently above 20°C in the summer, and when upstream water was slightly below 20°C, water temperatures would exceed 20°C several miles downstream of Fairview Dam (ENTRIX, 2003). Modeling results from the ENTRIX (2003) temperature study found that releases of 100 cfs would result in peak water temperatures of less than 23°C in normal run-off and normal air temperature conditions (less than 0.5°C increase from current conditions), but could reach a peak of 25°C under low run-off years in hot conditions (Figures 7.3-11 through 7.3-13 in Section 7.3.3.2, *Water Quality*, subsection, *Water Temperature*; ENTRIX, 2003). In low run-off and hot conditions, the water temperature model results indicate that water temperatures in August would increase up to 1°C under proposed Measure WR-1 in the lower portions of the bypass reach, and warmer water temperatures would also likely be observed farther upstream. Although these warmer water temperatures would follow patterns associated with the natural hydrograph and are expected to benefit native transitional zone fish species, particularly hardhead, the shift in peak MIFs from summer to spring may have a minor, local, and short-term reduction in rainbow trout habitat distribution in the lower portions of the bypass reach.

Under the proposed Project, there are no substantial changes or alterations in river flows. Flows will continue to depend on seasonal and annual water availability, as well as the MIF requirements of the license. Periodic whitewater boating flows (proposed Measure WR-5) and other Project-related flow alterations (e.g., Project outages), may create opportunistic conditions for certain types of angling during these events, but in general angling opportunities under the proposed Project would be similar to existing conditions. Existing MIF conditions provide habitat for recreational trout throughout the Fairview Dam Bypass Reach, although existing water temperatures are at the upper end of trout tolerances. Therefore, implementation of SCE's proposed Measures WR-1 and WR-5 would have minor to no effect on non-Project angling opportunities.

7.7.3.3. Unavoidable Adverse Effects

The proposed Project would not result in unavoidable adverse effects on recreation resources.

7.8. LAND USE MANAGEMENT AND RESOURCES

This section describes existing land management and use and the applicable management direction regarding land use in the vicinity of the Project and within the FERC Project Boundary. Section 7.8.1 discusses the affected environment and resource conditions under current Project O&M (i.e., baseline condition). Section 7.8.2 identifies environmental measures, management plans, and programs that are included in the proposed Project. Section 7.8.3 includes an analysis of ongoing or new environmental effects of O&M from the proposed Project, including potential effects from proposed measures. The full description of proposed measures is provided in Appendix E.1.

The descriptions presented within this section were developed using existing, relevant, and reasonably available information and also include results from the following relicensing study where additional information was collected to further describe the resources:

- LAND-1 Road Condition Assessment

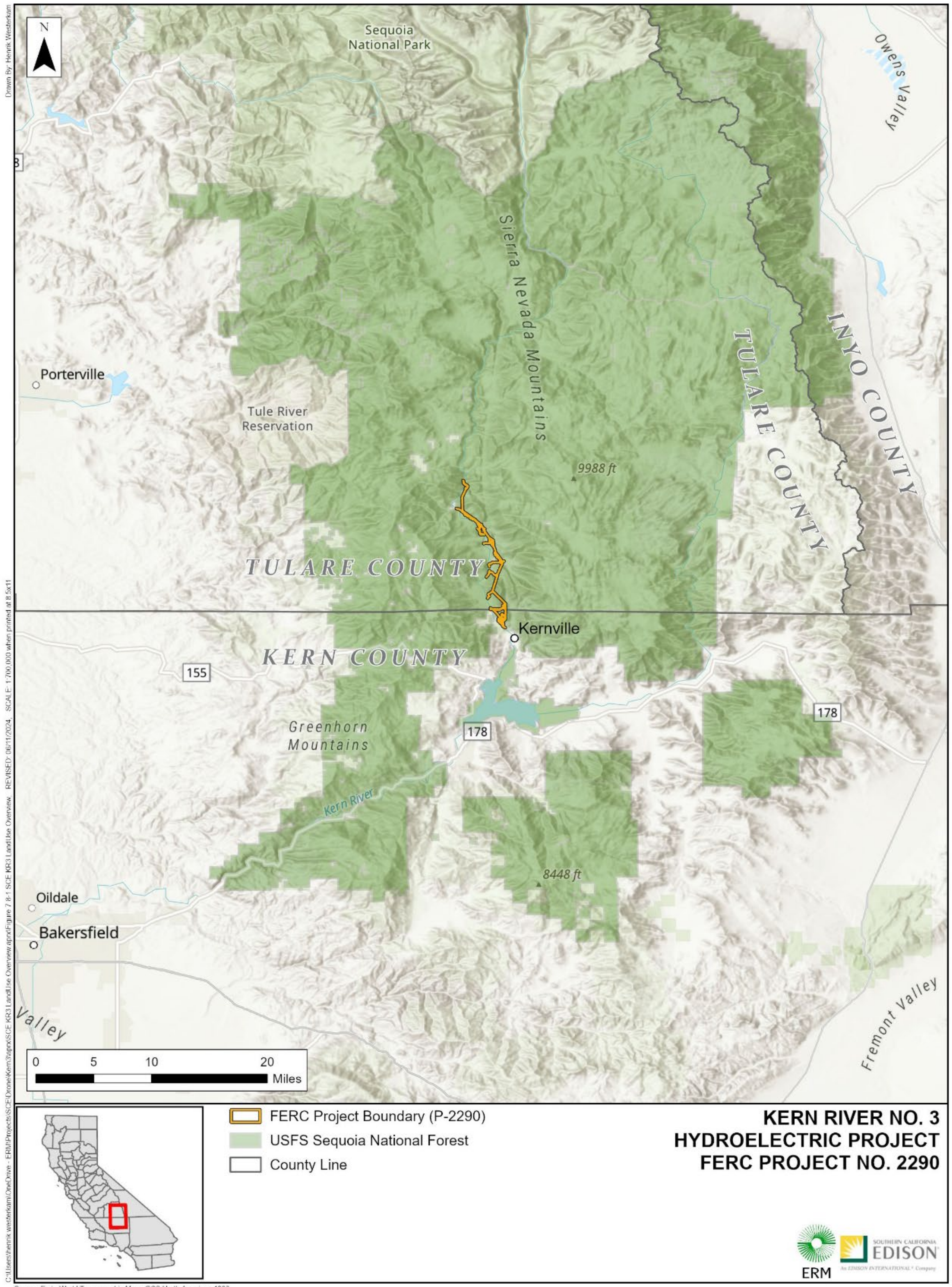
The LAND-1 Technical Memorandum includes a discussion of Project road conditions as well as a characterization of road use by SCE and the public (Appendix E.2).

Related information pertinent to the discussion of land use resources is summarized herein and also discussed in detail in Section 7.2, *Geologic and Soils Resources*, Section 7.7, *Recreation Resources*, and Section 7.9, *Aesthetic Resources*.

7.8.1. AFFECTED ENVIRONMENT

The Project is located in the foothills on the western slope of the Sierra Nevada within Kern and Tulare Counties at elevations ranging between approximately 2,700 and 3,800 feet amsl. The nearest town is Kernville, to the south, with an estimated population of 836 (U.S. Census Bureau, 2022a). The largest community in Kern County is the city of Bakersfield, which is located approximately 55 miles from the KR3 Powerhouse and has a population of 410,654 (U.S. Census Bureau, 2022b). Among the largest communities in Tulare County, the city of Porterville is approximately 65 miles from the KR3 Powerhouse and has an estimated population of 143,965 (U.S. Census Bureau, 2022c). Figure 7.8-1 depicts the area surrounding the Project, nearby major population centers, and county boundaries. Project facilities and the surrounding lands are primarily located on federal lands within the SQF and within SCE-owned lands around the KR3 Powerhouse. Land ownership and jurisdiction is presented on the detailed map series in the LAND-1 Technical Memorandum in Appendix E.2.

No shoreline buffer zones are present within the FERC Project Boundary because the Project does not include a reservoir.



FERC = Federal Energy Regulatory Commission

Figure 7.8-1. Major Population Centers and County Boundaries Near the Kern River No. 3 Hydroelectric Project.

7.8.1.1. Land Management in the Vicinity of the Project

SCE's management of Project lands located within the SQF is directed by the existing FERC license and Project resource management plans. The three parcels within the FERC Project Boundary that are not part of the SQF are owned by SCE and fall within Kern County. These inholdings are subject to land use designations as stipulated by the Kern County General Plan and land development regulations (e.g., zoning, subdivision) based on the General Plan (Kern County Planning Department, 2009). All Project activities within Tulare County are entirely on lands administered by the SQF, and management of these lands is provided in the *Land Management Plan for the Sequoia National Forest* (Forest Service, 2023). A CMP was developed by the Forest Service (1994a) in response to Pub. L. No. 100-174 that was enacted and placed portions of the NFKR within the Project Area into the National Wild and Scenic River System. An overview of the applicable plans are provided in the following subsections.

<u>Kern County General Plan</u>

The Kern County General Plan includes goals, policies, and implementation measures to guide development in the county on a long-term basis (Kern County Planning Department, 2009). The county land use regulations do not apply to property administered by the state or federal government, defined by the county as "Non-Jurisdictional Lands," in the absence of Memoranda of Understanding indicating otherwise. Private inholdings within the SQF are primarily resource lands (i.e., lands managed for limited, if any, development). Much of the land along the Kern River is within one or more environmental overlays—locations within which the development provisions of the underlying uses (e.g., residential, commercial, and resource lands) are augmented to address specific environmental conditions—specifically, flood hazard, steep slopes, and seismic hazards (Kern County Planning Department, 2009). Other non-federal lands near the Project within Kern County include the following:

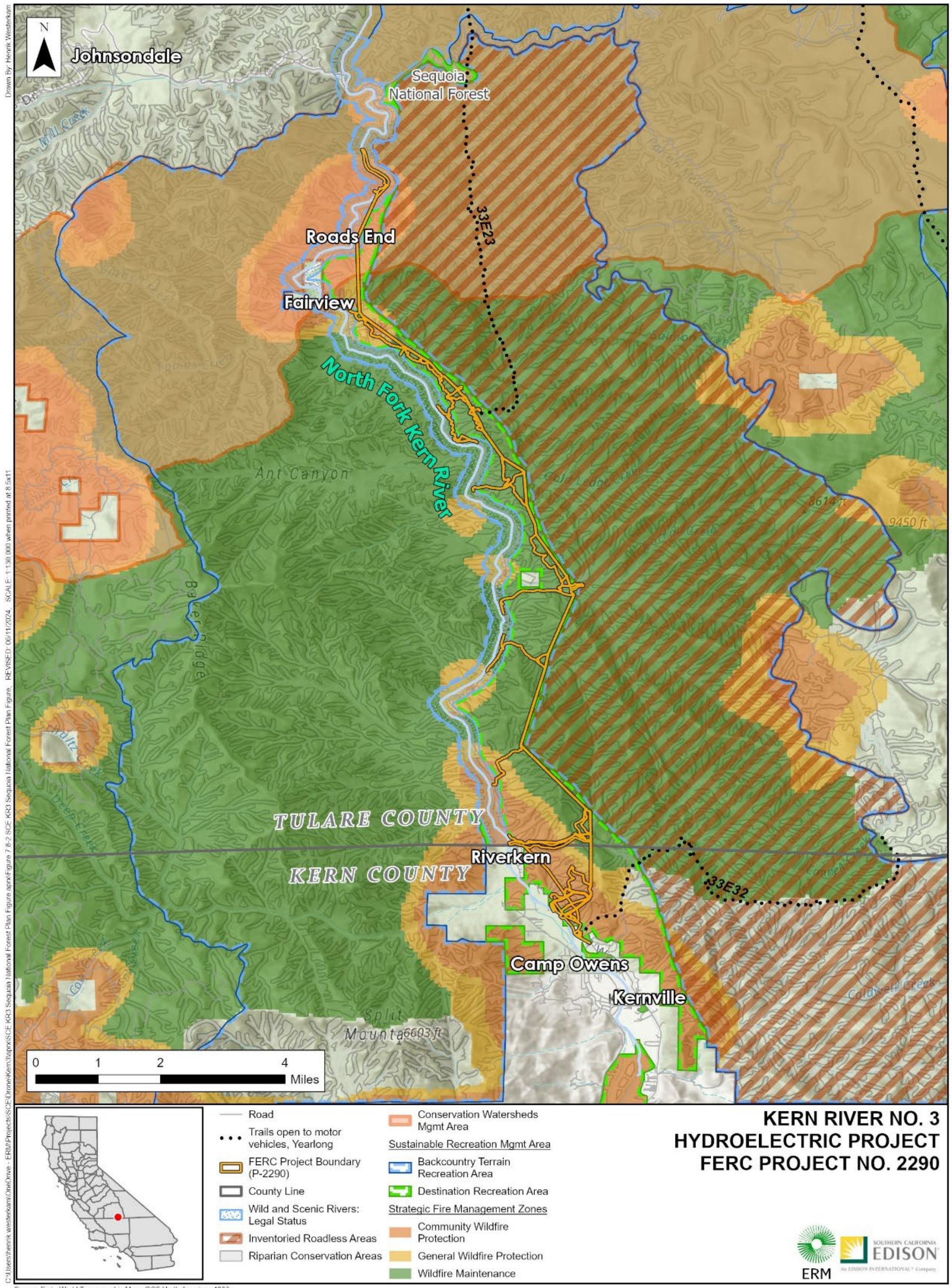
- Riverkern—an unincorporated community within the Sequoia National Forest Proclamation Boundary and adjacent to some Project facilities near Cannell Creek. It consists of a medium-density residential neighborhood and commercial uses along Route 521/Sierra Way, which turns into Mountain Highway 99.

- Kernville—an unincorporated community/town located south of the SQF boundary and the Project. Kernville stretches about 1 mile along both banks of the NFKR and includes low- and medium-density residential areas, commercial uses (primarily along Route 521/Sierra Way, east of the river), recreation uses, and public facilities such as schools.

<u>Sequoia National Forest Land Management Plan</u>

The majority of land within the FERC Project Boundary is located on National Forest System lands administered by the SQF and is managed under guidance provided in the LMP, adopted in 2023 (Forest Service, 2023). The LMP provides the management direction, goals, objectives, and prescriptions to guide land management activities within the SQF to achieve desired existing and future conditions. This management direction includes energy uses, such as hydroelectric and other facilities that provide public utility needs, and infrastructure, such as roads, trails, recreation facilities, administrative facilities, airstrips, and other facilities, such as range-related facilities and historic facilities. The LMP designates specific “management areas” and “designated areas.” Management areas have the same set of applicable plan components, do not have to be spatially contiguous, and typically have a management emphasis. Designated areas consist of areas or features identified and managed to maintain a special character or purpose. Some are designated by statute (such as wild and scenic rivers or wilderness) and others are administratively designated (like research natural areas). Where management areas and designated areas overlap, the more stringent or restrictive direction applies.

According to the LMP, the Project is within the Kern River Ranger District of the SQF. National Forest System lands within the FERC Project Boundary are not considered suitable for timber production and are not within any designated wildlife habitat management area, recommended wilderness, or the Pacific Crest National Scenic Trail Management Area (Forest Service, 2023). National Forest System lands within the FERC Project Boundary fall within management areas and designated areas specified in the LMP, including Conservation Watershed/Riparian Conservation Area, Roadless Area, Designated National Recreation Trail (motorized), Strategic Fire Management Zone, Sustainable Recreation Management Area, Special Interest Area, and Wild and Scenic River Area. These specially designated areas of the LMP are discussed in detail in the following sections and their relationship to Project facilities is illustrated on Figure 7.8-2.



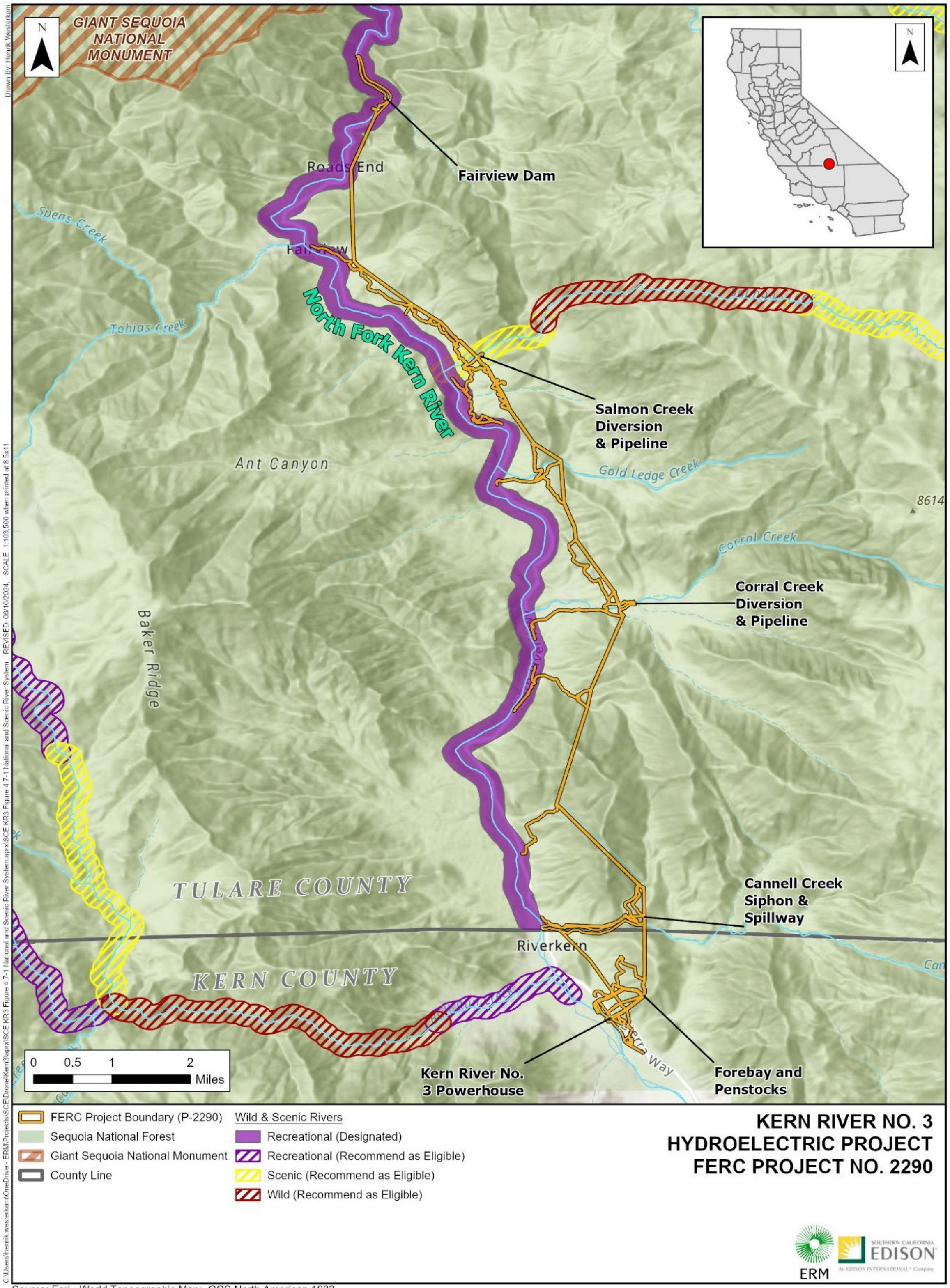
FERC = Federal Energy Regulatory Commission; Mgmt = Management

Figure 7.8-2. Project Facilities Relative to Specially Designated Areas of the Land Management Plan.

Comprehensive Management Plan—North and South Forks of the Kern Wild and Scenic River

In 1987, Congress designated 78.5 continuous miles of the NFKR from the Kern/Tulare County line up to the headwaters in Sequoia National Park as “wild and scenic river” (Pub. L. No. 100-174, 101 Stat. 924 [1987]; Forest Service, 2023). A portion of the FERC Project Boundary (from Fairview Dam downstream to the Kern/Tulare county line) is included within the designated Wild and Scenic River Area with a segment classification type of Recreational (Figure 7.8-3). The wild and scenic river designation of the NFKR within the FERC Project Boundary (Johnsondale Bridge to the Kern/Tulare County line) was documented as having an ORV due to the presence of the Fairview slender salamander species (*Batrachoseps* spp.) (Forest Service, 1982). Project amenities south of the Cannell Creek–NFKR confluence, such as the pressure flume, forebay, penstocks, and KR3 Powerhouse are not located within the wild and scenic river corridor. Additional management direction for this bypass reach related to its wild and scenic river designation is provided in the 1994 CMP (Forest Service, 1994a). The ORVs of recreational, scenic, and wildlife are discussed in Section 7.7, *Recreation Resources*; Section 7.9, *Aesthetic Resources*; and Section 7.5*, Wildlife Resources*.

The 2023 SQF LMP updates the management direction of the 1994 CMP for the designated wild and scenic river within the jurisdictional boundaries of the SQF, including the Fairview Dam Bypass Reach (Forest Service, 2023). The LMP also notes that existing hydroelectric projects that were licensed by FERC at the time of a designation may continue to operate.



Source: Esri - World Topographic Map; GCS North American 1983

FERC = Federal Energy Regulatory Commission

Figure 7.8-3. National Wild and Scenic River Segments Surrounding the Kern River No. 3 Hydroelectric Project.

7.8.1.2. Land Management and Use in the Vicinity of the Project

In general, development near the Project is constrained by steep terrain and the presence of public lands. Accordingly, the area near the Project is sparsely populated and mostly undeveloped. Developed or dispersed rural uses occurring nearby include three largely residential communities, individual residences, and associated ranching and agricultural lands. Land use primarily consists of recreational developments and grazing, as summarized in the following subsections.

<u>Recreation Development</u>

Land use in the immediate vicinity of the Project facilities and along the NFKR between the Fairview Dam and the KR3 Powerhouse consists of various outdoor recreation amenities including day-use sites, campground (dispersed camping and DCGs), and hiking trails. Recreation resources, opportunities, and use are described in detail in Section 7.7, *Recreation Resources*.

<u>Roads and Trails</u>

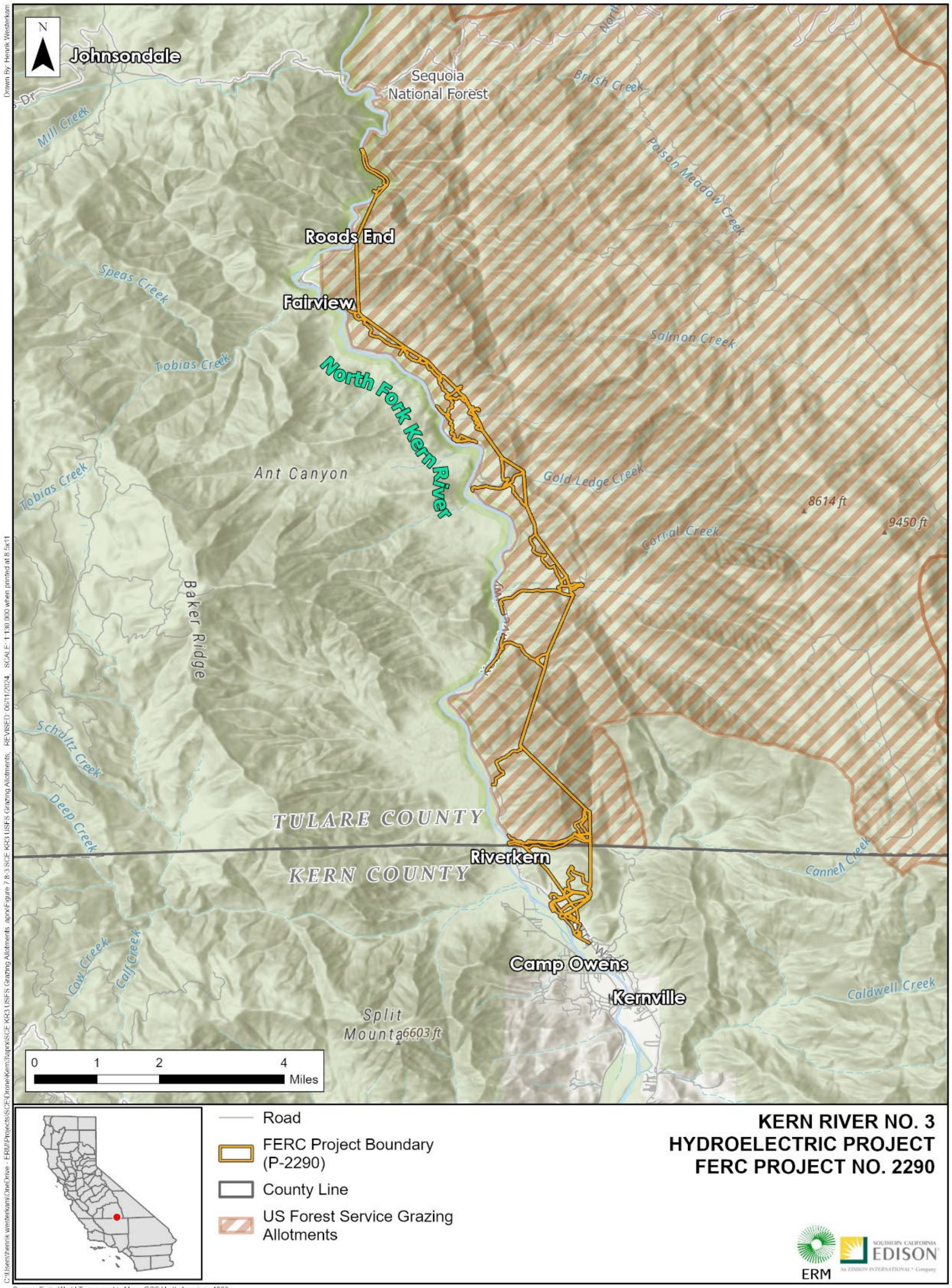
A two-lane county road (Sierra Way in Kernville transitions to Mountain Highway 99 at the Tulare County line) runs parallel along the east side of the NFKR and is the main throughfare into National Forest System lands. There are also numerous gravel roads located along the eastern hillside that go into the national forest, some of which are used by the Project, and numerous trails maintained by the SQF are situated on both the east and west side of the NFKR. Additional information on Project roads is included in Section 7.8.1.3, subsection *Project and Shared Access Roads within the FERC Project Boundary*, and in the LAND-1 Technical Memorandum, provided in Appendix E.2.

<u>Grazing</u>

Livestock has grazed the rangelands of the SQF since the late 1800s, and grazing still occurs in the vicinity of the Project, both inside and outside the FERC Project Boundary on National Forest System lands under the terms of an SQF special use permit as established under the Federal Land Policy Management Act [43 USC 1752(i)] schedule for grazing allotment (Forest Service, 2019, 2023). The grazing allotments are managed the same whether or not within the FERC Project Boundary.

Figure 7.8-4 shows the areas allotted to livestock grazing authorized by these Forest Service special use permits.[44]

[44] Based on geographic information system data from the Forest Service’s grazing allotments database (Forest Service, n.d.).



FERC = Federal Energy Regulatory Commission

Figure 7.8-4. Livestock Grazing Allotments Authorized by Forest Service Special Use Permits.

7.8.1.3. Land Use within the FERC Project Boundary

Land use within the FERC Project Boundary is related to hydropower generation and a limited amount of recreation and grazing.

Recreation Use Within the FERC Project Boundary

Within the FERC Project Boundary, an existing Project recreation development managed by SCE is an undeveloped whitewater put-in/take-out gravel parking area located approximately 250 yards downstream of the KR3 Powerhouse. Additional non-Project recreation facilities within the FERC Project Boundary includes the Willow Point Whitewater Take Out, a Forest Service-managed facility located upstream of Fairview Dam that has a small parking area, shoreline access for a whitewater boating take-out, and informational kiosk. The Rincon Trailhead (outside of the Project Boundary) is accessed by the public via Shared Access Roads within the Project Boundary (see below for more information about roads). Additional discussion on recreation use is described in Section 7.7, *Recreation Resources*.

Project and Shared Access Roads Within the FERC Project Boundary

The FERC Project Boundary encompasses 33 road segments, totaling more than 18 miles, which are situated primarily along the eastern hillside above the NFKR (refer to the LAND-1 Technical Memorandum in Appendix E.2 for additional description of roads and road features). Roads are described as Shared Access Roads, which are defined as road segments that have unrestricted public access (i.e., no gate) and Project roads, which are road segments with restricted public access (i.e., gated) and are primarily located around Project facilities including Fairview Dam, the Cannell Creek Siphon, and the KR3 Powerhouse. The majority of these roads are on SQF lands. A short segment (0.5 mile) of the KR3 Powerhouse Access Road is located on SCE-owned lands.

Project and Shared Access Roads were inventoried and described in detail in the LAND-1 Technical Memorandum provided in Appendix E.2. The results of the LAND-1 Study also include a characterization or frequency of usage along these roads by SCE and the public. Table 7.8-1 includes the list of Project and Shared Access Roads.

SCE regularly inspects all Project roads during normal Project activities. Minor repairs are conducted on an as-needed basis and major repairs are implemented annually during late summer/fall. Vegetation management may be conducted concurrently with road maintenance on an as-needed basis. SCE's road management and maintenance practices and activities are described in detail in Section 5.1, *No-Action Alternative*.

Table 7.8-1. Project and Shared Access Roads

Road ID	SCE Road Name	SQF Road ID –Name	Road Start / End	Land Ownership	Gated?
Fairview Dam/North Road Segments					
1	Sandbox Access Road	--	Mountain Highway 99 / Sandbox	SQF	Yes
2	Tunnel 1-4 Flume Access Road	23S20 –Roads End Guard Station	Mountain Highway 99 / Tunnel 1/4 Flume	SQF	No
3	Tunnels 5-8A Access Road	--	Mountain Highway 99 / Tunnel 8B Access Road	SQF	No
4	Tunnel 8A-8B Flume Access Road	--	Rincon Access Road / Tunnel 8A/8B Flume, Tunnel 8B Portal	SQF	No
Salmon Creek and Rincon Trail Road Segments					
5	Salmon Creek Diversion Access Road	--	Rincon Access Road / Salmon Creek Diversion	SQF	No
6	Rincon Access Road	24S89-Rincon (portion)	Mountain Highway 99 / Tunnels 10–12 Access Road	SQF	No
7	Tunnel 9A/9B Flume Access Road	--	Rincon Access Road / Tunnel 9A/9B Flume	SQF	No
8	Tunnel 9B Spur Road	24S89-Rincon (portion)	Rincon Access Road / end	SQF	No
9	Tunnels 10–12 Access Road	--	Rincon Access Road / Tunnel 11/12 Flume	SQF	No
10	Tunnel 10/11 Flumes Access Road	--	Tunnels 10–12 Access Road / Tunnel 10/11 Flumes	SQF	No
11	Rincon Trail Access Road	33E23	Mountain Highway 99 / Rincon Access Road	SQF	No
12	Rincon Trail Access Road Spur	--	Mountain Highway 99 / Rincon Access Road	SQF	No
Goldledge Road Segments					
13	Tunnel 12/13 Flume Access Road	--	Gold Ledge Access Road / Tunnel 12/13 Flume, portals	SQF	No
14	Gold Ledge Access Road	--	Mountain Highway 99 / Tunnel 13/15 Flumes, portal	SQF	No

Road ID	SCE Road Name	SQF Road ID –Name	Road Start / End	Land Ownership	Gated?
15	Tunnel 14/15 Flume Access Road	--	Gold Ledge Access Road / Tunnel 14/15 Flume, portals	SQF	No
Corral Creek Road Segments					
16	Tunnel 16/17 Flume Access Road	--	Corral Creek Flumes Access Road / Tunnel 16/17 Flume, portal	SQF	No
17	Corral Creek Flumes North Access Road	--	Corral Creek Diversion Access Road / Corral Creek Flumes	SQF	No
18	Corral Creek Diversion Access Road	--	Mountain Highway 99 / Corral Creek Diversion	SQF	No
19	Corral Creek Flumes South Access Road	--	Corral Creek Diversion Access Road / Corral Creek Flumes	SQF	No
20	Tunnel 18/19 Flume Access Road	--	Mountain Highway 99 / Tunnel 18/19 Flume, portal	SQF	No
21	Tunnel 19/20 Flumes Access Road	--	Tunnel 18/19 Flume Access Road / Tunnel 19/20 Flumes, portal	SQF	No
Cannell Creek Road Segments					
22	Cannell Creek Siphon Spillway Access Road	--	Cannell Creek Access Road / Cannell Creek Siphon Spillway	SQF	Gate on lower road segment
23	Cannell Creek Access Road	--	Mountain Highway 99 / Cannell Creek Siphon-Siphon Spillway Access Road	SQF	Yes [a]
24	Cannell Creek Siphon Access Road	--	Cannell Creek Access Road / Cannell Creek Siphon	SQF	Gate on lower road segment
Powerhouse Road Segments					
25	Kern River No. 3 Forebay Access Road	--	Mountain Highway 99 / Kern River No. 3 Forebay	SQF	No
26	Kern River No. 3 Machine Shop Access Road	--	Mountain Highway 99 / Kern River No. 3 Powerhouse	SQF SCE	Yes

Road ID	SCE Road Name	SQF Road ID –Name	Road Start / End	Land Ownership	Gated?
27	Kern River No. 3 Penstocks North Access Road	--	Mountain Highway 99 / Kern River No. 3 Penstocks	SQF	No
28	Kern River No. 3 Penstocks South Access Road	--	Mountain Highway 99 / Kern River No. 3 Penstocks	SQF	Yes
29	Chlorinator House Access Road	--	Mountain Highway 99 / Chlorinator House and Water Tanks	SQF	Yes
30	Kern River No. 3 Powerhouse Access Road	--	Mountain Highway 99 / Kern River No. 3 Powerhouse	SQF SCE	Yes
31	Kern River No. 3 Warehouse Access Road	--	Kern River No. 3 Powerhouse Access Road / Kern River No. 3 Warehouse	SCE	Yes
32	Kern River No. 3 Campus Access Road	--	Mountain Highway 99 / Kern River No. 3 Powerhouse	SQF	Yes
33	Kern River South Garage Access Road	--	Mountain Highway 99 / Kern River South Garage	SQF	Yes

-- = not named; SCE = Southern California Edison Company; SQF = Sequoia National Forest
Note:
[a] Forest Service gate was installed along this road segment in April 2024 to prevent vehicular access.

7.8.1.4. Specially Designated Areas

Pursuant to FERC regulations, a description of specially designated areas in the vicinity of the Project is provided in the following subsections.

<u>Sequoia National Forest Land Management Plan Management Areas and Designated Areas</u>

The majority of land within the FERC Project Boundary is located on National Forest System lands administered by the SQF and is managed under guidance provided in the LMP for the SQF (Forest Service, 2023). The LMP includes the following management areas and designated areas that apply to lands near or within the FERC Project Boundary:

- Conservation Watershed Lands
- Inventoried Roadless Area and National Recreation Trail (motorized)
- Strategic Fire Management Zone
- Sustainable Recreation Management Area

- Special Interest Area
- National Wild and Scenic River
- Giant Sequoia National Monument

Figure 7.8-2 illustrates the Project facilities that are within these specially designated areas. The LMP lists desired conditions, objectives, standards, guidelines, and potential management approaches for the management of lands under each designation.

Conservation Watershed Lands

Conservation watersheds are management areas identified as a network of watersheds that (1) have been determined to have a functioning or functioning-at-risk rating, (2) are anchored to areas (like wilderness or inventoried roadless areas) that augment resilience, (3) provide connectivity for at-risk species, and (4) provide high-quality water for beneficial uses downstream. According to the LMP, “the management emphasis for conservation watersheds is to maintain or improve, where possible, the functional rating of these systems for the long term and to provide for persistence of at-risk species by maintaining connectivity and refugia for these species. The intent of [LMP] direction in conservation watersheds is to focus restoration and monitoring over the long term, while still allowing for other resource uses or activities within these areas” (Forest Service, 2023).

Lands designated as an “Upper North Fork Kern River Conservation Watershed” area and lands within a “Riparian Conservation Area” are present within the FERC Project Boundary.

Inventoried Roadless Area and National Recreation Trail (Motorized)

The Forest Service’s 2001 Roadless Area Conservation Rule (Roadless Rule) established prohibitions and permissions on road construction, road reconstruction, and timber harvesting on 58.5 million acres of National Forest System lands nationwide (66 *Federal Register* 3244 [January 12, 2001]). The LMP does not incorporate the Roadless Rule but includes it as informational. Inventoried Roadless Areas are located to both the east and west of the FERC Project Boundary, from the north to south end of the National Forest System lands south of designated Wilderness and Monument areas.

The Cannell Meadow National Recreation Trail, one of three national recreation trails on the SQF, includes an Inventoried Roadless Area. The Cannell Meadow National Recreation Trail has a trailhead near Kernville and traverses 20.3 miles to a ridgetop east of the Project; this trail is not within the FERC Project Boundary.

Strategic Fire Management Zone

The LMP includes fire management zones designed to support decision-making by pre-assessing the risk to and benefits from wildland fire (both wildfire and prescribed fire) on the landscape. Wildfire responses include a spectrum of strategies that include full suppression, confinement and containment, monitoring, and management to meet resource objectives.

Within the FERC Project Boundary, lands within strategic fire management zones are designated as “Community Wildfire Protection,” “General Wildfire Protection,” and “Wildfire Maintenance.”

The Community Wildfire Protection zone encompasses locations where communities, community assets, and private land could be at a very high risk of damage from wildfire where high fuel loadings exist. Wildfires that start in this zone contribute more to potential loss of community assets than any other strategic fire management zone. Under most weather and fuel conditions, wildfire mitigation, fuel reduction treatments, and fire protection are needed within the Community Wildfire Protection zone to prevent direct threats to life or property. This zone is present along the NFKR on National Forest System lands north of Kernville, just past the town of Riverkern, and around Fairview Dam (Forest Service, 2023).

The General Wildfire Protection zone identifies “where conditions currently put some natural resource and/or community values at high risk of damage from wildfire” (Forest Service, 2023). In some areas of this zone, wildfires may negatively affect natural resources due to the natural fire regime and condition of the ecosystem. Wildfires that start in some areas of the General Wildfire Protection zone can contribute to the high fire risk in the Community Wildfire Protection zone. Managing wildfires to meet resource objectives in this zone is often considerably constrained due to fuel conditions, the high risk of loss of natural resources, and the potential adverse effects on communities threatened by wildfires starting in this zone. This zone is present surrounding the Community Wildfire Protection areas discussed above and around several Forest Service campgrounds situated along the NFKR (Forest Service, 2023).

The Wildfire Maintenance zone encompasses areas where wildfire poses a low threat to communities in average fire season conditions and where conditions allow natural resources to benefit from wildland fire. Conditions in this zone are favorable to implementing prescribed fire for ecological restoration (Forest Service, 2023). The remainder of land within the FERC Project Boundary and surrounding areas not included in Community or General Wildfire Protection zones is included within the Wildfire Maintenance zone.

Sustainable Recreation Management Area

Sustainable recreation applies to all lands used for recreation purposes within the SQF; however, the LMP also describes particular management direction for recreation management areas to provide specific opportunities and activities focused on protecting resources and supporting sustainable recreation. Project lands within the FERC Project Boundary include certain lands with the designations of “Destination Recreation Area” and “Backcountry Terrain Recreation Area.”

Destination Recreation Areas experience high levels of recreation use, supported by more facilities, amenities, and services than other areas. Iconic destinations or well-known attractions draw visitors to specific locations (areas such as the Kern River upstream from Lake Isabella). Destination Recreation Areas provide the most developed recreation opportunities in the SQF. Destination Recreation Areas emphasize such amenities as roads, parking lots, and restrooms.

Backcountry Terrain Recreation Areas are undeveloped, natural, and suited for dispersed motorized and nonmotorized recreation use. Backcountry Terrain Recreation Areas are maintained for low visitor use and density. They are generally in remote areas with few amenities and limited recreation management. Backcountry Terrain Recreation Areas may overlap with inventoried roadless areas, and the Forest Service may allow the continuation of such multiple uses as fuelwood gathering, vegetation management, livestock grazing, existing utility infrastructure, and mining. Backcountry Terrain Recreation Areas provide opportunities for motorized and nonmotorized uses that are challenging due to terrain and the low density of roads and trails. Use levels are low and users are spread out, minimizing opportunities for conflict.

Special Interest Area

The LMP includes management direction for Special Interest Areas with specific scenic, geological, botanical, zoological, paleontological, archaeological/historical, or recreational values, or combinations of these values (Forest Service, 2023). There are no Special Interest Areas within the FERC Project Boundary. Special interest areas near the Project include the following:

- Packsaddle Cave, which is a geologic Special Interest Area (specifically containing Packsaddle Cave), about 0.7 mile east-southeast of Fairview Dam; and
- Baker Point, which is a botanical Special Interest Area about 2.5 miles west of the western terminus of the Corral Creek Diversion Access Road (where the road approaches the confluence of Corral Creek with the NFKR).

National Wild and Scenic River

Forest Service Manual 2354.03 (Forest Service, 2009) implements the policies for wild and scenic rivers pertaining to river recreation and includes the following elements:

- Plan and manage river recreation in a context that considers the resource attributes, use patterns, and management practices of nearby rivers;
- Emphasize activities that harmonize with the natural setting of the national forest;
- Manage the use of rivers by establishing as few regulations as possible;
- Emphasize user education and information;

- Coordinate river management with other federal, state, or local agencies having primary or concurrent jurisdiction;
- Ensure that proposed and ongoing projects and activities conform with the Wild and Scenic Rivers Act;
- Establish use limits and other management procedures that best aid in achieving the prescribed objectives for a river and in providing sustained benefits to the public; and
- Acquire sufficient water to achieve management objectives.

Specific management direction for the designated wild and scenic river segment of the NFKR located within the Fairview Dam Bypass Reach is provided in the LMP (Forest Service, 2023). This management direction updates and augments the previous CMP (Forest Service, 1994a), as discussed above in Section 7.8.1.1.

Two additional tributaries to the NFKR within the Fairview Dam Bypass Reach (Salmon Creek and Bull Run Creek) were recommended as eligible for inclusion by the Forest Service (Figure 7.8-3; Forest Service, 2023). Bull Run Creek, located along the western side of the NFKR, is not within the FERC Project Boundary. A Project diversion dam, Salmon Creek Diversion, is located on Salmon Creek approximately 1 mile upstream from its confluence with the NFKR. The Forest Service has classified this segment of Salmon Creek as “scenic” citing ORVs of scenery, recreation, wildlife, and prehistory (Forest Service, 2023). Refer to Section 7.7, *Recreation Resources*, and Section 7.9, *Aesthetic Resources*, for additional discussion on this river segment.

While Salmon Creek is not yet designated as a wild and scenic river, interim protection measures are outlined in Forest Service Handbook 1909.12, section 84.3 for recommended river segments to manage eligible, suitable, or recommended river corridors, to protect free flow and outstandingly remarkable values and maintain preliminary classification (MA-EWSR-STD) until a decision is made on the future use of the river and adjacent lands through an Act of Congress or a change in eligibility or suitability status from a future study (Forest Service, 2023).

Giant Sequoia National Monument

The LMP provides management direction for the Giant Sequoia National Monument, which encompasses about 328,215 acres within the SQF. The purpose of the management direction is to protect giant sequoia trees, groves, and associated ecosystems along with unique geological and cultural resources within the National Monument. Additional management direction is provided in *Giant Sequoia National Monument Management Plan* (Forest Service, 2012). At its closest point, the boundary of the Giant Sequoia National Monument is about 0.7 mile northwest of the northernmost boundary of the impoundment upstream of Fairview Dam, although most Project facilities are 4 to 6 miles east of the National Monument boundary. The National Monument provides opportunities for viewing the giant sequoia trees, which grow in groves. The National Monument also includes The Needles, a series of enormous granite spires that attract rock climbers to the area. The Needles is about an hour’s drive north of Kernville.

California-Protected River Segments

There are no Project facilities on a river segment that is specifically protected by the State of California. The NFKR is not designated as a Wild and Heritage Trout Water (CDFW, 2023). The NFKR is not designated as a California wild and scenic river (CA Water Boards, 2017).

Scenic Highways/Scenic Byways

No designated State or County Scenic Highways are located in the vicinity of the Project (California Department of Transportation, 2023).

Wilderness Areas

As provided in the Wilderness Act of 1964 (Pub. L. No. 88-577; 16 USC 1131–1136), a wilderness area is an “area of undeveloped Federal land retaining its primeval character and influence, without permanent improvements or human habitation, which is protected and managed so as to preserve its natural conditions.” The Project is not located within a state or federal wilderness or recommended wilderness area (Forest Service, 2023). The following six designated wilderness areas are either in whole or in part within the SQF’s administrative boundary:

- Domeland Wilderness
- Golden Trout Wilderness
- Jennie Lakes Wilderness
- Kiavah Wilderness
- Monarch Wilderness
- South Sierra Wilderness

The nearest designated wilderness area is the Domeland Wilderness Area (located approximately 6 miles east of the Corral Creek Diversion Dam) and the Golden Trout Wilderness (located about 12 miles north of the northernmost boundary, upstream of Fairview Dam).

7.8.1.5. Fire History, Fuels Management, and Fire Suppression

The Project is situated within the Kern River valley, an area primarily characterized by grasslands and herbaceous cover in mountainous territory that is prone to wildfires. Like other forested parts of California, large wildfires have occurred near the Project, as shown in Table 7.8-2. The largest recorded fire (since 1910) within 1 mile of Project facilities was the 2002 McNally Fire, which was started by a campfire and burned more than 149,000 acres primarily north of the Project. According to available data from the

California Department of Forestry and Fire Protection (CAL FIRE), no wildfires are believed to have been started by Project operations.

Table 7.8-2. Wildfires within 1 Mile of Kern River No. 3 Hydroelectric Project Facilities (1910–2020)

Wildfire Name	Start Date	Containment Date	Acres Burned [a]	Cause
Hillside	6/30/2000	7/1/2000	73.0	Playing With Fire
McNally	7/21/2002	8/28/2002	149,475.0	Campfire
Chico	6/29/2003	6/30/2003	24.9	Miscellaneous
Halfway	7/30/2003	8/1/2003	34.3	Lightning
James	4/29/2007	8/2/2007	1,348.9	Miscellaneous
Goldledge	6/3/2007	6/16/2007	4,196.0	Miscellaneous
Fairview	6/28/2009	6/28/2009	115.0	Miscellaneous
Corral	8/7/2009	8/8/2009	136.0	Miscellaneous
Creek	7/15/2010	7/16/2010	95.9	Lightning
Bull	7/25/2010	7/31/2010	16,448.2	Miscellaneous
Willows	9/4/2011	9/12/2011	1,121.1	Arson
Fish	5/20/2015	5/27/2015	20.9	Campfire
Cedar	8/16/2016	8/16/2016	29,100.6	Miscellaneous
Bell	6/27/2017	7/1/2017	107.3	Miscellaneous

Source: CAL FIRE, 2023

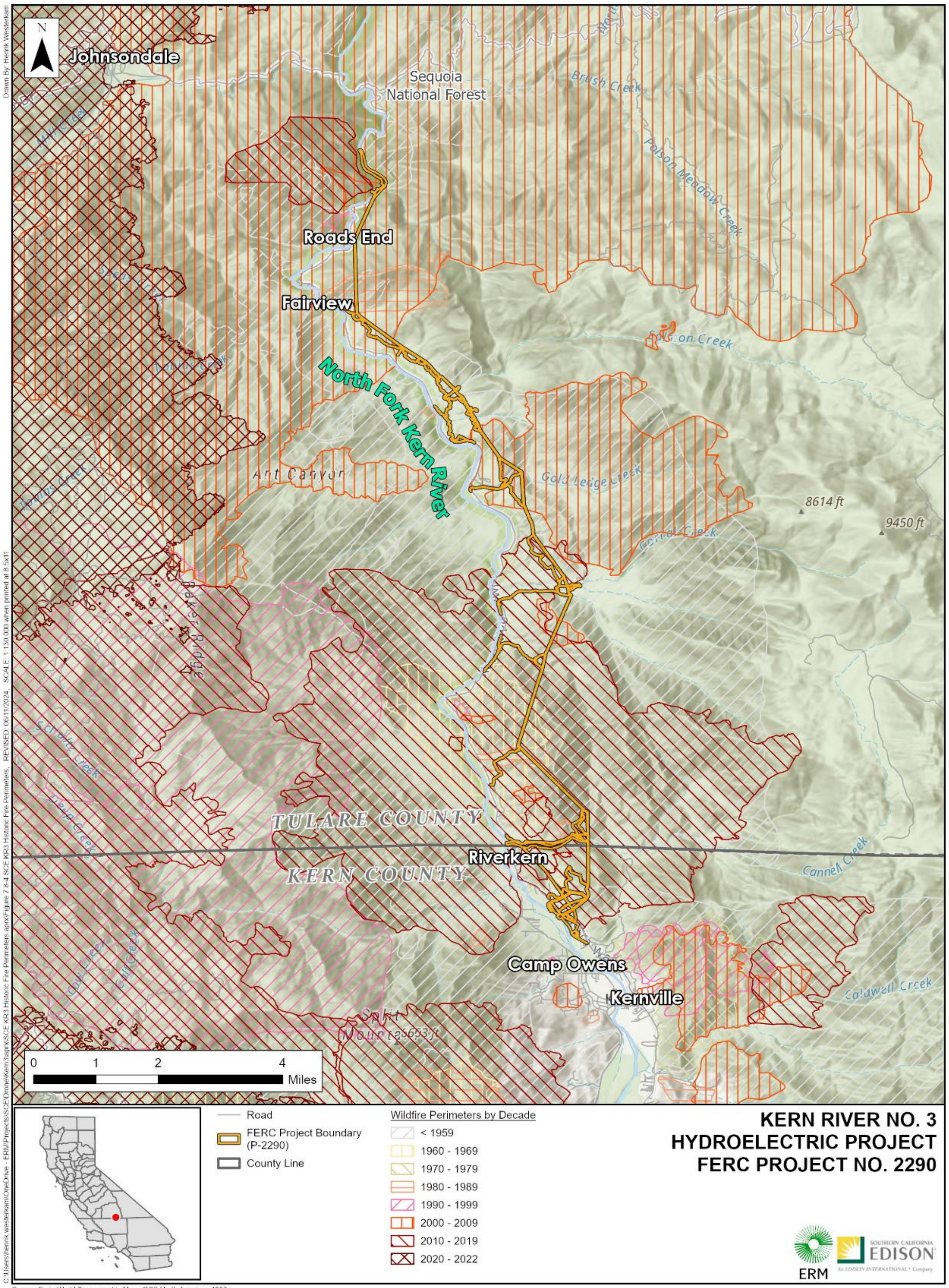
Note:
[a] Based on mapping analysis performed by CAL FIRE, this acreage may differ from reported amount of acreage burned.

Figure 7.8-5 shows the locations of major fires that have occurred since the early 1900s, grouped by decade.

Fire prevention and fuels management within and adjacent to the FERC Project Boundary are primarily provided by the Forest Service. Through an interstate compact agreement with the Forest Service, the Tulare Unit of CAL FIRE also provides fire prevention and response within the portions of SQF at and near the Project (CAL FIRE, 2023). 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 (CAL FIRE, 2013).

According to the SQF LMP, fire management within and surrounding the FERC Project Boundary falls within three strategic fire management zones based on wildfire risk within the forest (Forest Service, 2023), as described above under Specially Designated Areas.

To reduce fire hazards associated with Project facilities, SCE implements regular maintenance activities, including vegetation management and hazard tree removal. Vegetation management includes trimming vegetation by hand and with equipment and applying herbicides to provide adequate buffer around facilities. In addition, SCE removes hazard trees that pose a threat to facilities and that could become a fire hazard. Refer to Section 5.1, *No-Action Alternative*, for a detailed description of Project facility maintenance activities and the locations and timing of their implementation.



Source: CAL FIRE, 2023

FERC = Federal Energy Regulatory Commission

Figure 7.8-5. History of Major Fires on Lands Surrounding the Kern River No. 3 Hydroelectric Project.

7.8.2. Proposed Environmental Measures

SCE proposes to implement the following environmental measures related to land use:

- Measure RR-1, *Recreation Management Plan*
- Measure LU-1, *Project Roads and Facilities Management Plan*
- Measure LU-3, *Treatment and Disposal of Solid Waste and Wastewater Plan*
- Measure LU-4, *Oil and Hazardous Substances Management Plan*

The proposed measures and their key features are described below. Refer to Appendix E.1 for the complete description of measures SCE proposes to include in any new license issued for the Project. Potential effects on the recreation and scenic values of the NFKR are also discussed in Section 7.7, *Recreation Resources*, and Section 7.9, *Aesthetic Resources*, respectively.

7.8.3. Potential Project Effects

Under the No-Action Alternative, the Project would continue to operate under the terms and conditions of the current license, as described in Section 5.1. The No-Action Alternative is considered the environmental baseline for this analysis. Potential effects on land use and management were identified in FERC's SD2 (FERC, 2022) and on an evaluation of continued O&M activities described as part of the proposed Project (Section 5.2, *Proposed Action Alternative*). Potential effects identified in FERC's SD2 include following:

- Effects of continued Project O&M on land use;
- Effects of continued Project O&M on traffic in the Project-affected area; and
- Effects of continued Project O&M on the designated wild and scenic segments of the Kern River.

The following sections describe the potential effects of the proposed Project, including the proposed environmental measures, on land use and management. Unavoidable adverse effects on land use are discussed at the end of this section and summarized in Section 10.0, *Conclusions and Recommendations*.

7.8.3.1. Effects of Continued Project Operations and Maintenance on Land Use and Traffic

With the implementation of the proposed Measures RR-1, LU-1, LU-3, and LU-4, proposed Project O&M activities (described in Section 5.1, *No-Action Alternative*, and Section 5.2, *Proposed Action Alternative*) would have (at most) minor, local, and short-term direct and/or indirect adverse effects on land use, including direct and indirect effects related to land use near Project features relative to the baseline current conditions.

With the exception of the proposed measures, SCE proposes to continue to operate the Project as it is currently operated. Implementation of SCE's proposed measures would ensure that potentially adverse effects on land use resulting from Project O&M activities would be avoided or reduced to minor levels, as described below.

Proposed Measure RR-1 will be developed and would include measures to address recreation use needs at the Project recreation facility. The plan would also include measures to avoid, reduce, or mitigate adverse effects on historic properties and to address ongoing maintenance of the Project recreation facility—KR3 Powerhouse Put-in/Take-out. In addition, proposed Measure RR-1 would support existing LMP objectives for recreation resource management. Therefore, proposed Measure RR-1 would have a beneficial effect on land use and management.

Proposed Measure LU-1 will be developed and would include a description of maintenance requirements associated with Project roads. The plan would incorporate the existing *Erosion and Sediment Management Plan* to (1) reduce the potential for a failure along the Project water conveyance system, (2) reduce impacts in the event of a flowline failure, and (3) describe inspections and outline steps required to address any future erosion issues that arise at Project facilities.

Proposed Measure LU-3 would continue current practices to treat and dispose of solid waste and waste water under its *Plan for Treatment and Disposal of Solid Waste and Waste Water* (SCE, 1997a). Therefore, implementation of proposed Measure LU-3 would have no effect on land use and management.

Proposed Measure LU-4 would continue current practices for the storage of oil and hazardous materials and the prevention and response to spills as specified in its *Plan for Oil and Hazardous Waste Storage and Spill Prevention and Cleanup* (SCE, 1997b). Therefore, implementation of proposed Measure LU-4 would have no effect on land use and management.

The potential effects of ongoing and proposed changes in Project O&M and new environmental measures (i.e., management plans) incorporated on land use are presented below.

<u>FERC Project Boundary Modifications</u>

The FERC Project Boundary would be modified (increased in some areas and/or decreased in others) to (1) include all lands necessary for O&M of the Project, (2) remove lands no longer necessary for O&M of the Project, and (3) correct known errors in the current Exhibit G for the Project. These revisions will be depicted on maps provided in Exhibit G as part of the FLA.

SCE is currently working with the SQF to obtain approval and reach agreement on terms of the modifications and would file a complete set of revised Exhibit G drawings in accordance with the regulations at 18 CFR § 4.39 and § 4.41(h). Proposed changes to the Project Boundary will be described and addressed as part of the FLA.

Land use designations would not change as a result of adding to or removing land from the FERC Project Boundary. All lands that would be added to or removed from the FERC Project Boundary would continue to maintain the same land use designations identified in Kern County General Plan (Kern County Planning Department, 2009), depending on location. Similarly, land uses identified in the LMP for SQF (Forest Service, 2023) would not change. Land uses permitted under the No-Action Alternative would continue to be allowed under the proposed Project. Therefore, implementation of the proposed Project including proposed Measure LU-1 would have a beneficial effect as compared to the No-Action Alternative by (1) ensuring that Project roads and facilities continue to be maintained by SCE; (2) providing SCE and the agencies with clear direction about SCE's responsibilities as they relate to Project road and facility maintenance; and (3) formalizing SCE's inspection, maintenance, consultation, permitting, and reporting requirements. Accordingly, implementing Measure LU-1 would ensure the Project roads and facilities are managed consistent with management direction in the SQF LMP. Therefore, Measure LU-1 would have a beneficial effect on land use and management.

Traffic

Almost all the roads within the FERC Project Boundary are ungated and used by the public as well as SCE. Roads surrounding the Fairview Dam and intake, Cannell Creek Access Road, and around the KR3 Powerhouse are gated with limited public access for security purposes. As described in the LAND-1 Technical Memorandum (Appendix E.2), Project roads are used daily or at least once per week (Monday through Friday) to access major Project features such as Fairview Dam and the sandbox, Salmon and Corral Creek Diversions, stream gages, aboveground flowline segments, and the forebay area. Other road segments leading to Project adits or tunnel muck locations are used once per month (during routine inspections), or on an as-needed basis. The number of SCE vehicles also varies depending on the type of activity being conducted. Typically, one or two SCE trucks are used during routine inspection and maintenance activities. During routine annual road maintenance work, additional equipment (e.g., a grader) is also on site. Refer to Section 5.1, *No-Action Alternative*, for a description and frequency of routine road maintenance activities. The proposed Project would not change the use of these roads as compared to the No-Action Alternative.

Of the 33 Project and Shared Access Road segments surveyed, the highest rate of public use was observed along the Kern River No. 3 Powerhouse Access Road. This road provides access to SCE's KR3 Powerhouse Put-in/Take-out recreation facility. Additionally, public use was noted on the two road segments leading up to the non-Project Rincon Trailhead located in the SQF: the Rincon Trail Access Road and the Tunnel 9B Spur Road (LAND-1 Technical Memorandum [Appendix E.2]).

The proposed Project also includes an update to the inventory of Project and Shared Access Roads within the FERC Project Boundary. Proposed changes to Project Shared Access and Roads are still in discussions with the SQF. Any effects on traffic will be addressed as part of the FLA.

SCE would include measures as part of the LU-1, *Project Roads and Facilities Management Plan* to mitigate the potential effects of identified traffic concerns when conducting routine maintenance along publicly accessed Project roads. This plan would include provisions for managing erosion around Project roads and parking areas constructed from spoil piles. With this plan in place, minor to no adverse effects are expected on land use as compared with the No-Action Alternative. Because SCE proposes no significant changes in Project operations or facilities, no physical effects on public roads such as detours, closures, or other changes that could adversely affect traffic would result from implementation of the proposed Project. Construction activities under the proposed Project would generally be limited to minor improvements and routine O&M activities, and SCE's workforce would not appreciably increase due to any construction activities.

Proposed Measure RR-1 would include measures to address recreation use at the Project recreation site to address recreation resource needs identified as part of the REC-2 Study. The measures included in this plan are under development and will be consistent with existing LMP objectives for recreation resource management.

7.8.3.2. Effects of Continued Project O&M on the Wild and Scenic River Corridor

Ongoing Project O&M would have no effect on the NFKR and eligibility or suitability as a wild and scenic river (refer to Section 7.7, *Recreation Resources*, and Section 7.9, *Aesthetic Resources*, for additional information related to these recourse areas).

Although Section 7 of the Wild and Scenic Rivers Act (Pub. L. No. 90-541, 82 Stat. [1968]) prohibits the development and licensing of new hydroelectric projects on designated wild and scenic rivers, the Project was constructed and began operation prior to the designation of the NFKR as a wild and scenic river, and the enabling legislation specifically indicates that the designation does not "affect the continued operations and maintenance of the existing diversion project, owned by Southern California Edison on the North Fork of the Kern River" (Pub. L. No. 100-174, 101 Stat. 924 [1987]).

For evaluation purposes, the Project and its operations at the time of the wild and scenic river designation (1987) are considered baseline conditions. Any proposed changes are measured against these baseline conditions. Existing conditions in the Fairview Dam Bypass Reach have been influenced by the Project since it was originally developed in 1921. Since 1987, the year of the wild and scenic river designation, the Project has not changed substantially. Following the wild and scenic river designation, FERC issued a new 30-year license in 1996 that included the current measures as described in Section 5.1. No new features are included as part of the proposed Project and SCE is proposing continuation of several measures so that the Project remains consistent, or in some instances enhance the baseline condition at the time of the wild and scenic river designation.

The Section 7 evaluation process also includes an assessment of the continued operation of the Project under established "direct and adverse effect" guidelines for wild and scenic rivers for a number of relevant criteria regarding the free-flowing condition, water quality, and ORVs of the river (Forest Service, 2004). The NFKR has three ORVs including recreation, scenery, and wildlife. The Forest Service's (2015) general criteria for establishing these criteria follow:

- Recreation—"recreational opportunities are high quality and attract, or have the potential to attract, visitors from throughout or beyond the region of comparison; or the recreational opportunities are unique or rare within the region. River-related recreational opportunities include, but are not limited to, sightseeing interpretation, wildlife observation, camping, photography, hiking, fishing, hunting, and boating. The river may provide settings for national or regional use or competitive events."

- Scenery—"landscape elements of landform, vegetation, water, color, and related factors result in notable or exemplary visual features or attractions. Additional factors, such as seasonal variations in vegetation, scale of cultural modifications, and the length of time negative intrusions are viewed, may be considered. Scenery and visual attractions may be highly diverse over different parts of the river or river segment. Outstandingly remarkable scenic features may occupy only a small portion of a river corridor."

- Wildlife—"wildlife values may be judged on the relative merits of either terrestrial or aquatic wildlife populations or habitat, or a combination of these conditions."

The full list of Section 7 evaluation criteria and considerations of these criteria as part of the proposed Project are provided in Table 7.8-3 (note: the Section 7 evaluation criteria are broader and address more than just land use, aesthetics, or recreation; they are a comprehensive set of criteria that address the free-flowing condition, water quality, and ORVs of the designated river segment). Relevant information regarding ORVs were obtained from the Final Environmental Impact Statement and Study Report: North Fork Kern Wild and Scenic River Study (Forest Service, 1982) and the Final Environmental Impact Statemen North and South Forks of the Kern Wild and Scenic River (Forest Service, 1994b).

Table 7.8-3. Wild and Scenic River Section 7 Evaluation Criteria

Section 7 Evaluation Criteria	Potential Effects Under the Proposed Action
Free-Flowing Condition	
• Alteration of within-channel conditions – Active channel location – Channel geometry – Channel slope – Channel form – Navigation of river	The proposed Project would not result in any changes or alterations of within-channel conditions (see the *Sediment Transport, Channel Geomorphology, and the Free-flowing Condition of the River* subsection in Section 7.2.3.1).
• Alteration of riparian and/or floodplain conditions – Vegetation composition, age structure, quantity, or vigor – Relevant soil properties – Relevant floodplain properties	The proposed Project would not result in any changes or alterations of riparian and/or floodplain conditions (see Sections 7.3.3.1, *Water Use and Hydrology*, and 7.6, *Botanical Resources*).

Section 7 Evaluation Criteria	Potential Effects Under the Proposed Action
• Alteration of upland conditions – Vegetation composition, age structure, quantity, or vigor – Relevant soil properties – Relevant floodplain properties – Relevant hydrologic properties	The proposed Project would not result in any changes or alterations of upland conditions (see Sections 7.6, *Botanical Resources*, and 7.8, *Land Use Management and Resources*).
• Alteration of hydrological processes – The ability of the channel to change course, reoccupy former segments, or inundate its floodplain – Streambank erosion potential, sediment routing and depositions, or debris loading – The amount or timing of flow in the channel – Existing flow patterns – Surface and subsurface flow characteristics – Flood storage – Aggradation or degradation of the channel	The proposed Project would not result in any changes or alterations of hydrological processes (see Section 7.3.3.1, *Water Use and Hydrology*).
• Magnitude and extent of off-site changes – Changes that influence other parts of the river system – Processes involved, such as water, sediment, and the movement of nutrients	The proposed Project would not result in off-site changes in the movement of sediment and/or nutrients (see subsection *Sediment Transport, Channel Geomorphology, and the Free-flowing Condition of the River* in Section 7.2.3.1, and Section 7.3.3.2, *Water Quality*).
Water Quality	
• Temperature	The proposed Project would not result in changes to water temperatures that would adversely affect fish and other aquatic organisms (see Section 7.3.3.2, *Water Quality*).
• Turbidity	The proposed Project would not result in changes to turbidity (see Section 7.3.3.2, *Water Quality*).
• Pollutants	The proposed Project would not contribute pollutants to the river (see Section 7.3.3.2, *Water Quality*).
• Sediment	The proposed Project would not contribute sediment to the river (see Section 7.3.3.2, *Water Quality*).
Outstandingly Remarkable Values	
• Scenery	The ORV includes the vistas of the canyon from the river and the highway. The proposed Project would not alter aesthetic conditions including vistas of the canyon as compared to baseline conditions (see Section 7.9, *Aesthetic Resources*).

Section 7 Evaluation Criteria	Potential Effects Under the Proposed Action
• Recreation	The ORV includes camping, picnicking, hiking, driving for pleasure, enjoying the basic scenery, angling, and whitewater boating. The SQF manages numerous developed and dispersed recreation facilities located along the NFKR between Johnsondale Bridge and the county line. Five hiking trails, one on the west side of the river and four on the east side are partially or wholly within the wild and scenic river corridor. The proposed Project would maintain or enhance recreation opportunities as compared to baseline conditions (see Section 7.7, *Recreation Resources*). The Project recreation facility (KR3 Powerhouse Put-in/Take-out) is outside of the wild and scenic river corridor.
• Wildlife	The ORV is due to the presence of a unique slender salamander species (genus *Batrachoseps*) (Forest Service, 1982). No changes in habitat conditions for the slender salamander are expected as part of the proposed Project. (see Section 7.5.3.1, *Terrestrial Amphibians and Reptiles*, subsection *Special Status Species*).

KR3 = Kern River No. 3; NFKR = North Fork Kern River; ORV = outstanding remarkable value; SQF = Sequoia National Forest

Therefore, the proposed Project would not conflict with established land management plans, land use designations, or specially designated areas relative to the No-Action Alternative.

7.8.3.3. Unavoidable Adverse Effects

The proposed Project would not result in unavoidable adverse effects on land use and management.

7.9. AESTHETIC RESOURCES

This section describes the scenic characteristics and applicable management direction regarding aesthetic resources within the FERC Project Boundary and lands surrounding the Project, specifically Project bypass stream reaches. Section 7.9.1 discusses the affected environment and resource conditions under current (i.e., baseline condition) Project O&M. Section 7.9.2 identifies environmental measures, management plans, and programs that are included in the proposed Project. Section 7.9.3 includes an analysis of ongoing and new environmental effects of Project O&M from the proposed Project, including potential effects from proposed measures. The full description of proposed measures is provided in Appendix E.1.

Related information pertinent to the discussion of aesthetic resources are summarized herein with additional information provided in Section 7.2, *Geologic and Soils Resources*; Section 7.3, *Water Resources;* and Section 7.7, *Recreation Resources*.

The descriptions within this section were developed using existing, relevant, and reasonably available information and include results from the following relicensing studies where additional information was collected to further describe the resources:

- AES-1 Aesthetic Flow
- REC-2 Recreation Facilities Use Assessment
- REC-3 Recreation Facility Condition Assessment
- WR-2 Hydrology
- GEO-1 Erosion and Sedimentation

Approved Study components for GEO-1, AES-1, and REC-3 are complete. Data collection and analysis for REC-2 and WR-2 are ongoing, and results will be provided upon completion of data collection and analysis. Technical Memoranda for data collected to date for each of these studies are included in Appendix E.2.

7.9.1. AFFECTED ENVIRONMENT

The Project is located in the Sierra Nevada foothills where the topography ranges from rolling hills to mountains with large rocks and granite outcrops that provide localized contrast and interest. The vegetation shifts from riparian to oak and grass to mixed-conifer communities depending on elevation. The varied topography and vegetation create an engaging mix of forms, lines, colors, and textures that contribute to the overall scenic quality of the area. Changes in vegetation colors (from vibrant greens to more subdued greens and tans) and kinetic flows in the river further enhance and add seasonal variation to the scenic opportunities within the FERC Project Boundary.

In addition to the Project, multiple other anthropogenic modifications (i.e., human-built structures and/or human-altered areas) are present in the vicinity of the Project. These modifications include recreation sites and facilities (e.g., campgrounds, boat ramps, day-use/picnic areas), private residences, commercial buildings and support facilities (e.g., restaurants and resorts), distribution lines, and travel corridors (e.g., paved and striped roads, signs), among others. In general, these modifications do not substantially detract from the overall scenic quality and are generally consistent with the level of development found in areas near to the Project.

7.9.1.1. Management Direction Pertaining to Aesthetic Resources

Several applicable management plans include visual resource information and management direction for the Project and its vicinity, including the SQF LMP (Forest Service, 2023), CMP for the North and South Forks of the Kern Wild and Scenic River (Forest Service, 1994), *Tulare County General Plan* 2030 update (Tulare County, 2012), and the *Kern County General Plan* (Kern County, 2009).

<u>Land Management Plan for the Sequoia National Forest</u>

The Forest Service updated the SQF LMP in May 2023 (Forest Service, 2023), and establishes planning and decision-making guidance to help direct activities on Forest Service-administered lands. The SQF LMP discusses the connection between aesthetics or scenic resources and other resource values (e.g., ecology and recreation) and establishes desired conditions for aesthetic resources and related actions to help achieve these desired conditions. Additional details on the SQF LMP are included in Section 7.8, *Land Use Management and Resources*.

In addition to establishing desired scenic conditions, the SQF LMP also designates Scenic Integrity Objectives for lands within the SQF. Scenic Integrity Objectives describe the desired condition of a region or state of *intactness*, which becomes the target condition for site-specific projects. The majority of the landscape within and around the FERC Project Boundary is mapped with a Scenic Integrity Objective of *high* (defined as management activities are unnoticed and the landscape appears unaltered), and smaller areas adjacent to the Project are mapped as *moderate* (defined as management activities are noticeable but are subordinate to the scenic character, and the landscape appears slightly altered) or are located outside federal land designation on private land owned by SCE (Forest Service, 2023). Importantly, the Project existed and was part of the scenic landscape when the Forest Service established these Scenic Integrity Objectives.

<u>Comprehensive Management Plan—North and South Forks of the Kern Wild and Scenic River</u>

Portions of the NFKR and the SFKR were designated as part of the National Wild and Scenic River System in 1987 (Public Law No. 100-174, 101 Stat. 924 [1987]), including the 78.5-mile segment from the Tulare County line to its headwaters in Sequoia National Park. The designation applies to the river and an approximate 0.25-mile buffer on each riverbank.

As described in Section 7.8, *Land Use Management and Resources*, a portion of the Project (from Fairview Dam down to the Kern/Tulare County line) is included within a designated Wild and Scenic River corridor with an ORV of recreation. This includes portions of the water conveyance system and other associated facilities (e.g., Project access roads), which fall within the 0.25-mile Wild and Scenic River corridor, while the downstream-most facilities (e.g., KR3 Powerhouse, forebay, penstocks) are outside the corridor. In addition, the Forest Service has determined that Salmon Creek is eligible for inclusion in the Wild and Scenic River System with an ORV of scenery. Salmon Creek includes an existing small diversion dam—Salmon Creek Diversion, located approximately 1 mile upstream from its confluence with the NFKR—and an unpaved road crossing. The Forest Service has classified this segment of Salmon Creek as "scenic," citing ORVs of scenery, recreation, wildlife, and prehistory (Forest Service, 2023).

The 1994 *Comprehensive Management Plan for the North and South Forks of the Kern Wild and Scenic River* identified the ORVs along the designated Fairview Dam Bypass Reach and provided management direction for protecting these values (Forest Service, 1994). These objectives included retention and partial retention of the scenic integrity of landscapes along the designated portion of the Fairview Dam Bypass Reach. Additional details related to the Wild and Scenic River designations are included in Section 7.8, *Land Use Management and Resources*.

Kern County General Plan

The southern portion of the Project is located in Kern County. The *Kern County General Plan* includes goals, policies, and implementation measures to help protect scenic resources in Kern County (Kern County, 2009). The Land Use, Open Space, and Conservation Element of the *Kern County General Plan* outlines several provisions that aim to minimize potential effects on scenic quality from land development and facilities through proper design and screening techniques. It also identifies provisions to protect views of the Kern River but does not specifically address aesthetic flows in the river.

Tulare County General Plan

A large portion of the Project is located in Tulare County. However, the portion of the Project within Tulare County is located entirely on lands administered by the Forest Service. The Land Use and Environmental elements of the *Tulare County General Plan* contain several provisions regarding scenic resources that are applicable to lands near the Project (Tulare County, 2012). Most of these provisions are oriented toward maintaining the open space character of the county and appropriately designing and screening facilities to minimize their potential effects on scenic quality. While the *Tulare County General Plan* does not address aesthetic flows in the Kern River, it does acknowledge the need to protect and maintain the scenic character of the county's rivers, lakes, and irrigation canals.

7.9.1.2. Management Direction Pertaining to Noise

Both the *Kern County General Plan* and the *Tulare County General Plan* 2030 update include a noise element or noise-related management direction (Kern County, 2009; Tulare County, 2012). The LMP for the SQF does not address or provide management direction about noise, except for a stipulation about minimizing disturbances to breeding fisher after large, severe disturbances (Forest Service, 2023).

Kern County General Plan

The *Kern County General Plan* includes a noise element that addresses noise levels and enforcement measures (Kern County, 2009). The plan establishes noise-sensitive areas and sets corresponding goals and policies to minimize the potential health impacts of exposure to unsafe noise levels. The identified noise-sensitive areas include residential areas, schools, hospitals, parks and recreation areas, and churches. The southern portion of the Project within Kern County is near to some residential areas and parks and recreation areas. The noise element includes the following noise-related goals:

- Ensure that residents of Kern County are protected from excessive noise and that moderate levels of noise are maintained.
- Protect the economic base of Kern County by preventing the encroachment of incompatible land uses near known noise-producing roadways, industries, railroads, airports, oil and gas extraction, and other sources.

These goals are supported by the following policies that address noise:

1. Review discretionary industrial, commercial, or other noise-generating land use projects for compatibility with nearby noise-sensitive land uses.
2. Require noise level criteria applied to all categories of land uses to be consistent with the recommendations of the California Division of Occupational Safety and Health.
3. Encourage vegetation and landscaping along roadways and adjacent to other noise sources to increase absorption of noise.
4. Utilize good land use planning principles to reduce conflicts related to noise emissions.
5. Prohibit new noise-sensitive land uses in noise-impacted areas unless effective mitigation measures are incorporated into the project design. Such mitigation shall be designed to reduce noise to the following levels:
    a. 65 decibels day-night average sound level or less in outdoor activity areas
    b. 45 decibels day-night average sound level or less within interior living spaces or other noise-sensitive interior spaces
6. Ensure that new development in the vicinity of airports will be compatible with existing and projected airport noise levels as set forth in the Airport Land Use Compatibility Plan.
7. Employ the best available methods of noise control.

8. Enforce the State Noise Insultation Standards (California Administrative Code, Title 24) and Chapter 35 of the Uniform Building Code concerning the construction of new multiple-occupancy dwellings such as hotels, apartments, and condominiums.

The *Kern County General Plan* also includes multiple measures that address actions and programs to implement the goals and policies of the noise element. These measures are primarily aligned with properly addressing potential noise impacts during the planning, permitting, and development of new projects in Kern County. Any proposed changes to the Project would potentially be subject to the provisions of the noise element's goals, policies, and implementation measures.

Tulare County General Plan

The *Tulare County General Plan* does not include a specific noise element, but instead includes noise-related provisions in other elements of the plan (Tulare County, 2012). Most of the noise-related guidance is included in the health and safety element of the plan. The health and safety element includes a specific noise protection principle: "locate noise-generating uses in areas with compatible surrounding uses."

The *Tulare County General Plan* (Tulare County, 2012) identifies the primary noise producers (or sources of noise) as "highways and roads, railroads, manufacturing plants, airports, and agricultural operations." Notably, this list of noise producers does not include utilities or power generating facilities, including the Project. The goal related to these and other potential noise producers in Tulare County is to protect county residents and visitors from the harmful effects of excessive noise while promoting the county economic base.

The *Tulare County General Plan* also includes a series of policies and implementation measures that address the following:

- Economic base protection
- Noise-impacted areas
- Noise-sensitive land uses
- Airport noise contours
- State noise standards
- Noise level criteria
- Inside noise-adjacent uses
- County equipment
- Automobile noise enforcement
- Peak noise generators
- Foothill and mountain noise
- Noise analysis
- Sound attenuation features
- Noise buffering
- State noise insulation
- Construction noise

Similar to the *Kern County General Plan*'s (Tulare County, 2012) noise element, these noise policies and implementation measures in Tulare County are primarily intended to guide the evaluation of existing projects and in the planning, permitting, and development of new projects, in particular those in noise-sensitive areas of Tulare County. The Project's components in Tulare County are located primarily on Forest Service-managed lands and thus are generally not subject to the *Tulare County General Plan*'s noise provisions (Tulare County, 2012). Additionally, while some noise-sensitive land uses (e.g., residential areas, parks and recreation areas) are present along the NFKR in the vicinity of the Project, they are not near Project components that may potentially generate excessive noise levels.

7.9.1.3. Visual Character Within FERC Project Boundary and Surrounding Area

The Project setting includes a range of topographical features, vegetative communities, and anthropogenic modifications that contribute to the current visual character of the area. Within the NFKR canyon, the river itself is a dominant feature of the landscape that is accentuated by and provides contrast with the surrounding topography. The sides of the canyon act as walls that enclose the landscape and focus viewers' attention on those landscape features within the enclosed area, including the river, riparian vegetation, rock outcrops, and general topography. The river's dark blue hues; dynamic, sinuous directional form; and shifting textures (generally from smooth to coarse) create visual interest and contrast with the surrounding landscape forms, textures, and colors. The result is a highly scenic river corridor that has intrinsic aesthetic value that is also integral to the recreational experiences found along the river reach.

The Project includes several existing facilities and structures that are visible on the landscape. The visibility of these facilities and structures to the public is variable and based on viewing location, vegetation, and topography. The primary Project-related structures include Fairview Dam, KR3 Powerhouse, flume, siphon, forebay, penstocks, and other associated facilities (e.g., access roads, fences, parking areas). Overall, the Project's facilities and structures are generally consistent with the area's level of development and are not visually dominant or overly obtrusive on the landscape. Pursuant to the 1997 *Visual Resource Protection Plan* (a condition of the existing license), Project facilities and structures are painted with appropriate earth tones to help them blend into the surrounding landscape (SCE, 1997). SCE continues to rely on this plan to help ensure that the Project's visual contrasts are minimized on the landscape.

To better understand the changing aesthetic conditions associated with different flow levels in the Fairview Dam Bypass Reach (the segment of the NFKR influenced by Project operations), SCE established a series of 16 key observation points (KOPs) from which to document aesthetic flows during the AES-1 Study. The views from these KOPs were intended to capture publicly accessible sites from which viewers would be able to see and experience the changes in flow levels that are due to operational and seasonal water variations or flow rates throughout the year.

Most of the KOP views are considered enclosed with a focus on fore- and middle-ground viewing distances. Enclosed views are defined by landscape elements that form a “floor” and “walls” that frame the visible landscape. In the case of the NFKR, the river channel and broader floodplain serve as the “floor,” while the surrounding hills, rock outcrops, and mountains form the “walls” that enclose the landscape. Within this enclosed landscape, the river is one element or feature that contributes to the overall scenic quality of the area. It is the combination of the river along with vegetation, rock outcrops, and the surrounding topography that creates a varied (e.g., forms, lines, colors, textures) and visually engaging landscape.

At each KOP, the presence and dominance of the river in the viewshed changes depending on flow level. In the Fairview Dam Bypass Reach, the amount of water in the river or flow level changes based on seasonal variations in water availability and Project operations. These flows generally follow a seasonal pattern with the highest average monthly flow levels in spring (April and May) and early summer (June and July) when snow melt is highest, and lower flows throughout the rest of the year (Section 7.3.1.1, *Water Use and Hydrology*). To assess the variation in flow and changing aesthetic conditions, multiple observations at different flow levels at each KOP were completed during the AES-1 Study.

In general, at lower flows (less than 160 cfs), the river level (amount of water) tends to be less prominent but still contributes positively to the overall scenic character of the NFKR canyon. However, at low flows (less than 40 cfs), the lack of water creates an emphasis on other landscape features, particularly large boulder fields in and riparian vegetation along the river channel, reducing the visual complexity of the landscape. At very high flows (greater than 3,000 cfs), the river takes on flood characteristics including water overflowing the banks, fully submerged rock outcrops, partially submerged riparian vegetation, and a much higher degree of turbulence (and associated color and texture changes). While impressive from a water volume standpoint, the visual characteristics under these very high flows tend to detract from the overall scenic integrity of the landscape (that is, the river becomes such a dominant feature to the detriment of other landscape elements).

Outside of these extremes, there is a high degree of visual variability across a range of moderate flows (generally between 160 and 1,000 cfs). This variability includes changes to the visibility of boulders in the river channel (e.g., exposed, partially submerged, fully submerged), the presence and magnitude of rapids, the width of the water in the river channel, and other visual changes in landscape elements. The degree of visual change depends in part on the viewing location, specifically the location of the KOP and the structure of the river channel that is visible from the KOP. At some KOPs, the visual changes associated with different moderate flow levels are minimal, while at others, the degree of visual changes is high. Details related to aesthetic flows are included in the AES-1 Technical Memorandum, which is provided in Appendix E.2.

7.9.2. Proposed Environmental Measures

SCE proposes to implement the following environmental measures related to aesthetic resources:

- Measure WR-5, *Recreational Boating Flows*
- Measure LU-2, *Visual Resources Protection Plan*
- Measure WR-1, *Minimum Instream Flows*

The proposed measures and their key features related to aesthetic resources are described below. Refer to Appendix E.1 for the complete description of measures SCE proposes to include in any new license issued for the Project.

7.9.3. Potential Project Effects

Under the No-Action Alternative, the Project would continue to operate under the terms and conditions of the current license, as described in Section 5.1. The No-Action Alternative is considered the environmental baseline for this analysis of potential effects. Potential effects on aesthetic resources were identified in FERC's SD2 (FERC, 2022) and were based on an evaluation of continued O&M activities described as part of the proposed Project (Section 5.2, *Proposed Action Alternative*). Potential effects identified in FERC's SD2 include the effects of continued Project O&M on aesthetic resources, including visual quality and noise, in the Project-affected area.

The following sections describe the potential effects of the proposed Project, including the proposed environmental measures, on aesthetic resources. Unavoidable adverse effects on aesthetic resources are discussed at the end of this section and summarized in Section 10.0, *Conclusions and Recommendations*.

7.9.3.1. Effects of Project Facilities on Aesthetic Resources

Project facilities and maintenance activities would have no effect on aesthetic resources. The Project currently includes existing facilities and structures that are visible on the landscape. SCE does not propose changes to these existing facilities. The visibility of these facilities and structures to the public is variable and based on viewing location, vegetation, and topography. The public primarily has views along Mountain Highway 99 of some of the Project's facilities and structures including the intake structure, diversion dam, siphon, forebay, penstocks, powerhouse, and other associated infrastructure. The facilities and structures located at the southern end of the Project are also visible from other public roadways and communities (e.g., forebay and penstocks are visible from the town of Kernville). The Project flowline is primarily hidden from public view because it is mostly underground or screened by existing vegetation and topography.

Although existing facilities are visible, the current LMP for the SQF acknowledges and provides for the continued presence of the Project on the landscape. Furthermore, the Project's facilities and structures are generally consistent with the area's current level of development and are not visually dominant or overly obtrusive on the landscape except in specific locations (e.g., on Mountain Highway 99 as motorists pass the KR3 Powerhouse).

Additionally, Project maintenance activities at/around Project facilities would have no effect on aesthetic resources. To help mitigate any potential visual contrasts, Project facilities and structures are painted with appropriate earth tones to help them better blend into the surrounding landscape per the 1997 *Visual Resource Protection Plan* (a condition of the existing license; SCE, 1997). Existing visual conditions surrounding the Project are consistent with current Scenic Integrity Objectives established in the 2023 LMP for the SQF and include use of appropriate paint colors (e.g., earth tones) and repeating the basic elements of form, line, and texture found in the predominant natural features of the characteristic landscape. Under the proposed Project, any potential maintenance activities would be limited to minor improvements and other routine maintenance tasks associated with the general upkeep of Project features.

Existing maintenance activities and activities included under proposed measures are consistent with Tulare and Kern Counties’ general plans. Routine maintenance activities at facilities and structures on private lands would continue to be consistent with the open space character emphasized in these plans and would be designed to minimize potential effects on scenic quality through appropriate measures (e.g., painting, screening) to avoid effects on the visual quality of the area.

Proposed Measure LU-2 would include routine painting and other aesthetic-related maintenance activities (e.g., vegetative screening) of Project facilities and structures that may be needed during the new license period.

Given that SCE does not propose new facilities and/or alterations to existing Project facilities, any visual effects of the continued presence of these facilities and structures on the landscape would remain unchanged. Therefore, the presence of Project facilities would have no effect on visual resources. Additionally, because the proposed Project would continue to be consistent with the Scenic Integrity Objectives in the SQF LMP, and maintenance activities would be limited to minor improvements and other routine maintenance tasks associated with the general upkeep of Project features, Project maintenance activities on these facilities would have no effect on aesthetic resources.

7.9.3.2. Effects of Project Operations on Aesthetic Resources

Under the proposed Project, SCE would continue to operate the Project as described in Section 5.1. However, minor adjustments to Project O&M are proposed in response to the implementation of new or modified environmental measures. With the implementation of proposed Measure WR-1 and Measure WR-5, proposed Project O&M activities (described in Section 5.1, *No-Action Alternative*, and 5.2, *Proposed Action Alternative*) would have no adverse effect on the free-flowing condition of the river and may provide enhanced aesthetic opportunities along the Fairview Dam Bypass Reach.

Flows in the NFKR are variable because of natural water availability, lack of storage behind Fairview Dam and Project operations, resulting in changing aesthetic conditions throughout the year. At times, low-flow conditions in the river diminish the overall scenic integrity of the landscape, but at other times, flows enhance the aesthetic conditions. Rivers are kinetic landscape features and scenic conditions along them are not static. Therefore, while Project flows influence the aesthetic characteristics of the NFKR, the effects are variable and subject to diverse visitor preferences for different flow levels. This is not anticipated to change under the new license.

Proposed Measure WR-1 would modify the existing instream flow schedule to better align with the natural hydrograph to enhance conditions for aquatic resources. The range of MIF releases (40 cfs to 130 cfs) would remain unchanged and consistent with current operations. However, there are timeframes when natural opportunistic aesthetic flows occur due to seasonal peak run-off and other localized high flow events as the Project's capacity to divert water is approximately 600 cfs. Natural hydrologic conditions and proposed changes to Project operations related to instream flows and flow releases along the Fairview Dam Bypass Reach are discussed in detail in Section 7.3.3.1, *Water Use and Hydrology*.

Proposed Measure WR-5 includes a timeframe in which the Project would not operate, allowing the full natural flow within the Fairview Dam Bypass Reach. Details about this measure are still in development and discussed in the *Whitewater Boating Flows* subsection of Section 7.7.3.2, *Effects of Project Operations on River-Based Recreation Opportunities*; however, the full natural flows are expected to be within the range of the seasonal peak run-off observed within the Fairview Dam Bypass Reach.

Given the range of MIF releases would remain unchanged and the proposed Recreational Boating Flows would be similar to seasonal peak run-off flow, implementation of the proposed measures would have no adverse effect on the free-flowing condition of the river and may provide enhanced aesthetic opportunities along the Fairview Dam Bypass Reach.

7.9.3.3. Effects of Noise on Aesthetic Resources

The proposed Project would have no effect on noise. Project operations have the potential to generate noise. The Project generates continuous and intermittent noise that is audible in the immediate vicinity associated with the operation of the powerhouse in addition to other noncontinuous or intermittent noise related to road maintenance. Examples of other non-Project-related noise sources in the vicinity of the Project include traffic along Mountain Highway 99, recreation use at the numerous developed and dispersed campgrounds and day-use recreation areas, and overhead aircraft (including military training runs along the NFKR). Natural noise sources may occur from flowing water, wind, and wildlife.

The proposed Project would not involve significant changes to Project O&M. Therefore, implementation of the proposed Project would have no effect on noise.

7.9.3.4. Unavoidable Adverse Effects

The proposed Project would not result in unavoidable adverse effects on aesthetic resources.

7.10. Cultural Resources

7.10.1. Introduction

This section summarizes the results of the FERC-approved Cultural Resource Technical Study Plan (CUL-1 Study) for FERC Project No. 2290, which included one study element covering archaeology and built-environment resources. Because of the complexity of resource findings and the distinct nature of the two cultural resource types, study implementation included the development of two separate Technical Study Reports (TSRs)—Archaeology and Built Environment. This discussion is intended to provide a basis for evaluating the potential issues summarized in the CUL-1 Archaeology and Built Environment TSRs, which are both filed as Confidential and Privileged in Volume IV of this License Application (**CUI//CEII/PRIV**). Currently, the CUL-1 TSRs are under review by the Cultural Resources Technical Working Group (TWG). SCE anticipates that during stakeholder review, more information about cultural resources may be identified.

The full description of proposed measures is provided in Appendix E.1. Tribal resources are discussed in Section 7.11, *Tribal Resources*.

This section was prepared to comply with Section 106 of the NHPA (16 USC § 470f) and its implementing regulations in 36 CFR Part 800, which requires that federal agencies consider the effect of their undertakings on cultural resources. The TSRs were developed in collaboration with a Cultural Resources TWG that includes representatives from FERC, the California SHPO, SQF, and Tribes and Tribal representatives identified by the Native American Heritage Commission (NAHC) and through SCE's Tribal outreach.

For the purposes of the TSRs, and as defined in the NHPA (54 USC § 300308), a **historic property** is any "prehistoric [precontact] or historic district, site, building, structure, or object included in, or eligible for inclusion on, the National Register of Historic Places (NRHP), including artifacts, records, and material remains related to such a property or resource." Following National Register Bulletin No. 36, *Guidelines for Evaluating and Registering Archaeological Properties*, an archaeological site is "a location that contains the physical evidence of past human behavior that allows for its interpretation." The term archaeological site refers to sites that are eligible for or are listed in the NRHP (historic properties), as well as those that do not qualify for listing in the NRHP. Unevaluated cultural resources are assumed eligible until determined otherwise.

A **district** is a geographic area containing a significant concentration, linkage, or continuity of sites, buildings, structures, or objects united historically or aesthetically by plan and physical development. Examples of districts include (but are not limited to) prehistoric archaeological site complexes, hydroelectric projects, residential areas, commercial zones, mining complexes, transportation networks, rural villages, canal systems, irrigation systems, or large ranches.

The term **cultural resource(s),** for the purpose of this document, is used to discuss any precontact or historic-period district, archaeological site, building, structure, object, or landscape regardless of its NRHP eligibility.

7.10.1.1. Project Personnel Qualification

Both CUL-1 TSRs (provided in Volume IV of this License Application [**CUI//CEII/PRIV**]) were completed by individuals who meet the Secretary of the Interior (SOI) Professional Qualification Standards (PQS) in Archaeology and/or History and Architectural History (36 CFR Part 61), are experienced at documenting historic properties in California, and hold the appropriate permits to conduct cultural resources work on lands managed by the Forest Service. SCE contracted with Historical Research Associates, Inc. (HRA), and Far Western Anthropological Research Group, Inc. (FW), to conduct background research, fieldwork, and prepare the TSR specific to archaeological resources. Davis-King & Associates (DKA) and Tiley Research (TR) were contracted to conduct Tribal resources studies and prepare the ethnographic background.

7.10.1.2. Study Objectives

The goals and objectives, as documented in the FERC-approved CUL-1 Study Plan, include the following:

- Meet FERC compliance requirements under in its regulations (18 CFR Part 5) and Section 106 of the NHPA, as amended, by determining whether Project-related activities and public access will have an adverse effect on historic properties.
- Identify all archaeological resources, built-environment resources, and Tribal cultural resources within the APE, determine which are historic properties, and develop the HPMP based on those results.
- Ensure that future Project facilities and operations are consistent with the cultural resources management goals of the SQF.

7.10.1.3. Extent of Study Area

The Project is located in Kern and Tulare Counties, California, north of the of the town of Kernville in the foothills along the western slope of the Southern Sierra Nevada. The majority of the Project is within land managed by SQF while portions are owned by SCE.

<u>Area of Potential Effects, Area of Direct Impact, and Federal Energy Regulatory Commission Project Boundary</u>

Under 36 CFR § 800.16(d), the 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.” For the purposes of this undertaking, the defined APE is discontinuous and inclusive of three components: (1) the 15 newly identified specific culturally important and interconnected places recommended as NRHP-eligible contributing elements of the Palegewan Heartland District (PHD); (2) the Area of Direct Impact (ADI) (described further below); and (3) the FERC Project Boundary. Importantly, the locations of the non-archaeological resources were generated primarily through consultation with Tübatulabal Chairman Robert Gomez and augmented with archival background research, but they were not further corroborated through field

survey, site visits, or other methods. While this study acknowledges the non-archaeological resources within the APE, because of the inherent difficulty in spatially depicting a mapped “boundary” for these resource types, they have been excluded from delineation on the APE map. Overview maps depicting the discontinuous defined APE, including the previously documented and newly recorded archaeological resources, and the spatial extent of the ADI are provided in the CUL-1 Archaeology and Built Environment TSRs, which are filed as Confidential and Privileged as a supplement to this License Application (**CUI//CEII/PRIV**).

While the APE is inclusive of the ADI, the ADI is defined as the area that includes the Project and is essentially coeval with the FERC Project Boundary and includes all Project facilities and access roads. The Project consists of the operating facilities associated with the dam, diversions, water conveyance system, forebay, penstocks, powerhouse, stream gages, access roads, and ancillary or support facilities under FERC’s jurisdiction.

The PHD includes 91 specific locations plus the land-waterscape of the District itself, of which 41 are located within the Tribal Resources 5-mile Study Area; of those, 15 are located within the APE while only 8 are within the ADI. The District’s contributing elements located within the APE consist of ethnographic places including villages, fishing locations, and geographic features along with archaeological and rock art resources.

For the purposes of this report, the APE and ADI are shown on maps that represent their district boundaries. Only the ADI was subject to pedestrian survey. The full boundaries of all archaeological resources that intersected the ADI were investigated, regardless of the FERC Project Boundary. The Cultural Resources Study Area includes a 0.5-mile buffer around the ADI, to allow for additional background research on known cultural resources in the vicinity (Figure 7.10-1).

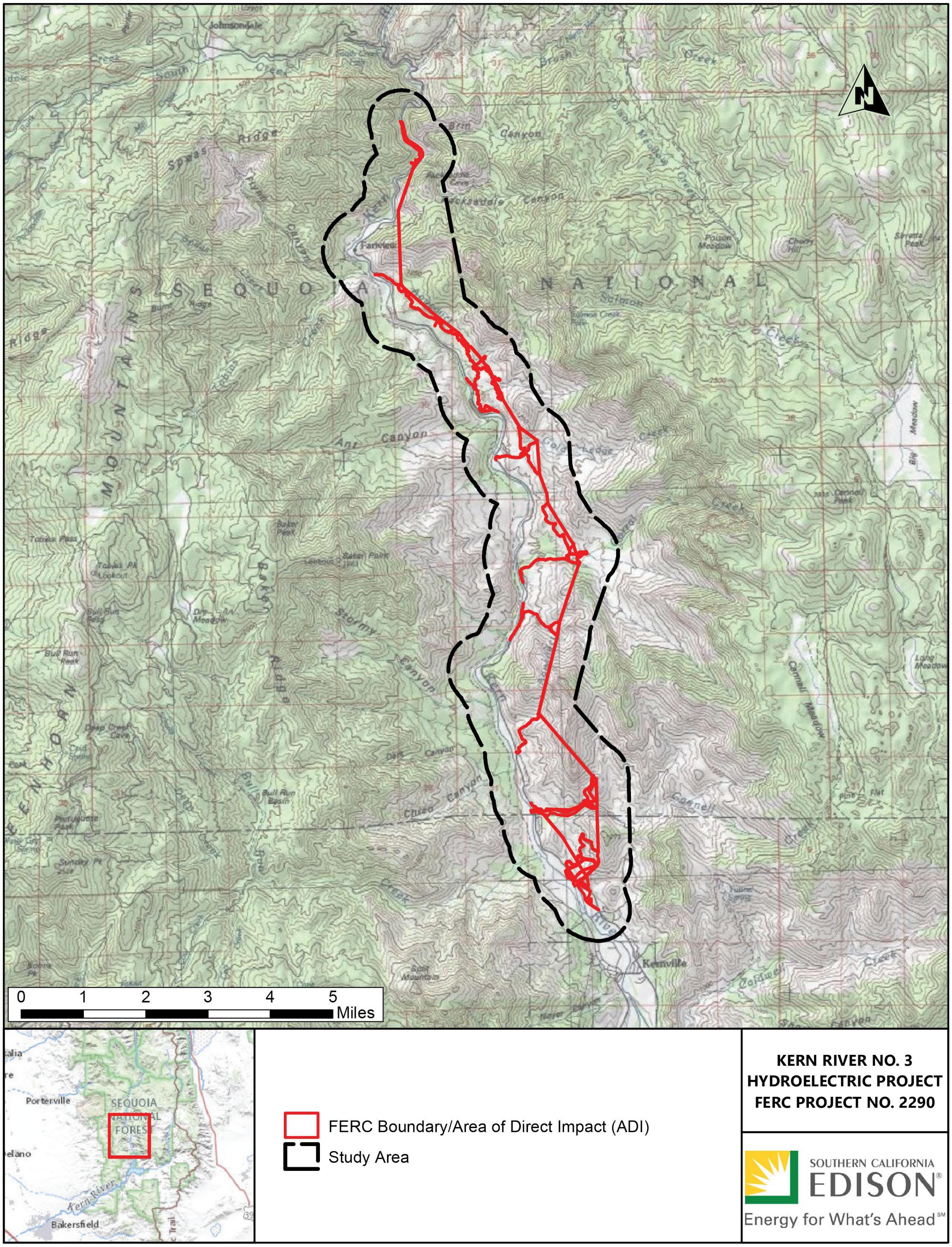


Figure 7.10-1. Study Area and Area of Direct Impact.

7.10.2. Environmental and Cultural Context

7.10.2.1. Environmental Context

Physical Environment and Climate

The Study Area extends from Kernville, California, north along the upper portion of the NFKR Canyon to RM 19.1. This section provides discussion of the environment to contextualize the archaeological and Tribal research as it relates to the past. Native and non-Native peoples' past and current interaction with both the physiography and biota of the Study Area and vicinity contributes to a comprehensive evaluation of places and properties of potential significance; geomorphological and environmental aspects relate directly to the physical integrity of archaeological sites regardless of their temporal affiliation.

A result of faulting and fluvial action rather than glaciation, the Kern River Canyon is steep and deeply entrenched. In many areas, the width of the canyon encompasses little more than the channel of the river, while in others alluvial terraces extend a short distance on either side, opening substantially only at the southern end near the confluence of the North Fork (Kernville) and South Fork Valleys.

The canyon and river split the Great Western Divide to the west and the Kern Plateau to the east. The Great Western Divide is a prominent, intramountain ridge separating the Kern River watershed from the San Joaquin Valley. Elevations range from about 2,000 meters (~6,560 feet), near the Little Kern Plateau, to almost 4,000 meters (~13,120 feet) amsl along the upper reaches of the Kern River Basin (Webb, 1946). The Greenhorn Mountains mark the southernmost range within the Great Western Divide; Sunday, Bull Run, and Tobias Peaks, among the taller in the Green Mountains at greater than 2,400 meters (~7,870 feet), overlook the western side of the Study Area. The Greenhorn Mountains are primarily drained by Poso Creek, which flows southwest throughout much of the range before flowing onto the plains north of Bakersfield. Other perennial and intermittent streams such as Speas, Tobias, and Bull Run Creeks drain into the NFKR near the Study Area.

East of the NFKR lies the Kern Plateau, which extends from the Kern River Canyon to the Sierra-Cascade crest. The plateau contains a series of high peaks, granite domes, and mountain meadows which vary substantially in elevation. Unlike much of the Sierra Nevada, it was never glaciated and lacks the sharply defined topographic relief typical of glacially carved montane formations. Instead, the topography of the plateau has been shaped by the SFKR, which has produced a mountainous landscape interspersed with broad valleys, floodplains, and meadows. These broad valleys and floodplains represent older, abandoned, or subsumed stream channels which were inherited by the SFKR rather than cut by it (Webb, 1946). Elevations on the plateau range from greater than 3,000 meters (~9,840 feet) amsl at Kingfisher Ridge to roughly 1,800 meters (~5,900 feet) amsl near the town of Onyx.

Climate in the area is generally described as Mediterranean with hot dry summers, cold wet winters, and occasional summer thunderstorms from desert monsoons. Observed temperature extremes at Isabella Dam range from a low 11°F to a high of 115°F. Winter temperatures are variable with daytime highs in the upper 50s°F and low 60s°F and average lows just below freezing during December and January. July and August are the hottest months of the year, and daytime temperatures frequently exceed 100°F. Annual precipitation averages 12 to 16 inches per year; measurable precipitation occurs in all months but is heaviest in fall, winter, and spring. Winter precipitation accounts for more than half of annual totals, while summer rains typically amount to an inch or less. Most precipitation falls as rain at elevations below about 1,500 meters (~4,920 feet) and as snow at higher elevations. While periods of heavy nighttime frost are not uncommon, measurable snow on the valley floor is rare. Summer thunderstorms often occur in the surrounding mountains and occasionally reach the valley floor.

Geology

The Study Area, with a central corridor, facilities, and access roads, parallels the southern reach of the deeply incised, V-shaped canyon of the NFKR, from Fairview Dam at Brin Canyon (near RM 18.6) to the powerhouse above Kernville (near RM 3.1). Rising in the granitic highlands of the Sierra Nevada, in glacial cirques leading to glacially carved valleys, the NFKR, and much of the SFKR, drain the Sierra Nevada from north to south, an uncommon orientation because most of this mountain range's primary watersheds flow east-west from its north-south trending crest; the Owens and San Joaquin Rivers occupy the rivers' bounding valleys. The NFKR (and the SFKR) upper reaches are bounded by the Great Western Divide to the west and the Sierran Crest and Mount Whitney massif to the east. Oriented along lineaments of the Kern Canyon Fault Zone, the river meanders through a series of prominent steps cut as Sierran uplift, in concert with river erosion of underlying meta-sedimentary and plutonic rocks (along with localized volcanic extrusions), which formed the prominent canyon. The structure of the river canyon is influenced by the Quaternary active "Rincon," the trace of the Kern Canyon Fault immediately east of the Study Area (Brossy et al., 2012).

As the NFKR intersects the APE in the vicinity of Fairview Dam, its canyon opens slightly and includes a narrow floodplain. The river channel is subject to significant variation in flow regime, depending on seasonal conditions. Due to Holocene activity along the Kern Canyon Fault, expressed by the deep trough of the Rincon, the river may be starved of sediment that would otherwise be entering the river system from the east. The valley of the Rincon, with its prominent east-facing ridges, entraps alluvium and sediment from expansive slopes east of the NFKR where lateral slip deflects drainages that are tributary to the North Fork (Brossy et al., 2012). Holocene surface ruptures are common in the Rincon, and tectonic activity is a significant local influence on sediment deposition and stream deflection in recent time.

The Study Area traverses west-facing, faceted ridges, outcrops, and ancient landslides along the prominent intermediary ridge between the Rincon and the NFKR. The ridges and features generally transition from open scrub woodland to exposed slopes and outcrops. Landforms intersecting the Study Area and its vicinity show a shallow sediment veneer or locally exposed bedrock. Soil development is limited to benches, terraces, and bounding valleys, or other locations where surface stability is long lasting. However, landforms in the Study 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. Buried, well-preserved archaeological resources are uncommon in the active and transitory river-margin and hillslope landforms. Most Project facilities and existing access roads are cut into relict sedimentary or bedrock stratigraphy below any thin Holocene sedimentary package. These conditions typically offer very good surface visibility for documenting and evaluating cultural resources of all ages.

Flora and Fauna

The varied relief and physiography of the Sierra Nevada produce a diverse array of habitats that correspond to differences in elevation, precipitation, soils, and temperature, creating a series of distinctive ecological zones inhabited by diverse plant and animal communities. In the relatively arid reaches of the NFKR Canyon, the standard foothill woodland community is augmented to include a series of xeric plants in addition to the common blue oaks and gray pines found elsewhere in the Sierra. Vegetation communities are heavily influenced by the availability of water as a function of slope, aspect, and proximity to drainages with increasingly xeric communities expanding out from the river canyon.

Overview of common plants is provided here as context for discussion of cultural resources. The NFKR corridor is often riparian and dominated by members of the red willow (*Salix laevigata*) Woodland Alliance. The overstory includes red willow, boxelder (*Acer negundo*), California buckeye (*Aesculus californica*), white alder (*Alnus rhombifolia*), incense cedar (*Calocedrus decurrens*), gray pine (*Pinus sabiniana*), western sycamore (*Platanus racemosa*), cottonwood (*Populus fremontii*), and canyon live oak (*Quercus chrysolepis*). Stands of Ponderosa pine (*Pinus ponderosa*) are also common. Below this canopy is an open and intermittent shrub layer dominated by mule-fat (*Baccharis salicifolia*), rough cocklebur (*Xanthium strumarium*), and other various samplings. Herbaceous undergrowth includes stinging nettle (Urtica dioica), goose grass (*Chenopodium* spp.), common rush (*Juncus effuses*), common knotweed (*Polygonum arenastrum*), common plantain (*Plantago major*), and cress (*Lepidium sativum*).

The hillslopes and clearings above and surrounding the river canyon is a Shrubland Alliance with rubber rabbitbrush (*Ericameria nauseosa*), the dominant species, along with big sagebrush (*Artemisia tridentata*), yellow rabbitbrush (*Chrysothamnus viscidiflorus*), Mormon tea (*Ephedra viridis*), California buckwheat (*Eriogonum fasciculatum*), western juniper (*Juniperus occidentalis*), and antelope bitterbrush (*Purshia tridentata*). Beneath the shrub canopy is an herbaceous layer that is sparse or grassy and includes annual grasses and herbs including Bromus, poppy (*Eschscholzia* sp.), filaree (*Erodium* spp.), goldfields (*Lasthenia californica*), and other grasses.

In addition to the local availability of gray pine nuts, buckeye, and acorns, pinyon (*Pinus monophylla*) groves are found at higher elevations within a day's walk to the higher elevations east of the SFKR. These and an array of other seed, nut, and bulb- or corm-producing plants were exploited by Native American populations during their annual round.

The southern Sierra Nevada support a diverse and extensive set of vertebrate faunas, though not all would have been of interest to precontact peoples. Some of the more important taxa are detailed below.

Among mammalian fauna, artiodactyls were arguably 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 more frequently exploited by Tübatulabal peoples (Voegelin, 1938). The only other artiodactyls found at higher elevations would have been bighorn sheep (*Ovis canadensis*). Although no historical evidence of bighorn sheep in the Study Area exists, ethnographic informants clearly identified them as food resources (Voegelin, 1938). Wehausen and Jones (2014) document evidence for Sierra Nevada bighorn along the Great Western Divide between Kaweah Peaks and Mineral King, where there were an estimated 125 bighorn sheep in the 1870s (Jones, 1950). Multiple sightings of bighorn have been reported around Maggie Mountain, just 14 kilometers farther south, and Sierran Bighorn sheep were also distributed along the Sierra-Cascade crest from Sonora Pass to Olancha Peak. Meanwhile large populations of desert bighorn populations occupied high elevation areas of the White, Inyo, and Argus Mountains and Coso Ranges in Owens and Indian Wells Valleys.

Large-bodied omnivores and carnivores were once found throughout the mountains and foothills. Larger predators such as grizzly (*Ursus arctos*) and black bear (*Ursus americanus*), puma (*Felis concolor*), coyote (*Canis latrans*), bobcat (*Lynx rufus*), and gray fox (*Urocyon cinereoargenteus*) would have competed with humans for many of the same resources, including artiodactyls, leporids, and larger rodents. Other common predators include mustelids (weasels and relatives), skunks, and badgers. None of these carnivores were regularly exploited for food.

Leporids, 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* sp.) are common throughout the high Sierra and adjacent foothills. Frequently encountered taxa include snowshoe hare, white-tailed jackrabbit, black-tailed jackrabbit, brush rabbit, and mountain cottontail, depending on elevation and habitat.

Rodents are the largest, most diverse group of mammals by far. California taxa range in size from as much as 30 kilograms (beaver [*Castor canadensis*]) to as little as 20 to 30 grams (voles and shrews, although shrews are technically members of the order Soricomorpha). Western gray squirrel (*Sciurus griseus*) and other squirrels (*Otospermophilus* sp., *Tamasciuris* spp.) are residents of the area, as are porcupine

(*Erethizon dorsatum*), woodrat (*Neotoma* sp.), yellow-bellied marmot (*Marmota flaviventris*), several types of chipmunk (*Tamias* sp.), and various species of pocket gopher (*Thomomys* sp.), rats, and mice. All are known to have been consumed by Native Americans, particularly the larger taxa.

Hundreds of bird species can be found in Kern and Tulare Counties, although many are more common or exclusively found in lower elevation areas. Taxa commonly found in montane settings include California quail (*Callipepla californica*), sooty and ruffed grouse (*Dendragapus fuliginosus*, *Bonasa umbellus*), woodpeckers (Picidae), great horned owls (Bubo virginianus), red-tailed hawks (*Buteo jamaicensis*), turkey vultures (*Cathartes aura*) and an array of smaller passeriforms (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 Kern River drainage, while rainbow trout are native to streams throughout the elevational range of the Sierra and in lakes below 1,800 meters (~5,900 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 19th century has reduced populations to a small fraction of historical numbers. Sacramento sucker are part of a broader San Joaquin Valley assemblage and may be a relatively late arrival in the upper reaches of the Kern River. Prior to extensive fish planting in the 19th and 20th centuries, many areas at elevations greater than 1,800 amsl lacked fish (Moyle, 2002). Local Native American peoples report taking all of these species from the Kern River and tributary streams and creeks.

7.10.2.2. Cultural Context

Following sections include a review of pre- and post-contact history and a summary of the Native American ethnography of the Study Area.

<u>Precontact History</u>

Some of the earliest archaeological work in the region was conducted by Julian Steward (1929), who documented various rock art locations, and Erminie Voegelin (1938), who documented a number of ethnohistoric Tübatulabal village sites and locations. Following World War II, Fenenga (1947) inventoried the cultural resources of the Isabella Reservoir basin prior to the construction of the Isabella Dam. That work involved surveying portions of 17 sections of land, recording 14 sites (CA-KER-1 through -14), and assessing the archaeological sensitivity of the region. Subsequent large inventories were made by Wallace (1970), Hanks (1973), Schiffman (1976), Glassow and Moore (1978), and Meighan et al. (1984), as well as numerous smaller inventories (see the records search discussion for a sample of this work near the Study Area).

Despite the level of inventory, relatively few sites have been tested and/or excavated. In 1971, Fresno State College reportedly excavated parts of KER-260 and KER-574, located south of the Isabella Dam, but no report on that work was completed and the disposition of the collection and notes remains unknown (Sutton and Pruett, 1989:6). Three years later, Robert Schiffman (1974) excavated KER-2398. Schiffman believed the site corresponds to the ethnographic Tübatulabal hamlet of Ho•lit, an unoccupied Palegewan site recorded by Voegelin (1938:43, site 18). Schiffman identified five occupational sites or loci within the hamlet (Sites A–E) and conducted both surface and subsurface collections. These produced a large variety of artifacts, including drills, knives, projectile points (mostly Desert Side-notch, Cottonwood Triangular), beads, worked bone, pottery, pendants grinding tools, as well as human remains (Schiffman 1974:5), but no substantive synthesis was completed.

Later that decade, Sally Salzman (1977) worked at the Long Canyon Village site (KER-311), located on the SFKR. She identified midden deposits, bedrock mortars, lithic scatters, rock alignments, and rock rings, which were taken as evidence of a permanent winter village. About this same time, Schiffman conducted excavations at KER-479, a large village and cemetery located west of Isabella Reservoir. That site contained numerous mortars, cupules, hunting blinds, and hearths features, as well as a wide variety of artifacts and burials. Unfortunately, no report on the results of the work has been written (Sutton and Pruett, 1989:6).

Kimberly Cuevas (2002) later mapped the Long Canyon Village site and excavated 14 test units, stating the site represented Wa•tiništ, or ”Juniper place,” one of the named Tübatulabal locations identified by Voegelin (1938:40). Cuevas’ (2002) work is noteworthy for testing several ethnographically based hypotheses about precontact seasonality, residentially, and trade for the area, which straddles several environmental zones. Cuevas found support for the site being most heavily used in the last 1,500 years and into the historic era, but not as a repeatedly occupied winter village. Lacking extensive midden deposits, Cuevas argues that the site is more consistent with the Tübatulabal pattern of shifting winter village choices, although the presence of several types of features (rock rings, granaries, a large rectangular feature), pottery, beads, diverse lithic tools, and extensive ground stone strengthen the overall interpretation of a village site. Cuevas’ findings also support the ethnographic Tübatulabal pattern of drawing resources and trade relations from both sides of the Sierra Nevada and the desert Great Basin. *Olivella* shell beads and acorn residues on ground stone attest to a westward connection, while pinyon pine residues and obsidian demonstrate connections to the mountains and desert.

Synthetic work to understand the area was conducted as part of archaeological efforts on the Pacific Crest Trail (PCT), located along the eastern edge of the range (Moratto, 1984). During the late 1970s and early 1980s, archaeologists surveyed a 35-mile segment of the trail, recording and testing more than 60 archaeological sites (Garfinkel et al., 1980, 1984; McGuire, 1981, 1983; McGuire and Garfinkel, 1980). Based on their investigations of sites along the Bear Mountain segment of the PCT, McGuire and Garfinkel (1980:52–53) proposed four generalized archaeological phases extending to approximately 6,000 years ago. These periods were defined based primarily on projectile point chronologies developed by Bettinger and Taylor (1974) in Owens Valley. While a pre-Middle Holocene record was not reflected in their original chronology, Garfinkel (2007:43) later added an earlier Kennedy Phase to account for any such occupations. This earlier period is recognized here, with the caveat that archaeological evidence for such early occupations remains scarce.

The Kennedy Phase (Initial Occupation to 5950 calibrated years before present [cal BP]) represents the first known use of the Kern Plateau, marked primarily by large lanceolate concave base and stemmed points similar to those found in the northwestern Mojave and Great Basin to the east. These projectile points have been found in contexts associated with radiocarbon dates and obsidian hydration measurements placing them in the late Pleistocene and early Holocene eras. Very few archaeological materials dating to this time have been recovered (Garfinkel, 2007:45), and the assumption is that the Sierran Uplands were essentially unoccupied and only used logistically.

The Lamont Phase (5950–3150 cal BP) is characterized by Pinto projectile points. The two specimens from the PCT investigations were made from fine-grained volcanic (FGV) and obsidian toolstone. The primary FGV source was hypothesized to be the Panamint Valley, while obsidian was reasoned to derive primarily from the Coso Volcanic Field. The obsidian specimen exhibited a hydration rim of 10.7 microns (McGuire and Garfinkel, 1980:49), consistent with obsidian Pinto projectile points from nearby Fort Irwin and China Lake. McGuire and Garfinkel (1980) suggest that Lamont Phase settlement-subsistence regimes were centered on small hunting groups making sporadic logistical hunting trips into the uplands, presumably during the summer months. Base camps were surmised to have been situated amid riparian zones in the Owens and Indian Wells Valley to the east, and it can be postulated these would have been situated in the San Joaquin Valley to the west, as well. This argument was based in part on the assumption that FGV toolstone was acquired from lower elevation sources in places such as Panamint Valley. However similar kinds of raw materials can also be found throughout the Kern Plateau (Harvey, 2019:59), undercutting this proposition somewhat. Outside of hunting pursuits, McGuire and Garfinkel (1980) maintained that unsystematic exploitation of upland pinyon might also have been incorporated into Lamont Phase adaptive milieus.

Sierra Concave Base and, less commonly, Elko and Humboldt dart points, are hallmark diagnostics of the Canebrake Phase (3150–1350 cal BP) in the southern Sierras. While occupational evidence in the southern Sierra Nevada is comparatively sparse, McGuire and Garfinkel (1980) see this period as the emergence of extensive local upland pinyon exploitation, noting that hunter-gatherers also fused ancillary seed and bulb collection and mixed small and large game hunting into their subsistence pursuits. Pinyon base camps incorporate portable milling equipment consisting largely, if not exclusively, of millingslabs and handstones (i.e., not bedrock mortars or other non-portable milling features). Sierra Concave Base obsidian points (presumably all Coso) from along the PCT possess average hydration rims of 5.5 ± 1.3 microns, falling in line with Saratoga Springs Period Rosegate projectile points made of Coso obsidian from Fort Irwin and China Lake. The latter form ranges between 4.0 and 6.5 microns in these areas, suggesting that upland and foothills Coso obsidian in the southern Sierra Nevada hydrates at a slower rate, or that the sample of obsidian analyzed by McGuire and Garfinkel (1980) is composed of more diverse sources.

The Sawtooth Phase (1350–650 cal BP), which is archaeologically characterized by the introduction of the bow and arrow, as evidenced by the production of Rose Spring and Eastgate (i.e., Rosegate) arrow points. This period also sees a marked jump in occupational intensity. Pinyon base camps, temporary pinyon processing stations, and small-scale hunting camps become comparably common, incorporating a wide range of artifacts and features, including bedrock mortars and cobble pestles, stone beads, and *Olivella* spire-lopped beads. These latter artifacts, and increasing dominance of obsidian in regional assemblages, suggest in-place exchange networks, as evident in the Haiwee Period of the Western Great Basin (ca. 1350–650 cal BP; Basgall and McGuire, 1988; Delacorte and McGuire, 1993). They imply regular upland use of the Sierra Nevada, and perhaps more intensive occupations than previously seen.

The Chimney Phase (650–100 cal BP), characterized by small Desert Side-notched and Cottonwood arrow points, is also marked by unpainted grayware made by Tübatulabal women, perhaps Owens Valley Brownware from the eastern side of the southern Sierra Nevada, and presumably Tulare Plain Ware to the west (Fenenga, 1952; Moratto, 2011). Otherwise, settlement-subsistence milieus are hypothesized to have remained relatively unchanged since the Sawtooth Phase. That said, the higher frequencies of various marker artifacts suggest even more intensive occupation of the region. With time, glass trade beads and *Olivella* disc beads become more favored than stone beads (Cuevas, 2002).

More work is needed in the southern Sierra Nevada, as the original scheme by McGuire and Garfinkel needs refinement. The most common work in the area remains focused on surface surveys (Harvey, 2019:53–57), with excavations near the Study Area limited to seven sites tested and reported by Mark Sutton during a previous KR3 relicensing effort (KER-405, -479, -2517, -2520, -2521, -2522, and -2527; Sutton et al., 1995; Sutton and Pruett, 1989) and more recent test excavations at KER-12 and P-15-017031 near Isabella Reservoir on behalf of the USACE (Whitaker et al., 2016). Neither produced assemblages substantial enough to justify a revision of the existing scheme.

<u>Native American Ethnography/Ethnohistory</u>

The primary ethnographer for the Tübatulabal was Ermine Voegelin (1938), supplemented by her husband’s linguistic work (Voegelin, 1935a, 1935b). Voegelin conducted her research in the summers of 1931, 1932, and 1933 in the Weldon area, near the SFKR. Stephen Powers (1976) also documented the groups, along with Alfred Kroeber (1925) and Charles Smith (1978), who wrote the Tübatulabal treatment in the Smithsonian handbook.

Prior to non-Native people entering the region, it was occupied by the Shoshonean--speaking Palegewan, a band closely related to the Tübatulabal. The linguistic groups subsumed under the term Tübatulabal include the Tübatulabal proper, on the lower SFKR, the Bankalachi, west of the NFKR on the slopes of the Greenhorn Mountains, and the Palegewan, who occupied the Study Area along the “unaugmented” Kern River. The Tübatulabal as a whole successfully utilized the ecotonal resources of both the Sierra Nevada and Great Basin and are unique among California Indians by having all the California Life Zones in their territory. In their home territory of the Kern River, the primary vegetable foods were the pinyon pine nut and the acorn. Indeed, the name Tübatulabal means pine nut eaters and incorporates the Shoshonean word tuba for the pinyon pine nut. Diet was supplemented by deer, rabbits and hares, and a fair amount of fish, along with nuts, seeds, corms, greens, berries, and mushrooms. Additives to the diet include their own special sugar collected as aphid honey dew, 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. Gathering and hunting took place seasonally, with summer forays into the higher elevations for nut gathering and fishing; autumn found people venturing downslope to the oak woodlands for acorn, and then into hamlet areas where they remained during the winter. Hamlets were recorded by Voegelin (1938), whose informants were largely Tübatulabal from the SFKR, and thus were not as familiar with the NFKR. Hamlets tend to be found near the Kern River or major tributaries, but only two were identified close to the ADI. These two are *cukka-yl* (a place formerly occupied by about 60 individuals, although unoccupied in 1932) and *ho-lit* (also unoccupied in 1932), according to Voegelin 1938.

Structural remains were of five main types: winter residence, sweat lodge, brush shelter, ceremonial brush shelters, and camp corrals. Material cultural remains reflect subsistence and residence patterns, with millingslabs and rock mortars indicative of seed and nut processing; tools reflecting scraping, cutting, and smoothing of items; architectural features related to hamlet winter homes; large brush circles for communal summer camping and dances; 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 obsidian. Wooden mortars were used, along with hopper baskets. Basketry was an elevated art, with several types made.

There has been a long oral and documented history among the Tübatulabal that relations were friendly with their neighbors, and they would travel great distances to acquire supplies. They ventured to the Pacific Coast to interact with the VentureZoñs, coming home with clam shell money and asphaltum. They often visited with neighbors of the eastern Sierra, with whom they would meet and exchange materials. In July, they would join with numerous other groups (Shoshonean, Yokutsan, and Chumashan speakers) to have a pronghorn drive. There appears also to have been a cooperative fishing agreement in the area near the Project, with Native Americans from all over coming to harpoon fish. Tübatulabal collected their red pigment in Koso territory, and the salt they gathered at desert salt lakes was especially important for curing fish and meat. There appears to be some settlement of the Kern River area by other groups; for example, the Panamint or Koso Shoshone are said to have lived with the Tübatulabal in historic times (Voegelin, 1938:7). Horses came to the Project region prior to white men, having been acquired by trade and other means from both the coastal Indians and the Koso. The Tübatulabal deny eating them, although Garcés (below) reported they killed and ate a mule. Warfare was infrequent, and usually there was an alignment with the Koso or Kawaiisu, the opposition being the Yokuts.

Birth, death, marriage, and other ceremonial activities were part of the annual life, and often outside Tribal groups would be hosted for ceremony. Burial would take place near the hamlet, often about a 0.25-mile distant and on a hillslope or rocky area.

Ethnohistorically, according to Erminie Voegelin (1938), the population of the Tübatulabal in the 1930s was about 145 people including the areas of Onyx, Kernville, and Bakersfield. Prior to white contact, Voegelin (1938) estimated between 300 and 500 people in two groups (Tübatulabal and Palegewan) over a 1,300 square-mile territory. Among the very first non-Natives to visit the Palegewan area was Garcés in 1776 (Coues, 1900), who spent more than 2 weeks in the hills east of Bakersfield. Pedro Font's guides were also in the area that same year. There was a great deal of interaction between the people of the Project region and the coastal Indians into the 1830s, followed by settlement of the area in 1846 and the rush for gold in 1857. The military left its mark on the Tübatulabal during the Civil War, when there was not only a massacre of the men near the confluence of the forks of the Kern, but also when Owens Valley Paiute were marched via the Kern River to Fort Tejon. A number of allotments and land grants were made to Indians in the area which allowed them to begin agricultural pursuits in the 1870s. In addition to those allotments, Tübatulabal worked in ranching, households, and agricultural fields, supplementing their income with pine nuts, rope making, beadwork, and basket sale, among other activities. In the 20th century, many of the surviving families moved to the Tule River Reservation, north of the Project.

<u>History</u>

HRA developed the following historic contexts around the main themes defining land use and development within the Study Area: early exploration, mining, agriculture and ranching, transportation, logging, hydroelectric development, and recreation.

Early Exploration

The first Europeans settled in California during the Spanish Period (1769 to 1821) when 21 missions and four presidios were established between San Diego and Sonoma. Though they were located primarily along the coastline, the missions secured Spanish economic, military, political, and religious control over the Alta California territory. This included the forced conversion of the Native population to Spanish colonial society and Catholicism, which often consisted of subjugating California Natives into servitude to Spanish citizens (Castillo, 1978; Cleland, 1941).

As stated above, the Tübatulabal were first contacted by Francisco Garcés in 1776 during an exploration of the lower Kern River Valley, followed by additional visits by the Tübatulabal to the Spanish during trading expeditions to San Buenaventura mission (Smith, 1978). Expanded exploration followed in the early 19th century, Jedidiah Smith was the first Euro-American man to cross over the Sierras into the region in 1826. Pete Skene Ogden, of the Hudson's Bay Fur Company, was presumably the first to explore the eastern Sierra during an 1829 to 1830 expedition. Captain Joseph Reddeford Walker and Garland Guthary, members of the Bonneville Expedition, charted what was to become Walker's Pass through the Kern Valley from the Mojave Desert while looking for a snow-free pass through the mountains in 1834. They learned the route from Native Americans. Walker returned through the pass in 1843, leading an immigrant wagon train into California that included prominent artist Edward M. Kern, whose namesakes include the Kern Valley, Kern River, and the town of Kernville (Varney, 2001). In 1845, the military surveying expedition of John C. Fremont used the pass.

With the success of the Mexican Revolution in 1821, Mexico received its independence from Spain, but changes to the mission system in today's California were slow to follow. When secularization of the missions occurred in the 1830s, the vast land holdings of the missions in California were divided into large land grants called ranchos. The Mexican government granted ranchos throughout California to Spanish and Hispanic soldiers and settlers (Castillo, 1978). According to Theodoratus (1984:55), 20 land grants were made under Spanish Rule and 500 were made under Mexican Rule.

By the mid-1840s, many American politicians and prominent citizens began plotting the annexation of California to the United States. Soon after Polk's inauguration, Governor Micheltorena of California and his Mexican troops were "deported" from California, which lead to the demise of Mexican Rule and chaos in its governance (Bean and Rawls, 1988:70–71). By 1846, Polk signed a declaration of war with Mexico. After 2 years of skirmishes in the more populated areas such as Los Angeles and Monterey, the Mexican-American War ended with the signing of the Treaty of Guadalupe Hidalgo on February 2, 1848, in which Mexico ceded California. After 2 years and 7 months of American occupation, California became a state on September 9, 1850 (Bean and Rawls, 1988:79, 95).

Mining

The discovery of gold the same year that the Mexican-American War ended initiated the California Gold Rush. Thousands of miners and settlers flocked to California, mainly settling in the north (Castillo, 1978; Cleland, 1941; Theodoratus, 1984:262). Settlement of the Kern Valley lagged behind, but exploration was underway. A few small discoveries in Green Horn Creek and Boulder Gulch (then called Rich Gulch) lured miners to the area. The local rush began in earnest in 1853 when Richard Keys discovered gold in a quartz vein. This led to the development of a nearby settlement named Hogeye, which later became Keyesville. This discovery lead to prospecting, the establishment of other settlements, and the construction of numerous "Chilean" stamp mills along the NFKR (Kelly, 2010:326; Powers, 2003:1–3; Theodoratus, 1984:278).

By 1854, it is reported that approximately 600 miners had passed through Visalia on their way to the "Kern Goldfields" (Kelly, 2010:326). More discoveries lead to the establishment of mining districts to regulate mining. Those located near the Project were the Greenhorn, Keyesville, and Cove. The Greenhorn District included the area along Greenhorn Creek where the first discoveries were made. The Keyesville district was established and included the Keyes Mine, Brother Johnathan, and Mammoth, as well as other placer and load mines located between Black Gulch and the area near Isabella Dam, including the area around Hogeye (Kelly, 2010:348).

Placer mining along the Kern River, in what became known as the Cove Mining District, began in the 1850s. In 1860, Lovely Rodgers found the Big Blue vein and the town of Rogersville was founded, drawing miners to the area through the 1870s and early 1880s. The mains mines in the area were later consolidated into the Big Blue-Sumner group. Operations at the mines were conducted on a large scale again between 1934 and 1943 (Clark, 1998 [1963]:42; Powers, 2003:3).

Rogersville was renamed Quartzburg after the large amounts of quartz that was found during mining. Quartzburg turned into a dry town in late 1861, which put the local saloon keeper, Adam Hamilton, out of business. Hamilton moved his establishment south. There the small town of Whiskey Flat built up around the saloon. In 1864, the residents elected to change the name of the town to Kernville to honor the artist, Edward Kern, one of the more prominent citizens (Powers, 2003:3; Theodoratus, 1984:279; Varney, 2001).

Quartzburg and Kernville continued to be prominent towns throughout the 1870s and early 1880s, until portions of the town of Quartzburg and the Big Blue Mine burned in a fire in 1883. Most of the town and mine were destroyed, and the mine itself fell into financial ruin and was sold at auction. Some attempts to recover gold from the badly collapsed adits at the mine were made by others up until the mid-1900s, when it became clear that additional mining was not financially feasible (Powers, 2003:3–8; Varney, 2001).

During this time, miners in the region were predominantly Euro-American. Those of Chinese descent were only allowed to mine if they were under contract to American mine owners (Kelly, 2010:330). Despite discrimination, a Chinese community formed in Hogeye Gulch, near current Isabella Lake, where there were placer mines (Kelly, 2010:330–331; Powers, 2003:16). Mining led to the establishment of small settlements, but it also led to the development of other industries such as agriculture and ranching, logging, transportation, and hydroelectric generation. Due in part to the pace of settlement and development in the area, Tulare County was established in 1852 and Kern County was established in 1866 (Theodoratus, 1984:280).

Agriculture and Ranching

As mining became less productive, agriculture and ranching grew. In the 1860s, former miners grazed their cattle and sheep in the foothills. Joseph Warren Sumner was one of these settlers. In 1869, Sumner purchased a ranch that included an orchard and dairy. Nearby, a beef ranch was developed by Robert Palmer Junior (Powers, 2003:8). Small farms were also developed and were used to sustain the residents of the area (Theodoratus, 1984:290–292). Some of the settlers were from the east, who mostly came to farm, but some turned to logging too (Theodoratus, 1984:283–286).

Much of the land in the higher elevations become part of the U.S. Forest Reserves in 1893 and later would become lands managed by the Forest Service at the turn of the 20th century (Theodoratus, 1984:293). Sheep grazing became prohibited on U.S. Forest Reserve lands in 1893 due to the destructive nature of this type of grazing. Cattle grazing continued in the higher elevations in the summer and eventually became a rather large enterprise for many by the 1920s (Theodoratus, 1984:296). As the snow melted in the spring, ranchers drove their cattle into the higher elevations via a network of trails and stage roads built for the mines. Given the distance and amount of time it took to travel, most ranchers established camps and brought their families with them for the summer (Theodoratus, 1984:293–294).

By the 1920s, the invention of the automobile and construction of roads greatly reduced travel time and led ranchers to truck their cattle at lease partway into the mountains to graze. Since the cattle returned to the same areas each year, the ranchers and their families began to develop ranches where they could spend their summers together replacing their former temporary summer camps (Theodoratus, 1984:296). Automobiles also spurred the construction of toll roads by private individuals and enhanced other local industries such as logging and recreation.

As agriculture and ranching increased, so did the need for irrigation. As early as 1877, the need for irrigation—and later hydroelectric development—threatened the future of the town of Kernville (Kelly, 2010:345–346). The fight for water rights along the Kern River became contentious and increased when, in the late 1890s, William G. Kerckhoff, obtained water rights on the Kern River and planned construction of a power plant designed by engineer Henry Hawgood (Myers, 1984; Mikesell, 1989). In 1902, Henry E. Huntington, with partners that included Kerckhoff, formed the Pacific Light & Power Company (PL&P) and in desperate need of electrical energy to power Huntington's growing streetcar system in Los Angeles, purchased the Kern River and Los Angeles Electric Power Company (KR&LAEP) stock. See Section 5.1.1, *Project Overview*, for additional details on the hydroelectric development along the Kern River. Eventually (in 1954), Isabella Reservoir was created by the USACE for flood control, irrigation, and as a source of water for Bakersfield (Theodoratus, 1984:330). As a result, in 1950 the town of Kernville was moved to its current location when it was confirmed that the “old” town be flooded by Isabella Reservoir.

Logging

Logging began in the Study Area and vicinity at about the same time as mining because timber was needed as building materials for the mines and settlements. Portable mills were transported to the logging site rather than using teams of oxen to skid the timber to the mill (Theodoratus, 1984:297). This was the most efficient way to cut timber in areas where roads were virtually non-existent and expensive to build. A more permanent mill, Evans Mill, was established at the Big Blue Mine circa 1860. Beginning in the 1850s, roads were constructed between the settlements and mines in the area, which allowed lumber to be hauled by freight wagons pulled by jerk-line teams (eight horses or mules hooked to a wagon; Powers, 2003:13). Between 1850 and 1860, William Lynn and others ran a freight route through the Greenhorn Mountains that linked the Kern River mining area with Visalia and San Francisco. The road was known as the Bull Road because bull oxen were needed to haul freight, including lumber, over the steep grades (Theodoratus, 1984:290).

The Timber and Stone Act of 1878 was invaluable to the logging industry. Those interested in logging had to go to the government office, fill out forms, and file a claim on 160 acres of timber land, allowing large companies to have individual employees file claims for $2.50 per acre (paid by the company; Theodoratus, 1984:298). The mills that sprang up in the area provided jobs for many, which helped increase the size of the settlements. Under the Forest Lieu Selection Act of 1897, speculators that had already cut their timber were allowed to trade their parcels for other pieces of forested land on an acre-for-acre basis. The law was detrimental to the U.S. Government's interests and was repealed in 1904. The land that had reverted to public domain was incorporated into the newly created Sierra Forest Reserve. The reserve was later divided into five units, including the SQF in 1908 (Theodoratus, 1984:268). The land in the Kern area became part of the SQF 1915 (Theodoratus, 1984:320). The first surveys of the public lands were conducted by the General Land Office between 1875 and 1885. During these surveys, they noted stands of trees; however, it was not until the Forest Service was formed that the condition, type, and commercial value of timber on public lands were assessed (ca. 1890–1910; Theodoratus, 1984:271). The construction of additional roads, including toll roads facilitated the continuance and profitability of the industry in the Kern River area, which supplied timber to growing cities in the San Joaquin Valley and to farther away places such as San Francisco from the first part of the 19th century to the present (Theodoratus, 1984).

In part due to the great depression and the need for jobs, a sawmill town north of the Study Area was created in 1935 by a land exchange with the Forest Service. The town was given the name of Johnsondale in 1938 by the Mount Whitney Lumber Company to honor company official, Walter Johnson (Gudde, 1998:158). The only access was by trail and a Forest Service road; therefore, Civilian Conservation Corps workers were brought in to build roads to haul the timber to the mill (Powers, 2003:144–145). Once the mill was in operation, the Mount Whitney Lumber Company cut the timber. The Civilian Conservation Corps also built a new scenic highway and bridge between Kernville and Johnsondale by 1937 (Powers, 2003:145).

Transportation

Transportation is tied to every aspect of the development of the Kern River Valley. A system of trails were traveled by the miners between their settlements and claims in the mid-1800s. Early maps show trails near the ADI starting in the late 1850s (Goddard, 1857; U.S. Surveyor General, 1882a, 1882b, 1882c, 1882d, 1882e). The trails were also used to haul ore and timber as described in previous sections.

The need for travel between settlements along the NFKR to exchange goods such as lumber, supplies, and services was the impetus for construction of some of the first roads in the area. They were constructed by local residents and were expensive to maintain. To offset maintenance costs of these privately constructed roads, many required a toll for their use (Theodoratus, 1984:289). By 1864, a stage route that ran from Visalia through the Greenhorn Mountains to the mines along the NFKR was established (Theodoratus, 1984:279, 290). The 1882 General Land Office surveyor plat map depicts an unnamed road that lead north along the NFKR and a few small homesteads established near it (U.S. Surveyor General, 1882c, 1882d, 1882e).

During this time, agriculture, ranching, and logging were becoming established industries in the lowlands. As described previously, trails and then roads were used to drive cattle and sheep to the higher elevations; by the 1920s, livestock was brought in by truck, and lumber was transported to the valley for shipment by rail to far-off destinations (Theodoratus, 1984:293, 294, 296).

In the mid-1890s, the precursor to State Route 178 was built by Edison Electric Company (name changed to Southern California Edison Company in 1909) to construct the Kern River No. 1 Powerhouse. It was a graded dirt road that started at the mouth of the river canyon and extended northeast to the site of the powerhouse. It was extended to the northeast via a bond that allowed for the grading of an additional 8.4 miles of road that led from the Kern River No. 1 Powerhouse to the town of Democrat. The powerhouse took several years to build and began operating in 1907. By that time, the road was known as Legislative Route 57 or the Walker Pass Route. State Route 178 eventually led through Walker Pass, ending near Ridgecrest by the early 1930s (Connelly, 2007).

The Project was constructed at the turn of the 20th century, which was also an impetus for the construction of roads, including extending what is now known as State Route 178. By 1906, Edison Electric Company obtained permits to build a road from its then proposed KR3 intake down to the forks of the Kern, now Mountain Highway 99/Sierra Way. In 1910, the road was extended north past the intake to SCE's Camp 8. SCE built a network of roads (KR3 Access Road Network) utilized to construct and maintain the KR3 Hydroelectric Project from Camp 8 down to the powerhouse with spurs to access the flowline, as well as a series of trails (Powers, 2003:93–94).

The nearest railroad station to KR3 was at the town of Caliente, 40 miles from construction headquarters for the powerhouse, making the average haul to the area about 50 miles. The road was mostly all up or down hill, the grades ranging up to 16 percent. The construction of the hydroelectric project called for supplies and materials amounting to 35,000 tons. Although SCE considered building a railroad, it was decided that it would be more economical to use motor trucks. SCE assembled a fleet of 95 trucks, including 43 company vehicles with capacity of 1 to 12 tons and 42 privately owned vehicles, to haul freight for KR3 (Mikesell, 1989:8).

The invention of the automobile revolutionized transportation in the area. Not only did it make the exchange of goods and services easier, but it also opened up the area for tourism. Although tourists had been coming to the area for hunting, fishing, and relaxation for quite some time, automobiles made these types of excursions much more enjoyable and allowed for the local resorts and packing/guide businesses to expand in the 1920s (Theodoratus, 1984:296, 307–308). The completion of a new scenic highway from Kernville to Johnsondale, completed in 1932, further aided industry and development of the area (Powers, 2003:145).

Hydroelectric Development

The Gold Rush gradually ended, and residents of the Kern Valley turned most of their efforts to ranching. The population increased in the Kern Valley and vicinity in the early 1900s bringing with it a demand for electricity. In an effort to bring more power to southern California, projects began on major waterways throughout the Central Valley and in the Kern River Valley in the 1890s.

By 1895, the Electric Power Development Company, a subsidiary of the Kern Land Company, began constructing the first hydroelectric plant on the Kern River. It was located at the mouth of Kern River Canyon, approximately 15 miles east of downtown Bakersfield. An 8,500-foot-long redwood flume carried water from upstream to a steel penstock and powerhouse at the mouth of the canyon (Lynch, 2004). A steam powered incline railway was constructed to transport construction materials to the crew on the very steep north side of the Kern River. The plant was completed in 1897, and in 1899 underwent major repairs to the flume to reduce the seepage and cave-ins (Lynch, 2004). The plant was purchased by the San Joaquin Light and Power Corporation in 1910, but was shut down by 1920 to make room for a new plant (Lynch, 2004). The 1920s plant is still operating today and was owned and operated by the Pacific Gas and Electric Company until it was recently sold to Kern and Tule Hydro, LLC, as the Kern Canyon Project FERC Project No. 178.

In 1895, the KR&LAEP, organized by William G. Kerckhoff, obtained water rights on the Kern River and planned construction of a power plant designed by engineer Henry Hawgood (Myers, 1984; Mikesell, 1996). KR&LAEP was unable to finance the project. But beginning in 1897, the KR&LAEP began to undertake just enough work on a canal to retain its water rights (Mikesell, 1996). In 1902, Henry E. Huntington, with partners that included Kerckhoff, formed the PL&P and in desperate need of electrical energy to power Huntington's growing streetcar system in Los Angeles, purchased the KR&LAEP stock. PL&P reconstituted KR&LAEP as a subsidiary named the Kern River Company and pushed construction as rapidly as possible. The plant, which Huntington named “Borel” for associate and San Francisco financier Antoine Borel, was completed in 1904. Kern River Company was absorbed into PL&P in 1908 and ceased to exist as a separate entity. PL&P merged with SCE in 1917.

In 1902, Edison Electric Company Chief Hydraulic Engineer F.C. Finkle surveyed the remote area of Kern River Canyon as a viable option for the construction of another power plant. The Edison Electric Company was founded in 1897 by George H. Barker through a merger with West Side Lighting Company. Two years after the initial survey, Vice President Henry Sinclair chose a suitable location along the Kern River for the new powerhouse. Situated approximately 14 miles upstream from the mouth of Kern River Canyon, the Edison Electric Company began operations at the Kern River No. 1 Powerhouse, a 75 kilovolt (kV) facility (Tinsley Becker et al., 2015).

The Kern River No.1 Powerhouse began service in 1907 and served as the generating facility for the Edison Electric Company’s Kern River to Los Angeles Transmission Line. At the start of operation, the Kern River Hydroelectric Project was identified as the “most permanent and costly hydraulic waterway in the country" (Tinsley Becker et al., 2015). In 1909, the Edison Electric Company was reincorporated as Southern California Edison to reflect its increasing presence through five counties in southern California. SCE merged with PL&P in 1916, gaining operation of the Borel system, as well as the Kern River No. 1 Powerhouse (Tinsley Becker et al., 2015).

The Project also took shape in the late 19th century. The earliest step taken to develop the Project was in 1894. In October of that year, the California Power Company and the Kern River Company filed documents with Kern County to appropriate water for the purpose of generating hydroelectric power. This early work was conducted to meet the Forest Service's permit requirements for active work to begin by September 1, 1913. Fifteen hundred feet of tunnels and 17 miles of usable roads were created during this time (Mikesell, 1989).

In 1900, Henry Sinclair, then president of the Redlands Company, placed a filing for 25,000 miner's inches of the Kern River above Fairview. This location eventually became the headworks for the Project (Powers, 2003:90). The KR3 route was surveyed in 1900, and the California Power Company applied to the Forest Service for a right-of-way in March 1901 (Mikesell, 1989).

Between 1902 and 1917, SCE acquired several independent companies under the direction of John B. Miller. As SCE acquired these new companies, it began a campaign to replace and repair and connect old and inefficient power plants, whether they were steam, coal, or hydroelectric powered (Mikesell, 1989).

In 1902, SCE purchased the California Power Company and subsequently acquired rights to build a hydroelectric plant along the NFKR. F.C. Finkle had already begun the design for such a plant while still with the California Power Company. He came aboard with SCE having already completed the identification and survey of five potential hydroelectric powerhouse sites along the Kern River. Only two of the five powerhouses were eventually built (Mikesell, 1989).

Finckle resigned in 1909 and left the design of KR3 Powerhouse to William A. Brackenridge. Plans for the KR3 Powerhouse were not approved until 1914, and construction did not begin until after World War I. During the peak of construction, the Project employed 2,500 men and required the use of 95 vehicles. A minimum of eight camps were built along the Project to accommodate the workforce, as well as several small satellite camps and construction areas The largest was Headquarters Camp with 40 buildings including cottages, dormitories, a cookhouse, kitchen, dining room, and warehouses. Smaller camps usually contained a few tents, a toilet, and a cookhouse. SCE also set up a hospital in a small area they dubbed Hospital Flat. Here, workers were treated for illnesses and work-related injuries.

Mapping of the Project was completed by 1911, including the potential locations of tunnels, flumes, and construction camps. By 1910, SCE had obtained the water rights, and a rough road had been built to the location of the headworks for the Project (Powers, 2003). A handful of camps and roads were completed by 1911, with construction of the Project already underway.

From the main road several spur roads were constructed up to camp locations near the adits leading to the various tunnels along the conduit line. Numerous roads were also joining the different tunnel portals. Two small road camps were maintained, one on the main river, about the center of the Project, and the other just below the intake at Roads End Camp/Camp 8. Four or five men were employed at each of these camps (Fowler, 1911:28).

Additionally, excavation had begun on Tunnels 24 and 25 at the lower end of the Project by 1911. This preliminary work was extremely arduous and physically demanding for the first workers on site. Conditions within the tunnels were dangerous (Fowler, 1911:30).

More extensive work for the Project began in 1915, following a decision from the SCE president, John B. Miller, in 1914. Construction during this time was limited to tunneling, grading, and creating access roads for the Project, in addition to the establishment of multiple construction camp sites (Mikesell, 1989; Powers, 2003).

Little was completed during the U.S. involvement in World War I, but construction resumed in 1919 and was completed by the spring of 1921. The Project's operating facilities were constructed primarily between 1919 and 1921. Work at the powerhouse site commenced in March 1919. On April 1, 1921, the KR3 Powerhouse turned on its first generator and began supplying power to the Kern Valley. The second generator came online on May 13, 1921 (Mikesell, 1989). The powerhouse was finally completed in 1921. In addition to the powerhouse, the operating facilities contained a dam and intake facility, a settling basin, 13 miles of conduit, two auxiliary dams, a forebay, two penstocks, and three support structures. When the Project was completed, it was revealed that 1.2 million pounds of gunpowder had been used to create the tunnels and 21,410 gallons of gasoline had been used during construction. During peak construction times, the Project averaged 2,500 employees (Mikesell, 1989).

Recreation

By the early 1900s, several hot springs resorts were established in the Kern River Canyon in the foothills south of the Study Area and Isabella Reservoir including Democrat, Hobo (also known as Miracle and Delonegha), and Scovern, located west to east through the canyon. Key to the success of these resorts was easy access via stage lines and logging roads. Guided by packers, they also traveled from the resorts to enjoy camping, hunting, and fishing (Theodoratus, 1984:305).

The formation of the Sierra Club (1892) and the Sierra Forest Reserves (1893) helped to encourage these early recreation activities along the NFKR and vicinity. The Sierra Club explored and mapped the area and in 1901 began organized outings. The Sierra Club established base camps and would take short excursions into the mountains by burro. Women were encouraged to participate in the outings which was fairly progressive for that time (Theodoratus, 1984:319).

SCE's precursor to State Route 178 for the construction of the Kern River No. 1 Powerhouse in the mid-1890s, and subsequent construction of the main access road to the Project (known as Mountain Highway 99/Sierra Way) in the 1910s, as well as other access roads, further opened the area to recreational opportunities. A pack station was established at Roads End in 1922, which was the location of SCE's construction Camp 8 (Powers, 2003:141). In the 1920s, the Forest Service took over many of the SCE construction camps; among them were Camp 3 and Headquarters Camp. The Forest Service removed the buildings and established public campgrounds. At that time, other camps, such as Camp 3 and Camp 8, were leased to individuals. Camp 3 is now a public campground and Camp 8 became Roads End where a pack station and later a resort were developed (Powers, 2003:98–100). The majority of the resort was destroyed by the McNally fire in 2002 (Historical Marker Database, 2015).

Once Highway 178 was completed along with Mountain Highway 99/Sierra Way, the pace of recreation increased. This allowed for the establishment of other Forest Service facilities such as hiking trails, campgrounds, and privately run resorts and pack stations. The eventual construction of Isabella Reservoir in the 1950s led to even more recreational opportunities such as water skiing and boating (Theodoratus, 1984;310). Currently, the lands in the APE, ADI, and Study Area are managed mostly by the SQF, which provides many outdoor recreational opportunities.

The following sections describe previous studies and the archaeological and built-environment resources that have been recorded to date. These resources are a testimony to the precontact, ethnographic, and historic-period development of the area explored in the previous sections.

7.10.3. Study Approach

7.10.3.1. Research Methods

The background research task includes the review of documents pertaining to the Cultural Resources Study Area to facilitate knowledge about past settlement and subsistence practices, past land use, and to capture data from the information sources discussed in the following paragraphs.

A records search was conducted using the ArcGIS Online database, which is maintained by SCE and includes a heritage search of all Forest Service Heritage Programs in Forest Service, Region 5, within the SCE service territory, as well as records searches from the California Historical Resources Information System.

The Forest Service, Region 5, has developed and maintains corporate databases that include information about heritage resources and heritage resource investigations (Natural Resource Manager Heritage Database) and geographic information system data in accordance with Section 112(2) of the NHPA and Forest Service Manual 2360. Region 5 Forests have shared with SCE the Natural Resource Manager geographic information system data that intersect utility facilities (e.g., transmission and distribution facilities, roads) on all National Forest System lands.

In addition to the records search, the following additional data sources were reviewed to guide the field survey:

- Huntington Library, SCE Collection: Records, Documents, and Photos
- NAHC
- SCE, Rosemead Office
- Forest Service, SQF Ranger District

SOI PQS personnel conducted background research using a series of research methods. First, a records search was performed to gain an understanding of the known cultural resources within the ADI and within a 0.5-mile radius surrounding the ADI. Second, a broader regional context of the area was investigated using existing literature. This information was used to guide identification of archaeological resources and site types. Finally, a pedestrian survey was conducted to ground-truth and record the condition of known resources, as well as identify new resources.

7.10.3.2. Previously Conducted Studies

Ninety-three previous cultural resources investigations were identified within the 0.5-mile Study Area. Of these, 53 have been conducted within the ADI. Among them are three studies conducted during the last relicensing. Archaeologists from Cultural Resources Facility (Sutton and Pruett, 1989) conducted an archaeological survey of the KR3 Hydroelectric Facilities and associated transmission lines in 1989 in support of the last relicensing. They located and updated the site records for five previously recorded archaeological sites—KER-260, -405, -406, -479, and -574. Archaeological sites KER-260 and KER-574 were merged and recorded as one archaeological site, KER-574. It was determined not to be within the FERC Project Boundary. Archaeological sites KER-405 and KER-406 were also recorded as one site, KER-405. Twelve previously unrecorded archaeological sites were identified during the survey: TUL-1477/H, KER-2512, -2513, -2517, -2518 -2519, -2520, -2521, -2522, -2524, -2527, and -2528. Eight of the sites located within the 1990 FERC Project Boundary—TUL-1477/H, KER-2512, -2513, -2518, -2519, -2522, -2524, and -2528—were evaluated and determined not eligible for listing in the NRHP. They recommended NRHP evaluation of sites KER-405, -479, -2517, -2520, and -2527, collection of two caches of handstones at site KER-2521 and recordation and photographs of site KER-2528, containing rock art (ENTRIX, 1990).

In November 1990, KER-405, -479, -2517, -2520, 2521, and -2527 were evaluated for their NRHP eligibility. Sites KER-405, -2517, -2520, and -2527 were determined eligible for the NRHP. Collection was accomplished at KER-2521 and determined not eligible, KER-2528 was recorded per recommendations and remains unevaluated (Sutton et al., 1990, 1995:80).

The transmission lines that were in the 1990 APE have since been removed from the FERC Project Boundary and are not a part of the current Project. As a result, only site TUL-1477/H is located within the defined ADI, while site KER-2528 is located within the 0.5-mile Study Area. The rest of the sites discussed in the previous two paragraphs are now located outside the 0.5-mile Study Area.

In 1989, Steven Mikesell evaluated and prepared an NRHP nomination for the Kern River No. 3 Hydroelectric Project Historic District (KR3HD or Historic District) as part of the relicensing effort. The KR3HD was determined eligible. In 2011, Natalie Brodie and Roderic McLean conducted a survey of the KR3 access roads (Brodie and McLean, 2011). They identified 29 archaeological sites and evaluated them for NRHP eligibility, as well as expanded the KR3HD to include archaeological sites associated with the construction of the Project. The KR3HD has been assigned P-54-004634/P-15-013772 (TUL-2887H/KER-7729H [FS 05-13-56-00022]). Sites identified during this effort included trails, roads, waste rockpiles, satellite work areas, and construction camps associated with the construction of the Project, as well as precontact sites.

Eight access roads associated with KR3 were recorded, including Forebay Road, Siphon Road, Adit 20-21 Road, Adit 19-20 Road, Corral Creek Road, Adit 14-15 Road, Salmon Creek Road, and Fairview Flume Road; these were combined into one cultural resource record (P-15-019726/P-54-004653). The roads were determined not individually eligible for the NRHP; however, they were determined eligible as contributing resources to the KR3HD. The rest of the sites recorded by Brodie and McLean (2011) included: P-15-015656, P-54-000865, -000875, -004635 -004636, -004637, -004641, -004642, -004643, -004644, -004645, -004650, -004651, -004652, -004654, -004655, and -004656, - 04658, -004816, -004817, -004818, -004819, -004820, -004821, -004822, and -004823. Archaeological sites characterized as waste rock piles, sparse historic-period debris scatters, and satellite work camps were all determined not eligible for the NRHP on an individual basis or as contributing elements of the KR3HD. Sites characterized as roads, trails, and construction camps for the Project were determined eligible for the NRHP on and individual basis and as contributing elements to the KR3HD (Brodie and McLean, 2012:41–82).

In 2013, Matthew Weintraub prepared Historic American Engineering Records (HAER) for the KR3HD, as well as the sandbox and Fairview Dam (Weintraub, 2013a, 2013b, 2013c). The KR3HD is described further in the section below. Previous studies in the 0.5-mile Study Area are depicted on figures included in the CUL-1 Archaeology Draft TSR, which is filed as Confidential and Privileged in Volume IV of this License Application (**CUI//CEII/PRIV**).

7.10.3.3. Previously Recorded Archaeological Sites

Archival research conducted to date identified 30 precontact, 18 multicomponent (precontact and historic-period), and 31 historic-period archaeological sites previously recorded within the 0.5-mile Study Area. Of these, a total of 29 previously recorded resources were identified within the ADI and included 1 precontact, 11 multicomponent, and 17 historic-period archaeological sites. The diverse types of sites and their NRHP eligibility are listed in the CUL-1 Archaeology Draft TSR, which is filed as Confidential and Privileged as a supplement to this License Application (**CUI//CEII/PRIV**).

The single precontact site is comprised of bedrock milling stations, a sparse lithic scatter, and possible midden deposit. Multicomponent sites include bedrock milling stations, lithic scatters, ground stone, and historic-period debris (e.g., can scatters, domestic debris scatters). Pictographs have also been recorded in the ADI. Historic-period sites include historic-period debris and the remains of buildings or structures. Some of these historic-period sites may be related to Native American reoccupation on their older sites. Twenty-three of the archaeological sites within the ADI have been evaluated for their eligibility for listing in the NRHP. Ten of the evaluated sites have been determined to be individually eligible and contributing elements to the KR3HD. Three of the evaluated sites have been determined not to be individually eligible but are eligible as contributing elements of the KR3HD. Ten of the sites have been determined not eligible on an individual basis or as a contributing element to the KR3HD. The remaining five sites have not been evaluated for their NRHP eligibility.

As detailed in the CUL-1 Archaeology Draft TSR, which is filed as Confidential and Privileged in Volume IV of this License Application (**CUI//CEII/PRIV**), 29 of these sites were mapped within, or partially within the current ADI and were addressed in some way, as detailed in survey results section. Some sites originally mapped within the 0.5-mile Study Area were ultimately recorded within the ADI as a result of the survey, and vice versa.

7.10.3.4. Previously Recorded Built-Environment Resources

Five built-environment resources within the 0.5-mile Study Area have been documented on California DPR forms. Of these, three are located within the ADI: the KR3HD, previously recorded as the “Kern River No. 3 System” but renamed as part of the present study; the KR3 Access Road Network; and the KR3 Powerhouse Complex. The remaining two resources are located within the Study Area but outside the ADI: Camp Erwin Owen and a culvert and check dam. See the CUL-1 Draft TSR provided in Volume IV of this License Application (**CUI//CEII/PRIV**) for details on the built-environment report in support of the Project.

7.10.3.5. Kern River No. 3 Hydroelectric Project Historic District

The Project is a hydroelectric facility consisting of an intake structure, a conduit, and a powerhouse. Each of these components includes several individual structures and is constructed largely of reinforced concrete.

The intake consists of a Fairview Dam, an intake structure, and flumes. The dam is reinforced concrete. Its crest is 240 feet long and is 60 feet high (Weintraub, 2013a:13). The flume leads to the sandbox, a settling basin. The sandbox is 448 feet long by 82 feet wide along most of its length, and 20 feet deep at its center. The sandbox is divided lengthwise into two compartments by a vertical wall and each compartment can operate independently with its own intake gate, fish screen, and outflow gate (Weintraub, 2013a:14).

From the sandbox water enters the conduit, which consists of 13 miles of concrete-lined arched tunnels, covered and open concrete box flumes, and a metal siphon. It contains 24 tunnel sections varying in length from a few hundred feet to great than 7,000 feet. Between tunnels 22 and 23, a V-shaped inverted siphon conveys water over the Cannell Creek chasm (Weintraub, 2013a:14).

The Salmon Creek and Corral Creek Diversion Dams and conduits were added to the system. These dams are concrete and each feed a metal pipeline that conveys water to flume sections of the main conduit (Weintraub, 2013a:14).

The conduit ends at the forebay, which is an open concrete box, approximately 60 feet long, 20 feet wide, and 30 feet high, located above the powerhouse site. It regulates the flow of water from the conduit, either by forwarding it through to the penstocks, which are controlled by 24-inch slide gates, or by releasing it through a spillway. The top of the forebay structure is at approximately 3,509 feet in elevation (Weintraub, 2013a:14). The penstocks are a pair of riveted and lap-welded metal pipes. The penstocks are 2,520 feet long, drop 821 feet in elevation between the forebay and the powerhouse and gradually decrease in diameter as they descend with the last 160 feet of the penstocks travel underground to connect with the powerhouse (Weintraub, 2013a:14).

The powerhouse is a reinforced concrete building designed in the Mediterranean Revival style. It is rectangular in plan, approximately 130 feet long and 88.5 feet wide. The building stands 57.5 feet above grade on the uphill side and extends 40 feet below grade. It has a slightly pitched reinforced concrete slab roof and a low parapet (Weintraub, 2013a:15).

The largest space in the interior of the powerhouse is the generator room, which is 105 feet long, 47 feet wide, and nearly 50 feet tall, containing two generators. The basement level below the generator room contains the turbines mounted in the floor between the basement and the subbasement. The penstocks connect to the turbines by passing underneath the unexcavated portion of the building. Water passes through the turbines and exits the powerhouse at the tailrace, which is a concrete wall, pointed downstream (Weintraub, 2013a:15).

The Project (P-54-004634/P-15-013772 [CA-KER-7729H/CA-TUL-2887H; FS 05-13-56-00022]) was nominated as a historic district for the NRHP in 1989 under Criterion A (commerce) and Criterion C (engineering and architecture) and was determined eligible (Mikesell, 1989). The original historic district includes the major system components: Fairview Dam and intake; the sandbox; the flowline composed of interconnected tunnels, flumes, and a siphon; the forebay; two penstocks; the powerhouse; and two ancillary buildings.

The period of significance begins in 1910, when the earliest construction activities were initiated, and ends in 1930, which is an approximate date that the three areas (also known as themes) of significance apply. There are a number of unique features that make the

Project culturally significant. At the time of its construction, it was the largest hydroelectric plant built by SCE, and it was by far the largest and most expensive project the company had undertaken. It was the first plant to use a reaction turbine as opposed to a power wheel, and the first in the world to use a large reaction turbine with a high head system. The system contains over 13 miles of conduit, the longest conduit system for SCE at the time, and the conduit was housed in the longest hydroelectric-related tunnel in California.

In 2012, the KR3HD boundary was expanded to include historic-period archaeological sites associated with construction/worker camps and a trail and road system that have the potential to provide information. Campsites built to accommodate the workers were not unusual but contribute to the significance because of their effort to create a home-like environment for laborers. As reported in Mikesell (1989), the operating elements of the KR3HD are significant under the following themes: engineering, pioneering high head facility, a distinguished example of type, period, and method of construction of hydroelectric powerplants, and significance in architecture. Directly related to the development of hydroelectric power are the themes of transportation, construction, and labor. Each of these themes is discussed below and establishes a framework within which to evaluate individual elements of the archaeological sites associated with the KR3HD and is taken from the 2012 updated District Nomination (Brodie and McLean, 2012).

<u>Transportation</u>

The early development of roads and transportation significantly contributed to not only the Project, but to the growth of the communities in the Kern River Valley. The roads created to access the Project became major access routes to the Kern River and other recreational opportunities. Local highways are crucial for the ongoing success of the economy and development of the local communities of Kernville and Isabella.

Property Types Associated with Transportation

Roads

The roads associated with the Project represent the network of access to the aboveground segments of the flowline and adits and provide workers a more efficient way to complete repairs and upgrades to the system. Roads include the unpaved alignments providing access to the flowline and vary in width, length, and existing condition. Some of the roads have been previously modified and maintained, and do not necessarily represent the original, as-built access, from 1920. Many of the roads began as mule roads before heavy equipment and vehicles were used to transport materials and people. Many vehicles could not access the places that mules could easily reach, and routes needed to be expanded, altered, and modified to allow for trucks. The alignment of the roads has likely changed over time as access and maintenance became a higher priority after construction was finished. This property type is subject to a case-by-case basis for evaluation, as some roads exhibit evidence of original use from 1911 to 1916 (through identification in historical photographs and maps) while others have clearly been graded or realigned more recently. However, the extant access roads have been in continual use since at least the 1960s and are considered historic-period in age. The roads represent a crucial element to the continued operation of the Project and are generally considered contributing elements to the KR3HD. The roads add to the setting of the Historic District.

Trails

Although there are no formal recreational trails associated with the Project, trails within the KR3 system reflect prior use of the landscape as a means to access all aspects of the system. Historic trail networks are visible on aerial photographs of the area, and link nearly all satellite work areas, camp sites, adits, tunnels, and other system features. The trails are distinct from the roads in that trails are often narrow and traverse more rough terrain than the access roads. The trails represent the pedestrian aspect of the Project and acted as routes of connection between camps and other group areas. An example of a trail is associated with site TUL-2996H, in which the trail extends a significant distance from the north side of the site, following a topographical contour that inevitably leads to the next adit or camp. The actual construction method of the trails is not clear, but it appears that many of the trails began as mule roads following the most efficient path, which generally coincides with a specific topographic contour, leading to each tunnel excavation area or construction camp. Many of the trails currently are wide enough to accommodate pedestrian traffic, and few have excessive vegetation obscuring the surface. As a recurring feature type representing a significant network of connectivity to both the camps and work areas, the trails are considered a contributing element to the Historic District.

<u>Construction and Labor</u>

The construction camps involved in the development of the Project played an inherently crucial role in the efficiency of work toward the completion of the project.

Property Types Associated with Construction and Labor

Construction Camps

Construction camps are the locations in which workers lived during the construction of the hydroelectric system. Camps range in size from small temporary camps to large camps with multiple tents and buildings. Larger camps include those such as the KR3 Headquarters Camp, which included a number of bunkhouses, camp office, commissary, and cookhouse. Smaller temporary camps may contain a single or very few cleared tent pads with associated scattered habitation debris. The housing may be temporary, such as tents or tent cabins, or more permanent, such as concrete or brick foundation buildings. Tent pads possess a defined shape, marked by areas mechanically flattened or cleared of vegetation, and may be defined by stacked rocks or earthen berms. Other specific use areas should be visible, such as kitchen or dining area, privies, and a freshwater supply. Other indicators of camps include significant domestic refuse, such as ceramics, metal cans, glass bottles, and other food containers. There may be evidence of recreation, such as tobacco or alcohol use. Overall, construction camps represent a critical element of the Project, as much of the work could not have been efficiently completed without placing workers near work areas. As such, construction camps are considered a contributing element to the KR3HD.

Satellite Work Areas

Satellite work areas include locations in which work occurred without residential occupation. These work areas contain relatively little evidence of occupation, but may include small, discrete refuse scatters in addition to concrete generator pads, pipelines, small concrete structure pads, or pits or depressions from equipment. The work areas generally lack many distinguishing features or sufficient integrity, and therefore, are not contributing elements of the Historic District.

Waste Rock

The excavation of tunnels for the KR3 system inevitably resulted in vast amounts of waste rock that needed to be moved from within the tunnels in order to construct the concrete-lined flume. Unlike mining sites, the goal of removing the rock was solely extraction rather than processing of ore for a metal commodity. Some of the waste rock removed from the tunnels has been moved from its original locations and used as road base or other forms of stabilization for roads and other features. While this feature clearly represents an activity associated with Project construction, the waste rock, as a whole, does not contribute to the significance of the KR3HD.

Discrete Refuse Scatters. Discrete refuse scatters or dumps are inherent in construction activities. The refuse scatters observed in association with the Project, however, are nearly all directly related to habitation areas, or represent single dumping events. Discrete trash scatters, however, may be located some distance from an established camp or work area, but remain associated with the construction activities of the Project. Some of the refuse scatters have inevitably been disturbed, whether through looting activity, natural erosion, vegetation growth, or road construction. Although these discrete scatters are associated with the Project, they are not considered contributing elements of the District due to lack of integrity of original character and composition.

<u>Summary</u>

As stated above, the Project, constructed primarily between 1919 and 1921, is significant in the areas of commerce (Criterion A), engineering and architecture (Criterion C), and potential for associated archaeological sites (Criterion D). Under commerce, the system made an important contribution to the development of private electric power utilities in southern California and nationwide. Under engineering, it was the highest-head reaction turbine in the world at the time it was constructed; it used the longest hydroelectric system tunnel in California at the time it was constructed; and it included a unique and innovative settling basin. Under architecture, the powerhouse is a fine example of Mediterranean Revival style, and a rare example of a powerhouse designed with architectural beauty and sophistication. Under historic-period archaeology, the system contains sites associated with construction/worker camps and a trail and road system that have the potential to provide information. The period of significance begins in 1910, when the earliest construction activities were initiated, and ends in 1930, which is an approximate date that the three areas of significance no longer apply.

7.10.3.6. Palegewan Heartland District

The PHD (P-15-020634 [CA-KER-11222]) and its 76 contributing elements have been determined eligible for listing in the NRHP, and some of the contributing elements have been determined individually eligible. The SHPO concurred with this determination in a letter dated March 5, 2024 (Polanco, 2024; SHPO Reference No. FERC_2023_0920_001).

The PHD originally consisted of 76 recognized ancestral sites of the Tübatulabal people, known as properties of traditional cultural and religious importance. These sites encompass the overall land and waterscape of the district, with 26 of them also verified through archaeological documentation (Ruth and Lloyd, 2023). Within this diverse yet cohesive land and waterscape, there exists a wide range of natural and cultural resources that have historical and functional interconnections. Many culturally significant locations are situated on both sides of the NFKR, stretching from Miracle Hot Springs north to Wofford Heights. The district extends west into the Greenhorn Mountains from Wofford Heights. Following Tübatulabal cultural practices of movement and return to places of intense dwelling and homecoming, all identified contributing elements form interconnected networking parts, creating a spatial whole. Additionally, the district encompasses the previously acknowledged historic property of traditional cultural significance—the 1863 Keysville Massacre Site (P-15-000410/000411).

The 2024 study by Tiley and Ruth on the adjacent Borel License Surrender Project is of particular relevance because of its relationship with the PHD, which is within the Tribal Resources 5-mile Study Area. Their description is provided below:

> The numerous resources and elements that contribute to the [Palegewan Heartland] District's historical functions and significance, also help comprise the extent of its boundaries. These include the mountain, canyon, and river features of *kuyuluy pann* (Kern [River] Canyon) and *palage wan* (North Fork Kern River) and extends from the District's southern end at *lela mup* (Miracle Hot Springs), through the Kern River Canyon to its northern end at *haxlamup* near Kernville along the North Fork of the Kern River, Kern County, California. Above *yaha waban*—the confluence of the North and South Forks of the Kern River—from Wofford Heights, the District extends west into the Greenhorn Mountains along *hamboyan* (Cane Creek) and *pasiwat* (Tillie Creek). The historically and functionally interconnected natural and cultural resources of the District serve as contributing elements that help produce and sustain the integrity of association to the Tübatulabal traditional cultural land/waterscape for present and future generations of Tübatulabal [Tiley and Ruth, 2024:i].

The suite of culturally important and interconnected places help produce and sustain integrity of location, setting, feeling, and association. These Tübatulabal ancestral places that continue to convey significance include known villages, a geographical area ethnohistorically recorded as a possible camp site, petroglyph/pictograph features, fishing locations, a gathering area, milling sites, an ancestral navigation and trail complex segment that was also historically used as a road to Keyesville, and the Keyesville Fort. The District also includes the site of the 1863 Keyesville Massacre (previously designated as a Traditional Cultural Property [TCP] named "the 1863 Massacre TCP"), an event that caused the loss of life not only for local Tübatulabal, but also neighboring Kawaiisu, Yokuts, and Owens Valley Paiute people and abandonment of much of the Palegewan heartland. The 1863 Massacre TCP corresponds to the NRHP property type "historic district" with TCP significance, rendering it a functional "component landscape" of the larger District.

As a result of the TRI-1 Draft TSR and collaboration with CUL-1 Archaeology Draft TSR, the PHD now includes 91 specific locations plus the land-waterscape of the District itself, of which 41 locations are located within the Tribal Resources 5-mile Study Area; of those, 15 are located within the APE, while only 8 are within the ADI. The District's contributing elements located within the APE consist of ethnographic places including villages, fishing locations, and geographic features along with archaeological and rock art resources.

<u>Summary</u>

Each of these 91 places contribute to the significance of the PHD under Criteria A and D. Additionally, one place is also eligible as a standalone site with TCP significance under Criteria A, B, C, and D; two places are individually eligible under Criterion C; and one place is recommended eligible individually under Criterion D (Lloyd et al., 2024) for additional information on standalone eligibility recommendations for archaeological components). It is important to clarify that many Tübatulabal properties of traditional religious and cultural importance (36 CFR § 800.16(l)(1)), including the NFKR, have multiple lines and attributes of interconnected function and significance to and for Tübatulabal people. The District was determined eligible for the NRHP under Criteria A, B, C, and D with contributing elements also eligible under Criteria A, C, and D. Considerations and its significance extends well over 50 years, from time immemorial.

7.10.3.7. Background Research

In addition to the records search, the following additional data sources were reviewed to guide the field survey:

- California Historical Landmarks;
- California Register of Historical Resources;
- General Land Office plats and land patents;
- USGS topographic quadrangles;

- NRHP listings;
- Office of Historic Preservation Historic Properties Directory;
- SCE engineering drawings and historical records;
- Huntington Library Southern California Edison Online Archives; and
- Aerial photographs.

Review of General Land Office plats and patents confirm some of the themes listed above provide an overview of past land use in the area. Reviewing one of the earliest maps of the Sierra Nevada geography by George H. Goddard drafted in 1857, the headwaters of the San Joaquin River in the mountains is named, along with some of the main rivers such as the Kaweah or Pipyuma River and the Kern or Porsiuncula River. Goddard's map does not, however, depict the giant south-trending canyon of the Kern River in the heart of the southern Sierra.

The first USGS topographic map of the region dates to 1906. It depicts a prominent road traveling north along the west side of Kern River near the southern part of the ADI, crossing the river near Cannell Creek and continuing north along the east bank for about 3 miles at which point it turns into a trail. Two miles north of this point, the trail splits (about 0.3 mile south of Gold Ledge Creek), with the western branch continuing north along the river while the eastern branch climbs northeast, outside the ADI, toward Salmon Falls. Aside from four buildings depicted on the west bank of the river on what today is known as Burlando Road, no other structures are mapped. Named drainages include Cannell Creek, located along the Kern/Tulare County boundary, and Salmon Creek in Tulare County. Other named places include Brin Canyon and Packsaddle Canyon, both located on the eastern slopes at the northern extent of the ADI.

While there were a series of revisions to the 1906 topographic maps into the 1920s, USGS did not survey the area again until the mid-1950s, after significant changes had been made along the Kern River corridor. The most prominent change is that features of the Project are depicted on the 1956 15-minute Kernville quadrangle, including the KR3 Powerhouse and associated buildings, penstocks, aqueduct, siphon, several flumes, and the associated roads used for maintenance. Almost as significant are the series of campgrounds and "4WD" roads noted in the canyon, which speak to increased recreation of the area. New communities along this section of river include Fairview near the northern end (consisting of 12 buildings) and Riverkern (consisting of 28 buildings) near the southern end of the ADI. A few "Prospect" notations highlight mining activity in the area, including near site P-54-000865 and on the east side of dirt road between Campground No. 3 and Headquarters Campground. A quarry or open pit mine is identified adjacent to site P-54-004823. Dirt roads opposite of Gold Ledge Campground lead to three no longer extant buildings, all of which would have been located within the western part of site P-54-000868. These new developments along the Kern River Canyon were confirmed in reviewing aerial imagery from 1955.

7.10.3.8. Potential Archaeological Site Types

Based on the cultural context of the Study Area and the types of archaeological sites previously documented, the ADI is most likely to contain historic-period sites related to the initial development and maintenance of the Project facilities. Small historic-period sites related to recreation in the area that post-date the initial development of the Project may be present. Such sites would be expected to include discrete debris scatters and isolated artifacts associated with the Project access road alignment.

Precontact sites are not expected to be as numerous as historic-period sites. However, there are many precontact lithic scatters and precontact bedrock mortar features, often found in association, in the ADI and its vicinity. Precontact artifacts and features are also found at multicomponent sites that also contain historic-period cultural material related to the development of the Project facilities. Additional lithic scatters and/or bedrock mortar features are likely to occur as individual precontact sites or in combination with historic-period artifacts and features within the Project.

7.10.3.9. Survey and Documentation Methods

The archaeological and built-environment inventory was performed by HRA and FW to current professional standards, as defined in the SOI PQS for Archaeology and Historic Preservation.

<u>Survey Methods</u>

The archaeological and built-environment inventory was performed to current professional standards, as defined in the SOI Standards and Guidelines for Archaeology and Historic Preservation. Archaeological survey occurring on SQF lands was conducted under Organic Act permit number FS037. Fieldwork was coordinated with SCE personnel including daily calls to the SCE Operations staff to alert them to planned locations for the day.

FW and HRA survey crews worked as a team to conduct pedestrian survey across the entire ADI. FW was primarily responsible for recording precontact sites and site components, while HRA focused its efforts on recording historic-period archaeological sites and components.

Most of the field investigations were conducted between March 15 and May 4, 2022, with follow-up fieldwork taking place between August 23 and 25, 2022 (19 field days total, broken into two 10-day sessions and one 3-day session). The primary purpose of the supplemental fieldwork in August was to conduct geoarchaeological studies at specific sites that contain precontact components to assess the potential for buried archaeological deposits. Additional information was also collected on lithic scatters and bedrock milling features during this time.

During surveys, archaeologists walked parallel transects spaced at no more than 15-meter (49.2-foot) intervals, as vegetation and terrain allowed. Representative photographs were taken throughout the Study Area, and GPS data was collected to record the progress of the survey each day. Estimates of surface visibility, vegetation communities, and other physical attributes of the areas were also noted on the survey maps. Areas within the ADI that could not be accessed in a safe manner (e.g., with dense vegetation, slopes over 30 percent) were not included in the survey; these areas are identified on the results maps in the CUL-1 Archaeology Draft TSR, which is filed as Confidential and Privileged in Volume IV of this License Application (**CUI//CEII/PRIV**).

Recordation Methods-Archaeology

All previously recorded sites within or adjacent to the ADI were revisited, in some cases if only to verify that they were indeed beyond the ADI. Examination of these sites began outside the designated site boundary, walking meandering transects spaced no more than 15 meters apart and flagging any artifacts and features observed. If artifacts were observed beyond the previously mapped site boundary, crews continued their transects until they no longer observed cultural materials on the surface or artifact densities dropped significantly. Existing site maps were used to verify archaeological features, which were then photographed and mapped via GPS along with temporally diagnostic artifacts. Sketch maps were assessed to determine whether they needed to be updated to reflect current site conditions or more modern recording methods (GPS).

Newly identified archaeological resources were defined as 10 or more artifacts in a 10-x-10-meter area. If deposits included mixed artifact classes (i.e., flaked and ground stone artifacts, midden, brownware pottery, and/or historic-period items), the 10-item requirement was abandoned, and the resource recorded as a site. Site perimeters are delineated by a 20-meter break in surface artifacts. All isolated features (rock rings, bedrock milling features, and rock alignments) were recorded as sites regardless of associated artifacts. New sites were fully documented following the recordation procedures outlined in Instructions for Recording Historical Resources (Office of Historic Preservation, 1995), using the appropriate DPR forms. The recordation of new sites included documentation, photographs, and GPS of all features, formed artifacts, and site boundaries. Additional artifacts, such as fragmentary glass or debitage, were roughly quantified and a representative sample assessed for additional information (e.g., glass color, flake type). Any site disturbances were noted and photographed as appropriate. Per SQF, isolates were recorded on DPR 523 Primary forms accompanied by a Location Map.

All artifacts identified during the field survey, whether within previously recorded archaeological sites or newly identified sites, were left in place. No artifacts were collected during the inventory. Photographs were taken of all diagnostic lithic artifacts and a sample of temporally diagnostic historic-period artifacts identified at each site. These photographs are included in the updated DPR forms. All DPR forms are located in the CUL-1 Archaeology Draft TSR, which is filed as Confidential and Privileged in Volume IV of this License Application (**CUI//CEII/PRIV**).

Recordation Methods—Built Environment Kern River No. 3 Hydroelectric Project Historic District

In Section 7 of the NRHP nomination of the KR3HD, Mikesell (1989) identified 15 contributing and nine noncontributing resources to the KR3HD. Mikesell grouped 24 tunnels into one resource (tunnels) and three flumes into another (flumes) as part of this listing. However, in the total resource count in Section 3 of the nomination, he lists 40 contributing resources, identifying each of the tunnels and flumes as individual resources. Due to this discrepancy and other observations during the 2022 field season, HRA regrouped the resources based on their function within the Project and identified 17 resources within the KR3HD, including 3 multicomponent complexes, 3 buildings, and 11 structures.

In consultation with SCE, HRA updated the KR3HD documentation using the following protocols:

- For resources built within the KR3HD period of significance (1910–1930) and determined to be contributing resources to the KR3HD in 1989, HRA provided an updated physical description, described known alterations since 1989, assessed the current condition of the resource, and made eligibility recommendations based on current conditions. All resources in this category received updated DPR forms as appropriate.

- For resources built within the KR3HD period of significance (1910–1930) and determined to be noncontributing resources in 1989, HRA provided an updated physical description, described known alterations since 1989, assessed the current condition of the resource, and made eligibility recommendations based on current conditions. Resources in this category received new or updated DPR forms as appropriate.

- For resources built between 1930 (the end of the KR3HD period of significance) and 1982 that were either determined to be noncontributing resources to the KR3HD in 1989 or previously unevaluated, HRA provided an updated physical description, described known alterations since 1989, assessed the current condition of the resource, and made eligibility recommendations based on current conditions. Resources in this category received new or updated DPR forms as appropriate.

- Resources built after the historic-period (1982 or later) are listed in the survey population table and noted on the KR3HD maps but were not documented in DPR forms.

All DPR forms are located in the CUL-1 Built Environment Draft TSR, which is filed as Confidential and Privileged in Volume IV of this License Application (**CUI//CEII/PRIV**).

7.10.4. Survey Results

Ground-surface visibility in the ADI was variable, ranging from 40 percent in riparian areas to nearly 100 percent visibility on exposed slopes and outcrops. In total, the FERC Project Boundary covers an area of approximately 234 acres, of which the archaeological crew surveyed approximately 174 acres. The remaining 60 acres were excluded for safety, due to slope or impenetrable vegetation or Project features belowground. Maps depicting the areas surveyed are located in the CUL-1 Archaeology and Built Environment Draft TSRs, which are filed as Confidential and Privileged in Volume IV of this License Application (**CUI//CEII/PRIV**).

7.10.4.1. Archaeological Resources

The survey documented 34 archaeological sites. Five of the sites were newly documented, while the remaining 29 were previously recorded. One of the newly documented and three of the previously documented sites contained built-environment elements related to the Project.

The sites within the ADI consist of 1 precontact, 9 multicomponent, and 24 historic-period sites. The precontact site consists of bedrock milling features and an associated lithic scatter, while the precontact components of multicomponent sites include lithic artifacts, bedrock milling features, and rock art panels. A combined 28 historic-period sites and historic-period components of multicomponent sites contain artifacts and features that are related to the development and use of the Project facilities. Five historic-period sites, including a farmstead, are also present and appear to be unrelated to the development, maintenance, or use of the Project. In addition, the TRI-1 Study and CUL-1 Study collaborated to identify and evaluate eight archaeological sites as contributing elements or containing elements that contribute to the NRHP-eligible Palegewan Heart Land District. Table 7.10-1 summarizes the archaeological sites recorded or revisited in 2022. See Section 7.11, *Tribal Resources*, for additional information on the PHD. All except a portion of one of the sites are located on National Forest System lands within the SQF.

Four historic-period isolates were also identified within the ADI during the 2022 inventory. These isolates are depicted in the CUL-1 Archaeology Draft TSR, which is filed as Confidential and Privileged in Volume IV of this License Application (**CUI//CEII/PRIV**). All the isolates are located on National Forest System lands within the SQF.

Table 7.10-1. Archaeological Sites within the Area of Direct Impact

Primary No. (P-)	Trinomial (CA-)	Forest Service No. (FS 05-) or Temporary No.	Age	Summary Description/ Association	Land Manager
15-015656	KER-8639H	13-54-00841	H	Hydroelectric construction	Forest Service
15-018562	KER-10157	—	P	Precontact	Forest Service
15-019726 / 54-004653	—	13-54-00729	H/BE	KR3 access road network	Forest Service

Primary No. (P-)	Trinomial (CA-)	Forest Service No. (FS 05-) or Temporary No.	Age	Summary Description/ Association	Land Manager
54-000865	TUL-865/H	13-56-00236	M	Precontact; hydroelectric construction	Forest Service
54-000868	TUL-868/H	13-56-00067; 13-56-00239	M	Precontact; historic-period farmstead	Forest Service
54-000875 (54-000876, 54-002213)	TUL-875/H (TUL-876/H, TUL-2127H)	13-56-00228, 13-56-00227, 13-56-00525	M	Precontact; hydroelectric construction	Forest Service
54-001477/ 54-004641	TUL-1477/H/ TUL-2894/H	13-54-00713	M	Precontact; historic-period artifact scatter	Forest Service
54-004635	TUL-2888H	13-54-00717	H	Historic-period artifact scatter	Forest Service
54-004636/ 54-005414	TUL-2889H, TUL-3164/H	13-54-00708	M	Precontact; hydroelectric construction	Forest Service
54-004637	TUL-2890/H	13-54-00709, 13-54-00855	M	Precontact; hydroelectric construction	Forest Service
54-004642	TUL-2895H	13-54-00714	H	Historic-period artifact scatter	Forest Service
54-004643	TUL-2896H	13-54-00715	H	Hydroelectric construction	Forest Service
54-004644/ 54-004645	TUL-2897H/ TUL-2898H	13-54-00718, 13-54-00716	H	Hydroelectric construction	Forest Service
54-004650	—	13-54-00723	H	Mining adit and waste rock pile	Forest Service
54-004652	—	13-54-00725	H	Waste rock pile and metal bucket	Forest Service
54-004654	TUL-2902H	13-54-00727	H	Hydroelectric construction	Forest Service
54-004655	—	13-54-00728	H	Hydroelectric construction	Forest Service
54-004656	—	—	H	Boulders with drill holes	Forest Service
54-004658	TUL-2996H	13-54-00856	H	Hydroelectric construction	Forest Service
54-004818	TUL-2992H	13-54-00867	H	Hydroelectric construction	Forest Service
54-004819 (54-004646, 54-004647, 54-004648)	TUL-2993/H (TUL-2899H, -2900/H, -2901H)	13-54-00719, 13-54-00720, 13-54-00721, 13-54-00722	M	Precontact; hydroelectric construction	Forest Service
54-004820	TUL-2994H	13-54-00865	H	Hydroelectric construction	Forest Service
54-004821	TUL-2995H	13-54-00856	H	Hydroelectric construction	Forest Service
54-004822	TUL-2997H	13-54-00858	H	Hydroelectric construction	Forest Service

Primary No. (P-)	Trinomial (CA-)	Forest Service No. (FS 05-) or Temporary No.	Age	Summary Description/ Association	Land Manager
54-004823 (54-004639, 54-004639, 54-004640, 54-004663)	TUL-2998/H (TUL-2891H, TUL-2892/H, TUL-2893/H)	13-54-00710, 13-54-00711, 13-54-00712	M	Precontact; hydroelectric construction	Forest Service
—	—	KR3-DJ-S-01	H	Hydroelectric construction	Forest Service
—	—	KR3-DJ-S-02	H	Hydroelectric construction	Forest Service
—	—	KR3-DJ-S-03	H	Hydroelectric construction	Forest Service
—	—	KR3-LW-14, CWA002-S-1210	H/BE	Highway, culverts, berms, artifact scatter	Forest Service
—	—	KR3-RA-S-01	H/BE	Corral Creek Dam	Forest Service
—	—	KR3-RA-S-02	H	Boulders with name and date markings	Forest Service
—	—	SWCA-TD1453458-S-001	M/BE	KR3 Powerhouse Complex	Forest Service/ SCE
—	—	SWCA-TD1562618-S-001	H	Historic-era artifact scatter	Forest Service
—	—	SWCA-TD1630677-S-001	H	North Fork Kern River Trail	Forest Service

BE = built-environment elements; H = historic-period; KR3 = Kern River No. 3; M = multicomponent; P = precontact; SCE = Southern California Edison

<u>Multicomponent and Historic-Period Sites: Hydroelectric Development</u>

The Project was constructed in the early 20th century, beginning in 1911 and continuing through to 1921. The majority of the construction work was done between 1915 and 1921, with the exception of 1917 and 1918, when the U.S. was involved in World War I (Mikesell, 1989). The major elements of the Project include the Fairview Dam, sandbox, approximately 13 miles of tunnel and flumes including the Cannell Creek Siphon and Spillway, forebay, Penstocks Nos. 1 and 2, KR3 Powerhouse, and the KR3 Powerhouse Complex. Other elements include the Kern River 3-Vestal 66 kV Transmission Line, the KR3 Road Complex, and Mountain Highway 99/Sierra Way. These elements are all part of the KR3HD (Waldroop, 2023). The KR3HD's period of significance spans from 1910 to 1930 (Brodie and McLean, 2012).

All 29 previously recorded archaeological sites with historic-period components and all five of the newly documented archaeological sites in the ADI are within the KR3HD. Of these sites, 28 have a clear or potential association with the KR3HD. The sites include various work areas associated with the development of Project facilities containing remnant machinery foundations, waste rock piles and other construction-related elements (P-15-015656, P-54-004652, -004656, -004658, -004818, -004820, -004821, -004822, KR3-DJ-S-1, KR3-DJ-S-2, and KR3-DJ-S-3); remnants of construction camps (P-54-000865, -000875, -004636/005414, -004637, -004643, -004644/004645, -004655, -004656, -004819, and -004823); roads and road remnants (P-54-004653, KR3-LW-14/CWA002-S-1210); the archaeological component of a powerhouse complex (SWCA-TD1453458-S-001); trail remnants (SWCA-TD1630677-S-001); boulders with name and date markings (KR3-RA-S-2); discarded elements of an existing KR3 facility (KR3-RA-S-1); and one discrete refuse scatter (P-54-004635). Many of these sites are contributing elements to the KR3HD for their potential to contribute significant information to the KR3HD themes of construction and labor and transportation. They are all included in the same site type (Hydroelectric Development) here because several sites contain elements of both of these major themes. Seven of the sites contain components associated with a precontact occupation (Table 7.10-2).

Table 7.10-2. Archaeological Sites with Components Associated with Hydroelectric Development

Primary No. (P-)	Trinomial (CA-)	Forest Service No. (FS 05-) or Temp. No.	Age	Condition	Previous NRHP	Current NRHP Recommendations
15-015656	KER-8639H	13-54-00841	H	Fair	CE to KR3HD; not individually eligible	Concurs with previous findings
15-019726/ 54-004653	N/A	13-54-00729	H/BE	Fair	CE to KR3HD; not individually eligible	Concurs with previous findings and expands road network with additional identified segments
54-000865	TUL-865/H	13-56-00236	M	Fair	CE to KR3HD H – individually eligible P – unevaluated	H – concurs with previous findings P – CE to PHD, individually unevaluated
54-000875 (54-000876, 54-002213)	TUL-875/H (TUL-876/H, TUL-2127H)	13-56-00228, 13-56-00227, 13-56-00525	M	Good	CE to KR3HD H – individually eligible P – unevaluated	H – concurs with previous findings P – CE to PHD, individually unevaluated
54-004635	TUL-2888H	13-54-00717	H	Fair	Non-CE to KR3HD; not individually eligible	Concurs with previous findings

Primary No. (P-)	Trinomial (CA-)	Forest Service No. (FS 05-) or Temp. No.	Age	Condition	Previous NRHP	Current NRHP Recommendations
54-004636/ 54-005414	TUL-2889H, TUL-3164/H	13-54-00708	M	Fair	54-004636: CE to KR3HD H – individually eligible 54-05414: unevaluated	Sites merged in 2022; H – concurs with previous findings and expands to P-54-005414 P – CE to PHD; individually unevaluated
54-004637	TUL-2890/H	13-54-00709, 13-54-00855	M	Fair	CE to KR3HD H – individually eligible; P – individually eligible under Criteria C and D	Concurs with previous findings P – CE to PHD
54-004643	TUL-2896H	13-54-00715	H	Fair	CE to KR3HD; not individually eligible	Concurs with previous findings
54-004644/ 54-004645	TUL-2897H/ TUL-2898H	13-54-00718, 13-54-00716	H	Fair	CE to KR3HD (both); 54-004644 (only): individually eligible	Site combined in 2020; retain as CE to KR3HD and individually eligible
54-004652	N/A	13-54-00725	H	Good	Non-CE to KR3HD; not individually eligible	Concurs with previous findings
54-004654	TUL-2902H	13-54-00727	H	Good	Non-CE to KR3HD; not individually eligible	Concurs with previous findings
54-004655	N/A	13-54-00728	H	Fair	Non-CE to KR3HD; not individually eligible	Concurs with previous findings
54-004656	N/A	—	H	Fair	Non-CE to KR3HD; Not individually eligible	Concurs with previous findings
54-004658	TUL-2996H	13-54-00856	H	Fair	CE to KR3HD; not individually eligible	Concurs with previous findings
54-004818	TUL-2992H	13-54-00867	H	Fair	CE to KR3HD; not individually eligible	Concurs with previous findings

Primary No. (P-)	Trinomial (CA-)	Forest Service No. (FS 05-) or Temp. No.	Age	Condition	Previous NRHP	Current NRHP Recommendations
54-004819 (54-004646, 54-004647, 54-004648)	TUL-2993/H (TUL-2899H, -2900/H, -2901H)	13-54-00719, 13-54-00720, 13-54-00721, 13-54-00722	M	Fair	CE to KR3HD H – individually eligible P – individually eligible under Criteria C and D	Concurs with previous findings P – CE to PHD
54-004820	TUL-2994H	13-54-00865	H	Fair	Non-CE to KR3HD; not individually eligible	Concurs with previous findings
54-004821	TUL-2995H	13-54-00856	H	Fair	Non-CE to KR3HD; not individually eligible	Concurs with previous findings
54-004822	TUL-2997H	13-54-00858	H	Fair	Non-CE to KR3HD; not individually eligible	Concurs with previous findings
54-004823 (54-004639, 54-004639, 54-004640, 54-004663)	TUL-2998/H (TUL-2891H, TUL-2892/H, TUL-2893/H)	13-54-00710, 13-54-00711, 13-54-00712	M	Poor	CE to KR3HD H – individually eligible P – unevaluated	H – concurs with previous findings P –non-CE to the PHD, unevaluated
—	—	KR3-LW-14/ CWA002-S-1210	H/BE	Fair	—	H – non-CE to KR3HD BE – CE to KR3HD H/BE – not individually eligible
—	—	SWCA-TD1453458-S-001	M/BE	Fair	—	H/BE – CE to KR3HD H– individually eligible P – not eligible
—	—	SWCA-TD1630677-S-001	H	Fair	—	CE to KR3HD, not individually eligible
—	—	KR3-DJ-S-01	H	—	—	Non-CE to KR3HD, not individually eligible
—	—	KR3-DJ-S-02	H	—	—	Non-CE to KR3HD, not individually eligible
—	—	KR3-DJ-S-03	H	—	—	Non-CE to KR3HD, not individually eligible

Primary No. (P-)	Trinomial (CA-)	Forest Service No. (FS 05-) or Temp. No.	Age	Condition	Previous NRHP	Current NRHP Recommendations
—	—	KR3-RA-S-01	H/BE		—	H/BE – non-CE to KR3HD H/BE – not individually eligible
—	—	KR3-RA-S-02	H	—	—	Non-CE to KR3HD, not individually eligible

BE = built-environment elements; CE = contributing element; H = historic-period; KR3HD = Kern River No. 3 Hydroelectric Project Historic District; M = multicomponent; N/A = data not available; NRHP = National Record of Historic Places; P = precontact; PHD = Palegewan Heartland District

Archaeological Sites: Non-Hydroelectric Development

One multicomponent site is associated with agriculture and mining, P-54-000868. This site is at the location of an abandoned corral and contains features and artifacts consistent with use as a farmstead. The site also contains a mining element (adit and waste rock pile) that may be contemporaneous with its overall use for agricultural purposes (likely livestock grazing). One site (P-54-004650) within the ADI is classified as the historic portion associated with mining. It is the one site that appears to be solely related to mining activity, which was prevalent in the region historically. One multicomponent and two historic-period sites consist of historic-period artifact scatters that date to periods after facilities within the KR3HD had been constructed and therefore have no clear association with work activities conducted or construction camps used during that period. These refuse scatters are also ephemeral and lack clear associations with the various other uses of the area, such as recreation, agriculture, or the O&M activities within the KR3HD. Of these sites two contain precontact components (P-54-000868 and -004650) and one (P-15-018562) only contains precontact elements (Table 7.10-3).

Table 7.10-3. Archaeological Sites With No Components Associated With Hydroelectric Development

Primary No. (P-)	Trinomial (CA-)	Forest Service No. (FS 05-)	Age	Condition	Previous NRHP	Current NRHP Recommendations
15-018562	KER-10157	—	P	Fair	—	CE to the PHD, individually unevaluated
54-000868	TUL-868/H	13-56-00067, 13-56-00239	M	Fair	—	H -Non-CE to KR3HD, not individually eligible; P – CE to the PHD, individually unevaluated
54-004650	N/A	13-54-00723	H	Fair	—	Non-CE to KR3HD, not individually eligible
54-001477/ 54-004641	TUL-1477/H/ TUL-2894/H	13-54-00713	M	Fair to Poor	—	Non-CE to KR3HD; H – not individually eligible P – CE to the PHD, individually unevaluated
54-004642	TUL-2895H	13-54-00714	H	Fair	Non-CE to KR3HD, not individually eligible	Concurs with previous findings
—	—	SWCA-TD1562618-S-001	H	Fair	—	Non-CE to KR3HD, not individually eligible

CE = contributing element; H = historic-period; KR3HD = Kern River No. 3 Hydroelectric Project Historic District; M = multicomponent; N/A = data not available; NRHP = National Record of Historic Places; P = precontact; PHD = Palegewan Heartland District

7.10.4.2. Built-Environment Resources

The study documented 18 historic-period built-environment resources associated with the Project. Of these, one is the KR3HD and the remaining 17 resources are located within or cross the Historic District. One of these resources, Mountain Highway 99/Sierra Way, is also associated with the theme of transportation. Concurrently another study documented and evaluated the Kern River Fish Hatchery (Offermann et al., 2024). No other built-environment resources are located within the ADI. Collectively, these resources comprise the survey population (Table 7.10-4).

HRA outlined previously established evaluation criteria and added new evaluations (when appropriate); revised district forms (as necessary); updated or created DPR forms for contributing and/or noncontributing resources within the ADI only, although full current descriptions of historic-period resources are included in the report; and provided recommendations related to potential Project effects on the historic properties.

Table 7.10-4. Built-Environment Resources

Primary Number/ (Trinomial)	Forest Service Number	Temporary Number	Historic Name/Current Name	Associated Facility	Date(s) of Construction	Previous NRHP Eligibility	In ADI?	Current NRHP Recommendations
P-15-013772/ P-54-004634 (CA-KER-7729H/CA-TUL-2887H)	05-13-56-00022	—	KR3HD; HAER No. CA-2309	KR3HD	1910–1930	Eligible Historic District	Yes	Eligible Historic District
—	—	KR3-LW-01	Fairview Dam; HAER (accepted by FERC and SHPO, not submitted to NPS)	KR3HD	1921	CE to KR3HD	Yes	CE to KR3HD
—	—	KR3-LW-02	Intake	KR3HD	1921	CE to KR3HD	Yes	CE to KR3HD
—	—	KR3-LW-03	Intake Flume	KR3HD	1921	CE to KR3HD	Yes	CE to KR3HD
—	—	KR3-LW-04	Sandbox; HAER No. CA-2309-A	KR3HD	1918–1919	CE to KR3HD	Yes	CE to KR3HD
—	—	KR3-LW-05	Building 128	KR3HD	1921	CE to KR3HD	Yes	CE to KR3HD
—	—	KR3-LW-06	Flowline	KR3HD	1919–1921	CE to KR3HD	Yes	CE to KR3HD
—	—	KR3-LW-07	Salmon Creek Dam	KR3HD	mid-1920s; mid-1930s	Non-CE to KR3HD	Yes	Non-CE to KR3HD
—	—	KR3-RA-S-01	Corral Creek Dam	KR3HD	1933; 1945–1960	Non-CE to KR3HD	Yes	Non-CE to KR3HD
—	—	KR3-LW-08	Cannell Creek Siphon and Spillway	KR3HD	1919–1921	CE to KR3HD	Yes	CE to KR3HD
—	—	KR3-LW-09	Forebay	KR3HD	1919–1921	CE to KR3HD	Yes	CE to KR3HD
—	—	KR3-LW-10	Penstock Nos. 1 and 2	KR3HD	1919–1921	CE to KR3HD	Yes	CE to KR3HD
—	—	KR3-LW-11	KR3 Powerhouse	KR3HD	1919–1921	CE to KR3HD	Yes	CE to KR3HD
—	—	KR3-LW-12	KR3 Tool Shed (Machine Shop)	KR3HD	1921	CE to KR3HD	Yes	CE to KR3HD

Primary Number/ (Trinomial)	Forest Service Number	Temporary Number	Historic Name/Current Name	Associated Facility	Date(s) of Construction	Previous NRHP Eligibility	In ADI?	Current NRHP Recommendations
—	—	SWCA-TD1453458-S-001	KR3 Powerhouse Complex	KR3HD	1919–1921	CE to KR3HD	Yes (partially)	CE to KR3HD
—	—	KR3-LW-13	Vestal–Growers–Kern River 3 66 kV Transmission Line	KR3HD	1920	—	Yes (partially)	Non-CE to KR3HD
—	—	KR3-LW-14	Mountain Highway 99/Sierra Way	KR3HD	1907–1910	—	Yes (partially)	CE to KR3HD
P-15-019726/ P-54-004653	05-13-54-00729	—	KR3 Access Road Network	KR3HD	1910; 1920s; ca. 1960	CE to KR3HD	Yes	CE to KR3HD
—	05-13-54-00871	—	Borel–Isabella–Kern River 3–Lakegen–Weldon 66 kV Transmission Line	KR3HD	1919–1921; 1940s and 1950s; ca. 1990	Not eligible	Yes	Non-CE to KR3HD
—	—	—	Kern River Fish Hatcher	None	1929	Not eligible	Yes	Not eligible

ADI = Area of Direct Impact; CE = contributing element; FERC = Federal Energy Regulatory Commission; HAER = Historic American Engineering Record; KR3 = Kern River No. 3; KR3HD = Kern River No. 3 Hydroelectric Project Historic District; kV = kilovolt; NPS = National Park Service; NRHP = National Register of Historic Places; PHD = Palegewan Heartland District; SHPO = State Historic Preservation Office

Character-Defining Features

NPS Preservation Brief 17 states:

> The Secretary of the Interior's 'Standards for Historic Preservation Projects' embody two important goals: 1) the preservation of historic materials and, 2) the preservation of a building's distinguishing character. Every old building is unique, with its own identity and its own distinctive character. Character refers to all those visual aspects and physical features that comprise the appearance of every historic building. Character-defining elements include the overall shape of the building, its materials, craftsmanship, decorative details, interior spaces and features, as well as the various aspects of its site and environment [NPS, 1988:1].

HRA has prepared a list of the significant character-defining features of the resources it recommends remain NRHP-eligible as contributing resources to the KR3HD (Table 7.10-5).

Table 7.10-5. Kern River No. 3 Historic District, Contributing Resources' Character-Defining Features

Primary No. (Forest Service No.)	Temporary Number	Name	Character-Defining Features
P-15-013772/ P-54-004634 (CA-KER-7729H/CA-TUL-2887H [FS 05-13-56-00022])	—	KR3HD; HAER No. CA-2309	• Mediterranean style powerhouse and tool shed • Building placement in functional clusters linked by long, linear features • Evidence of continuity-of-use approach within an operational hydroelectric historic district • Juxtaposition of Project components with rugged locations and settings • Location
—	KR3-LW-01	Fairview Dam; HAER (approved by FERC and SHPO not submitted to NPS)	• Rubble-filled concrete dam • Fish ladder • Impounds and controls flow of water from NFKR to Intake • Location
—	KR3-LW-02	Intake	• Concrete, wedge-shape structure • Full-length trash rack • Gates controlling water flow into intake flume or free-flowing NFKR • Location

Primary No. (Forest Service No.)	Temporary Number	Name	Character-Defining Features
—	KR3-LW-03	Intake flume	• Open, reinforced concrete flume with concrete bracers • Reinforced concrete support piers • Enclosed flume with gates • Location
—	KR3-LW-04	HAER No. CA-2309-A; Sandbox	• Unique barge-like design • Concrete bracing and center divider • Settling basin between Intake Flume and impounds water into the conduit • Location
—	KR3-LW-05	Building 128	• Original wood construction materials and cladding • Location
—	KR3-LW-06	Flowline	• 24 tunnels, 3 flumes, and 1 siphon convey water from the intake to the forebay • Design variety of reinforced concrete tunnels • Open air flumes • Adit locations for maintenance • Location
—	KR3-LW-08	Cannell Creek Siphon and Spillway	• Unique inverted siphon design • Spillway structure at north end • Location
—	KR3-LW-09	Forebay	• Open, reinforced concrete wedge-shape with concrete bracers • Division of rooms between reservoir where pressure pipe enters and the transference to the penstocks • Spillway gate • Location
—	KR3-LW-10	Penstock Nos. 1 and 2	• Exposed riveted pipe with reducers • Reinforced concrete piers and anchors • Location
—	KR3-LW-11	KR3 Powerhouse	• Mediterranean style • Entablature (architrave, frieze, cornice) • Evenly spaced bays on all sides • Expose basement and subbasement on southwest elevation • Substation on top of the building • Location

Primary No. (Forest Service No.)	Temporary Number	Name	Character-Defining Features
—	KR3-LW-12	KR3 Tool Shed	• Modest Mediterranean style mimicking the powerhouse • Cornice and architrave • Location
—	SWCA-TD1453458-S-001	KR3 Powerhouse Complex	• Archaeological components • Location
—	KR3-LW-14	Mountain Highway 99/Sierra Way	• Location • Setting along NFKR along mountain path
P-15-019726/ P-54-004653 (FS 05-13-54-00729)	—	KR3 Access Road Network	• Remote access mountain paths • Mostly dirt and gravel roads • Location

FERC = Federal Energy Regulatory Commission; Forest Service = U.S. Department of Agriculture, Forest Service; HAER = Historic American Engineering Record; KR3 = Kern River No. 3; KR3HD = Kern River No. 3 Hydroelectric Project Historic District; NFKR = North Fork Kern River; NPS = National Park Service; SHPO = State Historic Preservation Office

7.10.5. Proposed Environmental Measures

SCE proposes to implement the following environmental measure related to cultural resources:

- Measure CR-1, *Historic Properties Management Plan*

The proposed measure and its key features related to cultural resources are described below. Refer to Appendix E.1 for the complete description of measures SCE proposes to include in any new license issued for the Project.

7.10.6. Potential Project Effects

FERC's decision to issue a new license is considered an "undertaking" pursuant to 36 CFR § 800.16(y), and the NHPA requires federal agencies to consider the effect of undertakings on historic properties and provide the Advisory Council on Historic Preservation an opportunity to comment. Project O&M activities have the potential to affect cultural and Tribal resources, TCPs, and other resources of traditional, cultural, or religious importance to the Native American community.

The purpose of identifying effects is to determine which resources may have heritage values compromised or altered and to aid in the development of management/protection measures that would be incorporated into the Project's HPMP.

The following sections describe the potential effects of the proposed Project, including the proposed environmental measures, on cultural resources. Unavoidable adverse effects on cultural resources are discussed at the end of this section and summarized in Section 10.0, *Conclusions and Recommendations*.

7.10.6.1. No-Action Alternative

Under the No-Action Alternative, the Project would continue to operate under the terms and conditions of the current license, as described in Section 5.1. The No-Action Alternative is considered the environmental baseline for this analysis of potential effects. Potential effects on cultural resources were identified in FERC's SD2 (FERC, 2022) and were based an evaluation of continued O&M activities described as part of the proposed Project (Section 5.2, *Proposed Action Alternative*). Potential effects identified in FERC's Scoping D2 include the following:

- Effects of continued project O&M on historic or archaeological resources in the Project-affected area, including TCPs that may be eligible for inclusion in the NRHP, or on other areas or places of religious, cultural, and traditional importance to Indian Tribes.

7.10.6.2. Project-Related Effects on Archaeological Sites

During the 2022 inventory, archaeologists observed disturbances at archaeological sites related to FERC Project O&M activities, as well as SCE non-Project O&M activities, and other non-SCE activities such as recreation, looting, and fire. The team assessed whether each archaeological site would be affected by future Project O&M, SCE non-Project O&M, and other non-SCE activities to assist SCE in prioritizing management measures at sites that are most likely to be affected by the Project. The purpose of identifying effects is to aid in the development of management measures that will be incorporated into the Project's HPMP. Table 7.10-6 lists the archaeological sites recorded in the ADI and the existing or potential effects to those sites. Observed and potential effects are classified into seven categories: erosion, bioturbation, construction, O&M, activities, recreation, looting, and fire.

<u>Current Cultural Resources Management Plan</u>

As part of the previous relicensing, SCE prepared a document entitled *Cultural Resources Management Plan for Southern California Edison Company's Kern River No. 3 Hydroelectric System Kern and Tulare Counties, California FERC Project No. 2290* (Taylor, 1991). The plan identifies specific measures undertaken by SCE to avoid adverse effects to the NRHP-eligible properties located within the FERC Project Boundary and various programmatic measures that SCE is required to implement. Resource monitoring and recordation of the NRHP within the FERC Project Boundary is required to occur in three 5-year increments to determine the success of current measures and to evaluate the need for additional treatment.

Table 7.10-6. Project and Non-Project Effects on Archaeological Sites in the Federal Energy Regulatory Commission Project Boundary

Primary No. (P-)	Trinomial (CA-)	Forest Service No. (FS 05-) or Temporary No.	Age	Summary Description of Archaeological Component	Land Manager	Observed Project O&M Disturbances	Observed Non-Project Disturbances	Project O&M Potential Effects	Non-Project Potential Effects	NRHP Eligibility
15-015656	KER-8639H	13-54-00841	H	Tramway, road and trail remnants, artifact scatters	Forest Service	None observed	Erosion	None anticipated	Recreation, fire	CE to KR3HD, individually eligible
15-018562	KER-10157	—	P	Bedrock milling features, lithic scatter	Forest Service	None observed	None	None anticipated	Fire	CE to the PHD, individually unevaluated
15-019726/ 54-004653	—	13-54-00729	H	KR3 Road System	Forest Service	None observed	Erosion, fire	None anticipated	Erosion, fire	CE to KR3HD, individually eligible
54-000865	TUL-865	13-54-00236	M	Lithic scatter; historic-period construction camp, artifact concentrations	Forest Service	None observed	Non-Project utility poles, fire, looting	Road maintenance	Non-Project utility pole maintenance recreation, looting, fire	H – Contributing element to KR3HD, Individually eligible; P – CE to PHD, individually unevaluated
54-000868	TUL-868/H	13-56-00239, 13-56-00067	M	Bedrock milling station, lithic scatter; historic-period farmstead features, mine adit, artifact concentrations	Forest Service	None observed	Non-Project utility poles, livestock trampling	None anticipated	Non-Project utility poles maintenance, livestock trampling, recreation, fire	Recommended H – non-CE to KR3HD; not individually eligible, P – CE to the PHD, individually unevaluated
54-000875	TUL-875/H	13-56-00228	M	Bedrock milling features; historic-period construction camp, artifact concentrations	Forest Service	Road maintenance	Non-Project utility poles, bioturbation	Road maintenance, Project utility pole maintenance	Non-project utility pole maintenance, bioturbation, recreation, looting, fire,	H – contributing element to KR3HD, individually eligible; P – CE to PHD, individually unevaluated
54-004635	TUL-2888H	13-54-00717	H	Refuse dump	Forest Service	None observed	Erosion	None anticipated	Recreation, erosion, fire	Non-CE to KR3HD, not individually eligible
54-004636/ 54-005414	TUL-2889H, -3164/H	13-54-00708	M	Lithic scatter; historic-period construction camp, artifact concentrations	Forest Service	Road maintenance	Non-project utility poles, bioturbation	Road maintenance	Non-project utility pole maintenance, recreation, looting, fire	Sites merged in 2022; H – concurs CE to KR3HD, individually eligible and expands to P-54-005414; P – CE to PHD, individually unevaluated
54-004637	TUL-2890/H	13-54-00709	M	Precontact rock art, milling feature; historic-period construction camp, artifact concentrations	Forest Service	Road maintenance	Non-Project utility poles, erosion, bioturbation	Road maintenance,	Non-project utility pole maintenance, recreation, erosion, fire	H – CE to KR3HD, individually eligible; P – CE to PHD, individually eligible under Criteria C and D
54-004642	TUL-2895H	13-54-00714	H	Artifact scatter	Forest Service	Road maintenance	Recreation, bioturbation	Road maintenance	Recreation, bioturbation, fire	Non-CE to KR3HD, Not individually eligible
54-004643	TUL-2896H	13-54-00715	H	Construction camp, trail, artifact concentration	Forest Service	Road maintenance	Recreation, bioturbation	Road maintenance	Recreation, bioturbation, fire	CE to KR3HD, not individually eligible
54-004644/ 54-004645	TUL-2898H, -2897H	13-54-00718, 13-54-00716	H	Construction camp, artifact concentration	Forest Service	Road maintenance	Recreation, bioturbation	Road maintenance	Recreation, bioturbation, fire	Site combined in 2020 retain as CE to KR3HD, individually eligible
54-004650	—	13-54-00723	H	Mining adit, waste rock pile	Forest Service	None observed	Bioturbation, erosion	None anticipated	Bioturbation, erosion, recreation, fire	Non-CE to KR3HD, not individually eligible

Primary No. (P-)	Trinomial (CA-)	Forest Service No. (FS 05-) or Temporary No.	Age	Summary Description of Archaeological Component	Land Manager	Observed Project O&M Disturbances	Observed Non-Project Disturbances	Project O&M Potential Effects	Non-Project Potential Effects	NRHP Eligibility
54-004652	—	13-54-00725	H	Waste rock pile, metal bucket	Forest Service	None observed	None observed	None anticipated	Recreation, fire	Non-CE to KR3HD, not individually eligible
54-004654	TUL-2902H	13-54-00727	H	Construction camp	Forest Service	None observed	Bioturbation	None anticipated	Bioturbation, recreation, fire	Non-CE to KR3HD, not individually eligible
54-004655	—	13-54-00728	H	Construction camp	Forest Service	None observed	Bioturbation	None anticipated	Bioturbation, recreation, erosion, fire	Non-CE to KR3HD, not individually eligible
54-004656	—	13-54-00726	H	Boulders with drill holes	Forest Service	None observed	None observed	None anticipated	None anticipated	Non-CE to KR3HD, not individually eligible
54-004658	TUL-2996H	13-54-00857	H	Rock crusher plant remnants, adit, trail, artifact concentration	Forest Service	Road maintenance	Erosion	Road maintenance	Erosion, recreation, fire	CE to KR3HD, not individually eligible
54-004818	TUL-2992	13-54-00860	H	Trail, waste rock pile, artifact scatter	Forest Service	Road maintenance	Recreation	Road maintenance	Recreation, fire	CE to KR3HD, not individually eligible
54-004819 (54-004646, 54-004647, 54-004648, 54-004649)	TUL-2993/H, -2899H, -2900/H, -2901H	13-54-00719, 13-54-00720, 13-54-00721. 13-54-00722	M	Precontact rockshelter and rock art panel; historic-period construction camp, artifact concentrations	Forest Service	Road maintenance	Bioturbation	Road maintenance	Bioturbation, recreation, fire	H – CE to KR3HD, individually eligible; P – CE to PHD, individually eligible under Criteria C and D
54-004820	TUL-2994H	13-54-00865	H	Generator footings, waste rock pile, artifact scatter	Forest Service	Road maintenance	None observed	Road maintenance	Recreation, fire	Non-CE to KR3HD, not individually eligible
54-004821	TUL-2995H	13-54-00856	H	Compressor house remnants, remnant roads, artifact concentration	Forest Service	Road maintenance	None observed	Road maintenance	Recreation, fire	Non-CE to KR3HD, not individually eligible
54-004822	TUL-2997H	13-54-00858	H	Generator footings, adit, waste rock pile	Forest Service	Road maintenance	None observed	Road maintenance	Recreation, fire	Non-CE to KR3HD, not individually eligible
54-004823 (54-004638, 54-004639, 54-004640, -54-004663)	TUL-2998/H, -2891H, -2892/H, -2893H,	13-54-00710, 13-54-00711, 13-54-00712	M	Lithic scatter; historic-period construction camp, waste rock pile, artifact concentrations	Forest Service	Road maintenance	Looting	Road maintenance	Looting, recreation, fire	H – CE to KR3HD; individually eligible; P –Non-CE to the PHD, unevaluated
—	—	KR3-DJ-S-01	H	Structure foundations, waste rock pile	Forest Service	None observed	Erosion, bioturbation	None anticipated	Erosion, bioturbation recreation	Recommended non-CE to KR3HD, not individually eligible
—	—	KR3-DJ-S-02	H	Berms, linear trench, artifact scatter	Forest Service	Road maintenance	Bioturbation	Road maintenance	Bioturbation	Recommended non-CE to KR3HD, not individually eligible
—	—	KR3-DJ-S-03	H	Earthen pad, remnant road, and artifact concentrations	Forest Service	Road maintenance	Bioturbation, fire	Road maintenance	Bioturbation, recreation, fire	Recommended non-CE to KR3HD, not individually eligible
—	—	KR3-LW-14; CWA002-S-1210	H	Hearth features, artifact scatter, possible historic-period road remnant	Forest Service	None observed	Recreation, bioturbation	None anticipated	Recreation, bioturbation, fire	Recommended non-CE to KR3HD, not individually eligible

Primary No. (P-)	**Trinomial (CA-)**	**Forest Service No. (FS 05-) or Temporary No.**	**Age**	**Summary Description of Archaeological Component**	**Land Manager**	**Observed Project O&M Disturbances**	**Observed Non-Project Disturbances**	**Project O&M Potential Effects**	**Non-Project Potential Effects**	**NRHP Eligibility**
—	—	KR3-RA-S-01	H	Pier blocks, trestle remnants for pipeline	Forest Service	None	None observed	Maintenance of diversion pipeline	Recreation, fire	Recommended non-CE to KR3HD, not individually eligible
—	—	KR3-RA-S-02	H	Boulders with name and date markings	Forest Service	None observed	None observed	None anticipated	Recreation, fire	Recommended non-CE to KR3HD, not individually eligible
—	—	SWCA-TD1453458-S-001	H	Structural remnants, quarry, trail, pits, artifact scatter	Forest Service	Road maintenance	Erosion	Road maintenance	Erosion, fire	Recommended CE to KR3HD, individually eligible
—	—	SWCA-TD1562618-S-001	H	Artifact scatter	Forest Service	Road maintenance	Non-Project utility pole	Road maintenance,	Non-Project utility pole	Recommended non-CE to KR3HD, not individually eligible
—	—	SWCA-TD1630677-S-001	H	Trail	Forest Service	None observed	Non-project utility poles, erosion	None anticipated	Non-project utility poles, erosion	CE to KR3HD, not individually eligible

CE = contributing element; Forest Service = U.S. Department of Agriculture, Forest Service; H = historic-period; KR3HD = Kern River No. 3 Hydroelectric Project Historic District; M = multicomponent; NRHP = National Register of Historic Places; O&M = operations and maintenance; P = precontact; PHD = Palegewan Heartland District

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7.10.6.3. Proposed Action Alternative

SCE would continue to operate the Project as described in Section 5.1, *No-Action Alternative*. However, SCE proposes minor adjustments to Project O&M with the implementation of new or modified environmental measures, which are described in Section 5.2, *Proposed Action Alternative*, and summarized below.

7.10.6.4. Proposed Historic Properties Management Plan

Under Measure CR-1, SCE would draft a new HPMP in consultation with the TWG to address potential effects from O&M activities on NRHP-eligible and unevaluated properties located within the FERC Project Boundary and submit the HPMP to FERC with the FLA. The HPMP would provide a guiding philosophy and specific steps for how SCE can assess potential Project-related effects on the historic properties under its control with the overarching goal of avoiding adverse effects on those properties whenever possible or minimizing those effects when they are unavoidable. The HPMP will address how to appropriately manage both archaeological and built-environment resources.

Furthermore, the HPMP would establish procedures for avoiding and minimizing adverse effects on both archaeological and built-environment resources that are unevaluated or determined eligible for listing in the NRHP, either as a contributing resource to one of the historic districts or as individually eligible for listing in the NRHP.

<u>Federal Energy Regulatory Commission Project Boundary Modifications</u>

Pursuant to 18 CFR § 4.41, the FERC Project Boundary must encompass all lands necessary for Project purposes, including Project O&M, over the term of the FERC license. The FERC Project Boundary would be modified (increased and/or decreased) under the proposed Project to (1) include all lands necessary for Project O&M; (2) remove lands no longer necessary for Project O&M; and (3) correct known errors in the current Exhibit G, *Project Maps*. These revisions will be depicted on Maps provided in Exhibit G as part of the FLA.

SCE is currently working with the SQF to obtain approval and reach agreement on terms of the modifications and would file a complete set of revised Exhibit G, *Project Maps*, drawings in accordance with the regulations at 18 CFR § 4.39 and § 4.41(h). Proposed changes to the FERC Project Boundary will be described and addressed as part of the FLA.

<u>Project Facilities</u>

Existing Project facilities are described in Section 5.1.2. These facilities would remain unchanged under SCE’s proposed Project. SCE does not propose any changes to existing storage/generation capacity under the proposed Project.

Project Operations

Under the proposed Project, 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 under the proposed Project and existing water rights held by SCE). In addition, SCE would continue to operate the Project in run-of-river mode generally consistent with water management practices described in Section 5.1.7.1, *Project Operations and Maintenance*, with the changes that include minor adjustments in response to the implementation of environmental measures, as described in the following subsections.

Project Maintenance

Under the proposed Project, routine inspection and maintenance activities would continue to be implemented as described for the No-Action Alternative in Section 5.1.5, *Project Maintenance*.

7.10.6.5. Project-Related Effects on Built-Environment Resources

Project-related effects on historic properties for the KR3HD may include but are not limited to new construction or demolition of, moving, or major alterations to a historic property (i.e., contributing or individually eligible) within the KR3HD. Regular Project O&M should not constitute an adverse effect unless done in a manner inconsistent with the HPMP. In cases where built-environment resources sit on parcels located along free-flowing portions of the NFKR, HRA has identified no immediate, direct Project-related effects

Unavoidable Adverse Effects

Additional cultural resources field work and analysis are required to fully assess potential effects under the proposed Project. This additional analysis will be completed prior to and described in the FLA.

7.11. TRIBAL RESOURCES

7.11.1. INTRODUCTION

This section describes the results of the FERC-approved *Tribal Resources Technical Study Plan* (TRI-1 Study Plan) for FERC Project No. 2290. The discussion here is intended to provide a basis for evaluating the potential issues summarized in the TRI-1 Draft TSR (provided in Volume IV of this License Application), which is filed as Confidential and Privileged in Volume IV of this License Application (**CUI//CEII/PRIV**). Currently the TRI-1 Draft TSR is under review by the Cultural Resources TWG. SCE anticipates that during stakeholder review, more information about the Tribal resources and interests identified may be forthcoming.

This Tribal Resources Section includes the following information:

- Section 7.11.1, *Introduction*
- Section 7.11.2, *Ethnographic and Ethnohistoric Context*
- Section 7.11.3, *Study Approach*
- Section 7.11.4, *Study Results*
- Section 7.11.5, *Proposed Environmental Measures*
- Section 7.11.6, *Potential Project Effects*

The full description of proposed measures is provided in Appendix E.1. Cultural Resources are discussed separately in Section 7.10, *Cultural Resources*.

This section was prepared to comply with Section 106 of the NHPA (16 USC § 306108) and its implementing regulations in 36 CFR Part 800, which requires that federal agencies consider the effects of their undertakings on Tribal resources. The TRI-1 Draft TSR was developed on behalf of SCE as a component of the TRI-1 Study Plan and was developed in collaboration with a Cultural Resources TWG that includes representatives from FERC, California SHPO, SQF, and Tribes and Tribal representatives identified by NAHC, SCE's Tribal outreach, and Project ethnographers, Shelly Davis-King, and Shelly Tiley.

FERC content requirements for this section are specified in Title 18 CFR § 5.6(d)(3)(xii):

> **Tribal resources.** A description of Indian tribes, tribal lands, and interests that may be affected by the project components of this description include:
>
> > (A) Identification of information on resources specified in paragraphs (d)(2)(ii)-(xi) of this section to the extent that existing project construction and operation affecting those resources may impact tribal cultural or economic interests,

> e.g., impacts of project-induced soil erosion on tribal cultural sites; and
>
> (B) Identification of impacts on Indian tribes of existing project construction and operation that may affect tribal interests not necessarily associated with resources specified in paragraphs (d)(3)(ii)-(xi) of this section, e.g., tribal fishing practices or agreements between the Indian tribe and other entities other than the potential applicant that have a connection to project construction and operation.

See Section 7.10, *Cultural Resources*, for the definitions of a historic property and a historic district. The following are definitions of additional resource types.

Traditional Cultural Properties (TCP) are defined in NRHP Bulletin 38 (NPS, 1998) and defines the requirements for (TCPs, as follows:

> …are eligible for the National Register because of their association with cultural practices or beliefs of a living community that (a) are rooted in that community's history, and (b) are important in maintaining continuing cultural identity of the community.

This means that these properties are important to protect because they are needed for the continuation of meaningful cultural practices; therefore, these properties warrant protection and access for both present and future generations.

The first step in determining the eligibility of something as a TCP is to determine whether it is a property (building, structure, object, site, or district)—a place—as opposed to, say, a belief, a dance, a song, or an "animal" (King, 2003:15).

The second step to determine eligibility is to consider the integrity of the resource or place. The criteria to determine integrity are stated above; however, additional consideration is needed when applying these criteria to potential TCPs. It is important to ascertain whether extensive integrity has been lost and "relationships with Tribal cultural values and practices do not survive" (King, 2003:19). When analyzing integrity, both integrity of relationship and integrity of condition should be addressed (King, 2003:174). Integrity of relationship means that those who value the place perceive a relationship between the place and the traditional activity that gives the place significance. In this instance, it is inappropriate to interpose an external standard dismissing this relationship of a people to a place (such as archaeological values being used to judge traditional cultural significance; King, 2003:174). Integrity of condition refers to the physical disturbances and alterations and how they may affect the ability of the place to continue to fulfill its cultural purpose (King, 2003:174). Both kinds of integrity should be judged through the eyes of those who value the place (King, 2003:175). A place that has lost its archaeological integrity can still retain integrity of relationship and condition when viewed from the perspective of those who value the place.

It is important to state that those who value locations or resources from their traditional cultural view may understand and perceive the landscape differently than agencies involved in managing an area. The oral history, ethno-historical and indigenous understanding of an area, site or object are considered equally important for agencies tasked with land management (Button, 2009). The landscape is a “forcible determinant” for indigenous cultures that perceive, understand, and experience the area under study (Ashmore and Knapp, 1999:1–2).

Traditional Cultural Landscapes are sometimes better characterized as Traditional or Ethnographic Landscapes (or Sea or Riverscapes). Landscapes need to be identified with one or more of the criteria above but are defined as “large-scale properties often comprised of multiple-linked features that form a cohesive area or place” (ACHP, 2012:1). Areas like a seacoast could include several different kinds of heritage resources such as locations to procure subsistence or other material resources, places or parts of a trade route, prime residential areas, important topographical features, and religious and/or sacred localities (Birnbaum, 1994). They are in this way analogous to an archaeological district.

Birnbaum (1994:1) identifies a cultural landscape as a “geographic area, including both cultural and natural resources and the wildlife or domestic animals therein, associated with a historic event, activity, or person or exhibiting other cultural or aesthetic values.” A cultural landscape includes four general types: historic sites, historic designed landscapes, historic vernacular landscapes, and ethnographic landscapes (Birnbaum, 1994:1). Due to the traditional heritage associated with the landscape of the Cultural resources study area, it is imperative that it be viewed under the lens of an ethnographic landscape. “An ethnographic landscape contains a variety natural and cultural resources that associated people define as heritage resources (Birnbaum, 1994:2). An ethnographic landscape may be eligible for the NRHP as a TCP (ACHP, 2011, 2012).

7.11.1.1. Project Personnel Qualifications

The TRI-1 Draft TSR (provided in Volume IV of this License Application) was completed by individuals who meet the SOI PQS in Ethnography (36 CFR Part 61) and have extensive experience documenting Tribal resources in California. As well as hold the appropriate permits to conduct cultural resources work on lands managed by the Forest Service. SCE contracted with Far Western Anthropological Research Group, Inc., (FW) to conduct background research, fieldwork, and assist in preparing the TRI-1 Draft TSR. Tiley Research (TR) and Davis-King & Associates (DKA) were contracted to conduct Tribal resources studies in support of the TRI-1 Study.

7.11.1.2. Study Objectives

The principal goal of the TRI-1 Study is to assist FERC in meeting compliance requirements identified in its regulations (18 CFR Part 5) along with those requirements subject to NHPA Section 106 (as amended), among other federal laws and regulations, by determining whether licensing of the Project would have an effect on Tribal resources, which may also include historic properties. FERC desires to know to whether and to what extent the existing Project O&M may affect Tribal resources and may have cross interests with other technical group studies. In addition to historic properties, which may be a type of Tribal resource, other Tribal resources may be identified through archival research, oral interviews, field inspections, and government-to-government consultation. The study intends to ensure such places are described from a Tribal perspective and to identify options for potential effects from Project O&M.

Additional goals of the TRI-1 Study Plan implementation are to ensure that Tribal values and resources are identified and acknowledged from a Tribal perspective and that an adequate baseline ethnohistory is developed. Similarly, ensuring that the land-managing agencies and any other stakeholder agencies have their program needs met with respect to the Project APE is a goal of the work. Finally, it is anticipated that management issues will be identified to be described and developed in subsequent planning efforts for the life of the license. Objectives include the following:

- Identify and document Tribal resources identified within or immediately adjacent to the proposed APE.
- Conduct an American Indian ethnographic/ethnohistoric survey of the proposed APE and study area.
- Conduct outreach and contact with Tribal governments and their representatives.

7.11.1.3. Extent of the Study Area

The Project is located in Kern and Tulare Counties, California, north of the town of Kernville, in the foothills along the western slope of the Southern Sierra Nevada. The majority of the land is managed by Forest Service, while portions are owned by SCE. The pedestrian surveys conducted for this Project took place within the ADI, as described below, which is located in T23S, R32E, T23S, R33E, T24S, R33E, and T25S, R33E, Mount Diablo Base Meridian, on the Kernville and Fairview 7.5-minute USGS quadrangles.

Study Area, Area of Potential Effects, Area of Direct Impact, and FERC Project Boundary

Under 36 CFR 800.16(d), “area of potential effects” 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.” For the purposes of this undertaking, the defined APE is discontinuous and inclusive of three components: (1) the 15 newly identified specific culturally important and interconnected places recommended as NRHP-eligible as contributing elements of the PHD; (2) the ADI, described further below; and (3) the FERC Project Boundary. Importantly, the locations of the non-archaeological resources were generated primarily through consultation with Tübatulabal Chairman Robert Gomez and augmented with archival background research, but were not further corroborated through field survey, site visits, or other methods. While this study acknowledges the non-archaeological resources as within the APE, due to the inherent difficulty in spatially depicting a mapped “boundary” for these resource types, they have been excluded from delineation on the APE map. Overview maps depicting the discontinuous defined APE, inclusive of the previously documented and newly documented Tribal resources, and the spatial extent of the ADI are provided in are provided in the TRI-1 Draft TSR (provided in Volume IV of this License Application), which is filed as Confidential and Privileged (**CUI//CEII/PRIV**).

While the APE is inclusive of the ADI, the ADI is defined as the FERC Project Boundary and includes all Project facilities and access roads. The Project consists of the operating facilities associated with the water conveyance system, dam, diversions, flowlines, forebay, penstocks, powerhouse, stream gages, access roads, and ancillary or support facilities under FERC's jurisdiction.

The PHD includes 91 specific locations plus the land-waterscape of the District itself, of which 41 locations are located within the Tribal resources 5-mile study area, of those 15 are located within the Project APE, while only 8 are within the Project ADI. The District's contributing elements located within the Project APE and ADI consist of ethnographic places including villages, fishing locations, and geographic features along with archaeological and rock art resources.

For the purposes of this report, the APE and ADI are shown on maps that represent their respective boundaries. The full boundaries of all archaeological resources that intersected the ADI were investigated, regardless of the FERC Project Boundary. The study area includes a 5-mile buffer around the ADI (Figure 7.11-1). This study area is a guide for archival research, development of the historical context and background statements, and general Tribal informant interviews. This study area overlaps that of the study area of the recent Borel License Surrender Tribal Resources Study (Tiley and Ruth, 2024). As shown in Figure 7.11-2, there is considerable overlap between the TRI-1 Study area and that of the Borel License Surrender Project (FERC Project No. 382).

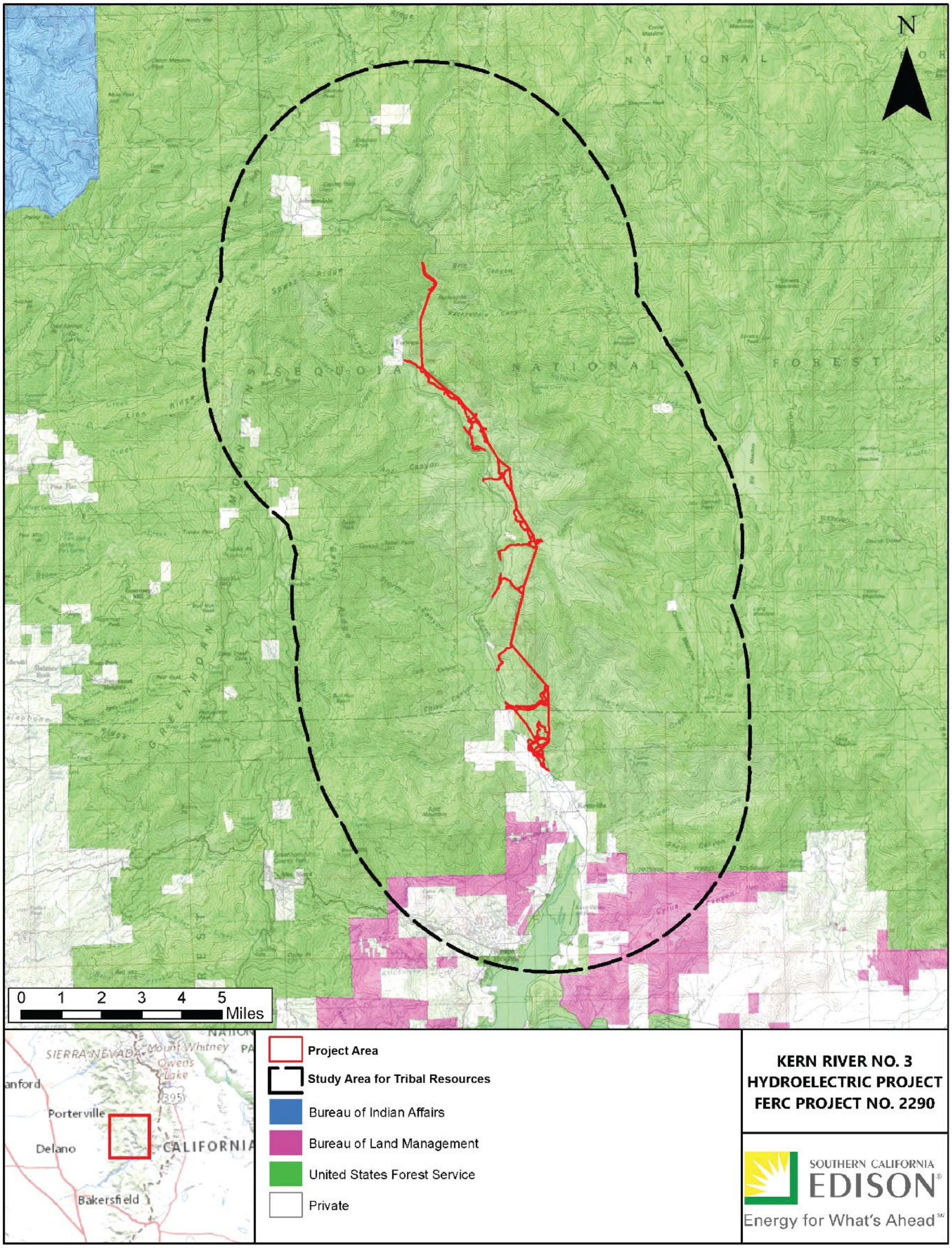


Figure 7.11-1. Ethnographic Study Area Boundary Relative to Kern River No. 3 Hydroelectric Project.

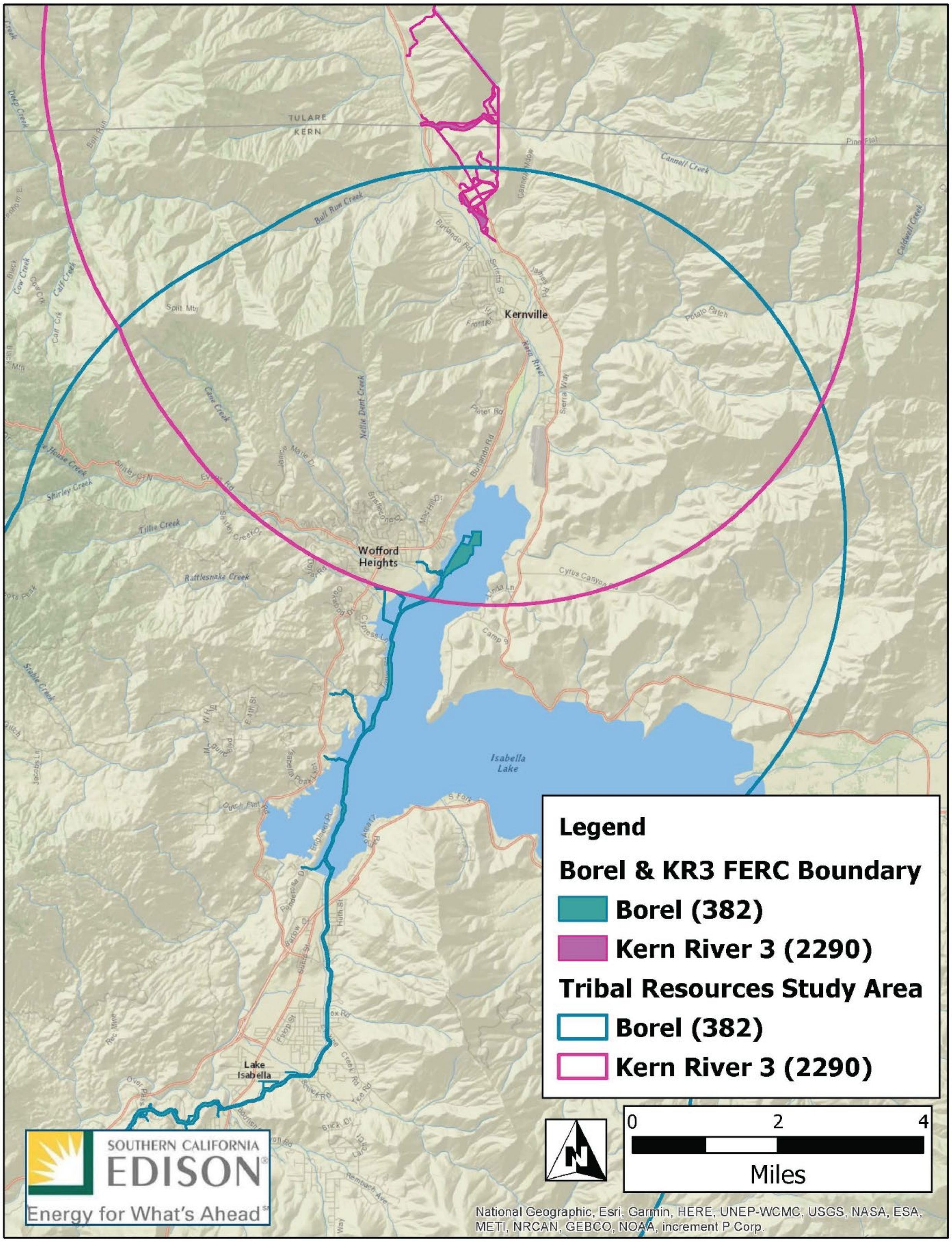


Figure 7.11-2. Overlap of Ethnographic Study Boundaries Relative to the Borel Hydroelectric Project (FERC No. 382) and Kern River No. 3 Project.

7.11.2. Ethnographic and Ethnohistoric Context

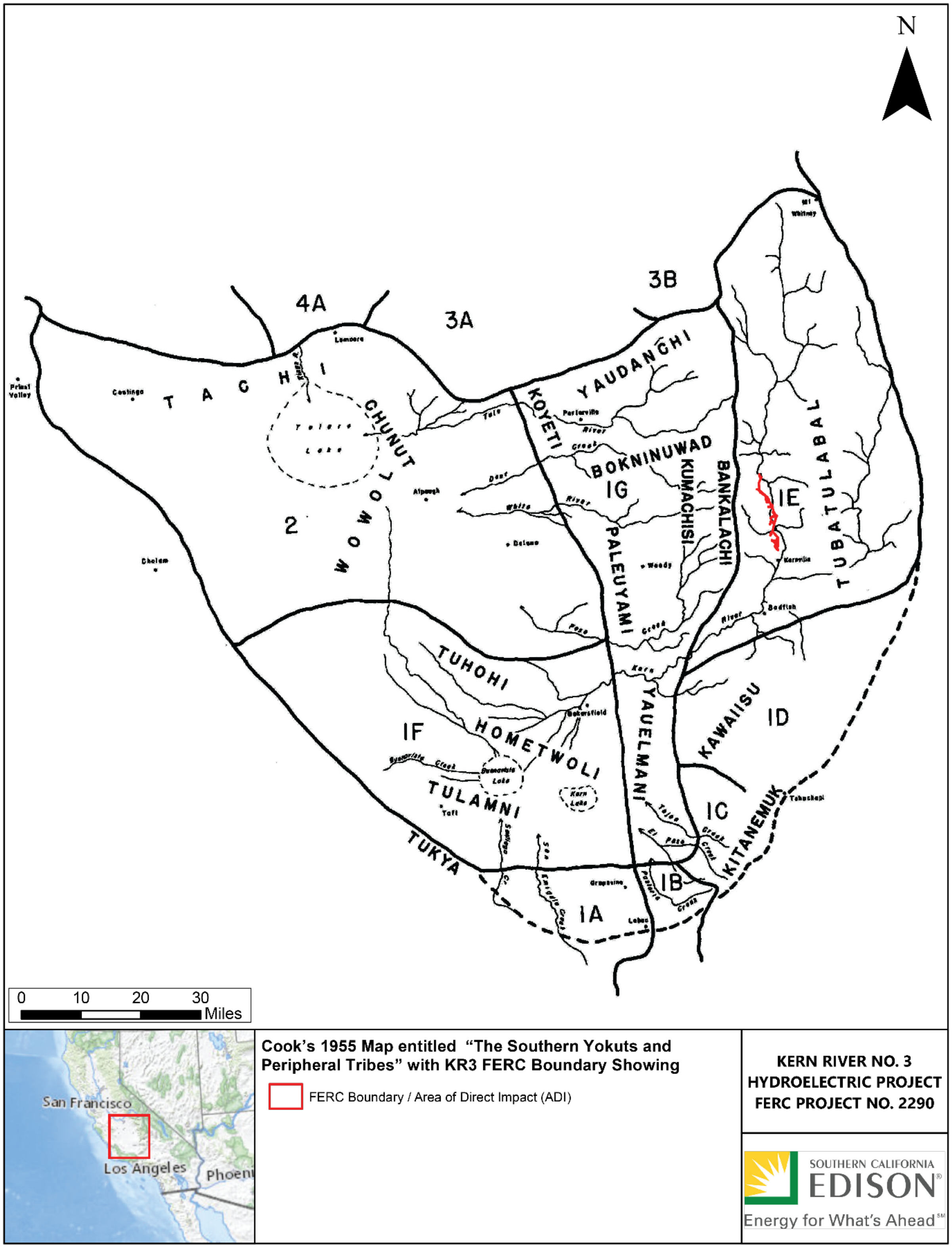
7.11.2.1. Ethnographic Background

Review of various ethnogeographic and territorial monographs, along with ethnographic investigations for the current Project license, suggests that the area surrounding the current FERC Project Boundary was inhabited entirely by Tübatulabal, a Tribal group consisting of three or more bands occupying the Kern River drainages "…from their sources near Mt. Whitney to approximately 41 miles below the junction of the two rivers" near Bakersfield (Smith, 1978:437; Figure 7.11-3).

Ethnographers

The principal ethnographers of the Tübatulabal were Ermine Voegelin (1938) and her husband Charles (Voegelin, 1935a, 1935b), the latter who worked on linguistic grammar and text translation. Stephen Powers (1976) also documented the group, largely lumping them with Paiute. Charles P. Wilcomb purchased a number of Tübatulabal baskets from 1898 to 1902 (Tübatulabal Tribe, 2011) and likely gathered ethnographic data to support his catalogue. John Hudson may have been the first museum collector in the area, principally acquiring baskets and other organic materials for the Field Museum of Chicago and the Academy of Sciences in San Francisco during the years 1901–1904. His field notes are housed both in Chicago and at the Grace Hudson Museum and Sun House in Ukiah, California. His field notes also describe the use of the upper Kern by Paiute, whose baskets were observed at Tule River and the Kern River (Hudson, 1901). C. Hart Merriam was the first ethnographer to truly work with the group, beginning to gather vocabulary in 1902 from the Kern Valley Pahkanapil-Tübatulabal and continuing his interviews into the mid-1930s. Several photographs he took of the area are available on the University of California Online Archive. John Peabody Harrington's unpublished notes of fieldwork in the area at approximately the same time are available through the Smithsonian Institution's website.

Alfred Kroeber (1925) included Tübatulabal in his overview of California Tribes but was especially important as being the first to describe the language in a publication (Kroeber, 1907). Other researchers (Waterman, n.d., but working 1910 to 1912; and Harrington in 1916, as reported in Mills and Brickfield, 1986) also gathered data and some photographs. According to Charles Smith (1978) who wrote the Tübatulabal chapter in the *Smithsonian Handbook of North American Indians*, there was no ethnographic work among the people for 30 years between 1938 and 1968—he began working with them in the latter year. Similarly, there has been little ethnographic work since 1968, and there is a dearth of Native American oral histories specific to the region, despite relatively rich ethnohistoric data. One notable exception is the ethnographic report compiled for the Lake Isabella area (Reddy, 2016), which includes a detailed analysis of the Harrington notes as well as interview data (Gehr and Conlan, 1984). Golla (2011) provided a refreshed look at Tübatulabal language, clearly identifying the Project as within the Tübatulabal territory. White and Taylor (1984) describe an area south of the Project, providing some ethnographic context applicable to this Project. Cook (1955) provided a map of various ethnographic groups in the region.



Source: Cook, 1955

Figure 7.11-3. Map of Tübatulabal Territory.

Tübatulabal Ethnography

Prior to non-Native people entering the vicinity of the Project, the Native Americans living there were the Uto-Aztecan-speaking Palagewan, who occupied the "unaugmented" mainstem Kern River. Palagewan were closely related to the Tübatulabal, a band on the South Fork of the Kern River. Linguistic groups now subsumed under the term Tübatulabal include the Tübatulabal proper, the Palagewan, and the Bankalachi (Bankalachi being the exonym commonly accepted in the literature, but more accurately, they should be called by the endonym of Toloim as other Tübatulabal referred to them), west of the Kern River on the slopes of the Greenhorn Mountains (Smith, 1978; Voegelin, 1938). Neighboring Tribes consist of the Western Mono and Yokuts (especially Yowlumne) to the west and south, the Kawaiisu and Coso Shoshone to the south and east, and the Owens Valley Paiute to north.

Environment

Tübatulabal 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. The territory had abundant water supplied by the perennial Kern River, numerous lakes, springs, and meadows, with typical Sierra Nevada temperatures of cold, wet months in the winter and very hot and dry months in the summer. This varied landscape provided a diversity of edible, material, medicinal, and other resources for the people.

Subsistence

In their home territory of the Kern River, primary vegetable foods were the pinyon pine nut and the acorn. Indeed, the name Tübatulabal incorporates the Shoshonean word tuba for the pinyon pine nut, and the translation of the name means "pine nut eaters," or as recorded by the Tübatulabal Tribe (2011), "pine nut gatherers." Diet was supplemented by deer, rabbits and hares, and a fair amount of fish, along with nuts, seeds, corms, greens, berries, and mushrooms. Pronghorn antelope (*Antilocapra americana*; extirpated from the vicinity of the Project since 1900) were abounded in the valley and foothills, Sierra Nevada bighorn sheep (*Ovis canadensis*) roamed higher elevations. Wild game birds were formerly plentiful, and golden eagles (*Aquila chrysaetos*) 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).

One critical environmental factor was the state of the Kern River, which varied in flow from a high of greater than 18,000 cfs to a dry season low of less than 100 cfs (Gehr and Conlan, 1984:682; Section 7.3.1.1, *Water Use and Hydrology*). Periods of high water occur during winter storms between November and January, and during the spring snowmelt from April to June (Figure 7.3-2). The river's lowest water occurs in October. Fish from the Kern River was a resource that in quantity was as important as or more than it was to the people of the southern San Joaquin Valley or to Great Basin people, except those who used Pyramid Lake or the salmon-rich Snake River tributaries (Voegelin, 1938:l).

Voegelin described the yearly subsistence round of the Tübatulabal (1938:11). Favored resources were pursued seasonally, but within two constraints. Much of the high country was inaccessible due to snow for 3 to 6 months a year, and high-water episodes on the Kern River discouraged lower elevation riparian visits. Voegelin's findings are summarized below.

- From February through the middle of August: food-gathering activities kept the Tübatulabal shifting about in family groups at lower elevations (2,000–4,000 feet), chiefly in lower and upper Sonoran life zones, in valleys, foothills, river canyons. Fish and nuts were taken in the higher elevations.
- From August to the middle of November: groups moved into higher elevations (5,000 to 6,000 feet), first east to pinyon grounds on the west slopes of Sierra Nevadas in the Transition zone, then west to acorn grounds in the Greenhorn Mountains in the upper Sonoran zone; family groups or individuals might also go on trading trips after pinyon harvest.
- From November to February: family groups returned to the valley foothill region in lower and upper Sonoran zones, and men did some hunting, fishing, and procured salt from the desert, but during this season, people "mainly stayed home, not doing anything (Esteban Miranda) and lived in small hamlets" (Voegelin, 1938:51).

Settlement

Tübatulabal winter hamlets tend to be found on the Kern River or major tributaries. Palegewan winter hamlets occur in lower elevations along the NFKR and its main stem below its junction with the SFKR. The floor of the Kern River Valley at the confluence lies between 2,500 and 2,600 feet in elevation; the highest known settlements occurred on the North Fork at ca. 2,900 feet.

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).

Voegelin (1938) recorded hamlets whose informants were largely Tübatulabal from the Weldon area, SFKR, and thus were not as familiar with the NFKR near Kernville. Only two hamlets were identified close to the Project. These two are cukka-yl (formerly occupied by about 60 individuals in 1932) and ho-lit (also unoccupied in 1932), according to Voegelin (1938).

Structures were of five main types: winter residence; sudatory or temescal (sweat lodge); brush shelter; ceremonial brush shelter; and camp corral. Material cultural remains reflect subsistence and residence patterns, with millingslabs and rock mortars indicative of seed and nut processing, tools reflecting scraping, cutting, and smoothing of items, architectural features related to hamlet winter homes, large brush circles for communal summer camping and dances, 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. Basketry was an elevated art, with both twined and coiled varieties in several functional types and dimensions.

Neighbors

This Tübatulabal core area is situated nearly equidistant between the Great Basin to the east and the San Joaquin Valley to the west, and Tübatulabal culture was influenced by ideas, trade, and people from each of these areas (Gehr and Conlan, 1984:686). There has been a long oral and documented history among the Tübatulabal that relations were friendly with their neighbors, and they would travel great distances to acquire supplies. They ventured to the Pacific Coast to interact with the Ventureños, coming home with clam shell money (and Olivella?), steatite, and asphaltum (Voegelin, 1938). They often visited with neighbors of the eastern Sierra, with whom they would meet and exchange materials. In July, they would join with numerous other groups (Shoshonean, Yokutsan, and Chumashan speakers) to have a pronghorn drive. There appears also to have been a cooperative fishing agreement in the vicinity of the Project, with Native Americans from all over coming to harpoon fish on the main Kern River. Tübatulabal collected their red pigment in Koso territory to the northeast, and the salt they gathered at desert salt lakes was especially important to them for curing fish and meat.

World View

The supernatural world was omnipresent, as people lived in the midst of a landscape described in traditional stories and occupied by yumigiwal spirits and shamans' helpers. Yumigiwal were human-shaped figures who co-occupied the landscape. Among these beings were dwarfs or "brownies" (ya'hii'twal) who were not evil but demanded respect (Voegelin, 1935b:207).

Datura was administered during puberty rights to give both men and women a long life. Shamans, assisted by spirit helpers, could be both male and female, although only males had healing powers. Curing shamans learned their songs and rituals while fasting and taking datura. Singing, dancing, and sucking and blowing tobacco smoke effected the cures, which also could include herbal remedies. There were no accidents in the Tübatulabal world, and witchcraft was blamed for misfortune. Female and male witches were greatly feared.

Life Cycle and Ceremonial Life

Birth, death, marriage, and other ceremonial activities were part of the annual life; often outside Tribal groups would be hosted for ceremony. Burial would take place near the hamlet, usually about a 0.25-mile distance and on a hillslope or in a rocky area. The last big ceremonial event was held in 1870, and none on a community-wide scale has occurred since 1900 (Gehr and Conlan, 1984:663–664). Groups do gather today for various communal events. One such event in 2023 honored the victims of the 1863 Keyesville massacre (see *The 1863 Keyesville Massacre* section, below).

Traditional History

Much of what is known about Tübatulabal traditional history and lifeways came from a set of men and women who taught the early anthropologists. Chief among the experts was Esteban Miranda, who survived the Keyesville massacre as a 13-year-old. Erminie Voegelin (1938) and Harrington (n.d.) both included his information extensively; linguist Carl Voegelin (1935b) gathered mythology and personal stories from Miranda in the Tübatulabal language, and also produced a Tübatulabal grammar (1935a). Voegelin also interviewed Esteban's son, Mike Miranda, and daughter, Stefana Miranda Salazar, as well as Rosie Pablo, Susie Williams Nieto, Legora Tungate and her two sons, and Petra Nichols. Both Petra Nichols and Petra Kennedy (also known as Petra Canada) accompanied Harrington on his place name trip.

<u>Tübatulabal Ethnohistory</u>

Early Contact

The earliest contact known in written accounts was provided by Spanish Franciscan missionary and explorer Francisco Garcés. On April 9, 1776, Garcés left San Gabriel Mission. By April 27, Garcés was in the vicinity of the [lower] Kern River, well east of Buena Vista Lake, and was received by another rancheria situated in a wooded arroyo. Garcés explored for many days in this area of Kern River. While traveling, he met some Indians from whom he acquired squirrels for food in exchange for shells. Garcés named the future Kern River as the "Rio de San Felipe" and explored the area where the Kern River leaves the mountains, flowing toward Bakersfield (Coues, 1900:280). F. W. Hodge and Lewis (1907) provided an ethnographic interpretation of Garcés' writings and opined that the people encountered were a Yokuts group, then contradictorily suggested they might be the "Palligawonap," who were a Paiute group. Given the multigroup gatherings at the mouth of the Kern River, they may have been correct in both instances. Guides for Father Pedro Font met a group of people south of the Kern River Junction (Coues, 1900). More meaningful contact occurred during their traditional coastal trading trips, particularly with groups at San Buenavista Mission in Ventura.

Later Tensions

Though spared by some of the negative effects of early colonization by the Spanish, the Tübatulabal suffered disease outbreaks beginning in the 1830s, though less than the Indian groups from lower elevations. The Banklanche, a related group from Poso Flat and

White River, moved into the area around historic Kernville to escape the malaria-infested lowlands (Powers, 1976:393). Banklanchi people were devastated by malaria and merged with the Palagewan after 1850. Some Yokut people also fled the valley, some settling for a brief period before the Gold Rush among the Palegewan people near the site of historic Kernville (Powers, 1976:394). Latta reported the Yokuts name for this short-lived settlement as Tulonoya (Latta, 1977:Frontispiece map).

The intrusion of miners after 1849 resulted in some conflict and some environmental destruction. As elsewhere in California starting in 1848, the discovery of gold in the Kern River in 1857 brought the first profound disruption of Native lifeways, though settlers had been impinging upon Tübatulabal territory from about 1850. By 1858, Pahkanapil people moved from Hot Springs Valley due to white settlement.

The real problems began with the increased displacement of local and non-local groups when more permanent settlement began. Koso Shoshone relocated to the eastern end of South Fork Valley after enduring a 32 year-long drought (Voegelin 1938:41, 51). The local environment was damaged by the Great Flood in the winter of 1861/1862, filling a lake (xaxlam) just south of present Kernville with debris, and damaging the fishery (Gehr and Conlan, 1984:683).

Factors farther afield also had an effect. To the east, the Owens Valley Paiute were starving because the bad weather had driven game away and cattle were beginning to damage their fields of wild hyacinth and nutgrass. In the exceptionally hard winter of 1861/1862, a cowboy found a Paiute man butchering a steer and he shot and killed him, leading to a series of reprisals and counter-reprisals that grew into the Owens Valley War (Chalfant, 1922). Some Owens Valley Paiute moved into the Kern Valley. Clyde Robinson (personal communication) stated: “Shoshones used to come up to Kern River Valley from the desert to the east and steal cattle. This is partially what precipitated the massacre.”

Clyde Robinson (personal communication) recalled:

> The Shoshones moved to the Kern River Valley from somewhere in the Coso area…They occupied winter camps at Tillie Creek, near Rocky Point, and at other locations in the northern part of the valley that I did not catch. There was a big camp down at the south end of the valley near where the pictographs are by the highway but it was occupied by other people who came from somewhere else.

The neighboring Kawaiisu were also suffering and retaliated for various wrongs by stealing cattle in Kern River Valley and killing a miner. Powers (1981:54) writes:

> By 1863 the anger of the [Kawaiisu] Indians directed toward the whites had reached the boiling point…[T]he Kawaiisu chief in Walker Basin (whose name was Old Jesus) had a hatred for the whites, feeling they had taken their land, forcing them into the hills, away from the productive land.

This combination of events would lead to the Keyesville massacre, which resulted in the annihilation of the Palegewan as a group.

The 1863 Keyesville Massacre

There had been a great deal of unrest in the Tulare, Kern, and Inyo County areas of California in the late 1850s and early 1860s. The American Civil War was in full swing, and sympathizers to the Confederate cause began to be accused of murder and other atrocities, dressing as Indians, with the goal of distracting and diverting the U.S. Union Army. Camp Babbitt near Visalia was established for a double purpose: to mitigate armed confrontations with local Native American populations and to keep watch over a strong Confederacy-leaning part of the state (Evans, 1862).

In spite of the relatively non-threatening relationship between the Palegewan and the local citizenry, the Commander of Camp Babbitt in Visalia received a petition from a group of miners for protection from the Indians of the Kern River Valley. There were reports of non-local troublemakers in the valley. Captain McLaughlin was being deployed to Owens Valley, and since he would pass by way of Kernville, he was ordered to assess the situation “and if the position of the Indians should be found as favorable as represented, if deemed advisable, will give them battle” (Kern County Historical Society, 1952:5; see Davis-King, 2003). McLaughlin’s men were fully armed and carried weapons to arm 20 additional men. In his report of April 24, 1863, McLaughlin noted that he had arrived safely at Camp Independence (Fort Independence in Owens Valley), but not without first attending to matters on the Kern River rancheria of “Paligawan” near modern Wofford Heights. After chronicling the many depredations supposedly committed by Native people in that area, he commented that the Indians there were largely “strangers in the valley and were thought to be Tehachapi and Owen’s River Indians.”

While some local settlers or miners had accused the native people of depredations, others allegedly tried to protect them (Barras, 1976:76). Concerned at the news that the military was coming, some Tübatulabal went to Judge Joseph Sumner, who was considered sympathetic, for advice. At least two local white men (Judge Sumner and Joseph Cadwell) tried to warn the Indians about the soldiers. Instructing them to flee, Sumner took their weapons so they would not appear threatening when encountered. McLaughlin was angered by this and apparently threatened by Sumner for becoming involved (Garfinkel and Williams, 2011:58–59). Although they had been warned, most local Indians believed that since they were not involved in the Owens Valley conflict, they had nothing to fear.

Apparently, McLaughlin was already acquainted with Jose Chico, a leader in this area who he employed as a guide, as he wrote in his report:

> …learning that Jose Chico was in the neighborhood, I sent for him and two other chiefs who were known to have been friendly. Jose Chico is an Owen’s River Indian, but resides on the Kern River, where he cultivates a farm. He speaks but little English. In Spanish he, however makes himself well understood. From him I learned that the Tehachapis had endeavored to have him go to war with them…that there were many Indians there whom he did not know, either Owen’s or Tehachapis…I informed Dr. George, Mr. Herman and other citizens that I would visit the camps early in the morning, that they might accompany me and vouch of such Indians as they might

> know. Accordingly at 2 a.m. on the 19th…with Jose Chico as guide, I left camp, and at dawn surrounded the [Indian] camp ten miles from Keysville, upon the right bank of the Kern River. I had the bucks collected together, and informed Jose Chico and the citizens…that they might choose out those whom they knew to have been friendly. This was soon done. The boys and old men I sent back to their camps, and the others, to the number of 35…were either shot or sabered…This extreme punishment, though I regret it, was necessary, and I feel certain that a few such examples will soon crush the Indians and finish the war in this and adjacent valleys (Kern County Historical Society,1952:7–8).

There were several witnesses to this massacre, including the future Tübatulabal leader, 13-year-old Steben Miranda (Sew-hu), who shared his recollections of that event with Walker (1958:10–11). Miranda related a similar version of the murders quoted above, saying that he stood by as a helpless witness, left only with the very sad responsibility of burying the slain men, including his father. Another version of the story was relayed to Mark Kerr in 1936 by George Robinson, an Owens Valley Paiute (Kerr, 1936). Powers (1974) provided numerous additional details on the massacre. He said the event occurred on Tilly (Tillie) Creek, near present Wofford Heights. Most accounts say the Owens Valley Indians hid in the rocks by the time McLaughlin's men arrived at the village, leaving the Palagewan to face the militia. The murder of so many Palegewan men was devastating to this group in so many ways with almost all of the adult males killed. There were apparently Yokut, Kawaiisu, and Owens Valley Paiute casualties as well (Tiley and Ruth, 2024:37).

The women and children proceeded to bury their dead. They also returned to their villages and burned the homes of the deceased and destroyed all the property of those who had been killed. The women went into mourning and smeared pine gum and dirt on their faces (Rankin, 1938).

The reaction of the local ranching and farming communities was one of horror. They found the killings utterly reprehensible. Judge Sumner accompanied survivors to his Big Blue Mine, where he gave them foodstuffs and slaughtered a steer (Powers, 1981:54, summarizing Rankin, 1938). Frederick Butterbredt, a Kern River miner, found a woman and her baby hiding in the willows after the massacre. She had just been widowed. Butterbredt called the woman Betty, married her, and raised her baby as his own. Together they raised a large family (Barras, 1984:78).

Lavinia [Nama] Rankin related the immediate aftermath on the lives of the Kawaiisu Indians in Walker Basin:

> …[they] came back to their home near the Lightner place and burned their wigwams and all property belonging to the dead warriors. You could hear the screams and yelps across the valley while the fire was burning. After their funeral exercises were over they came down to our home and sat down in a semi-circle on the ground as evenly as if the places were marked for them. There were about 15 women and they were in full mourning with pine

> gum and dirt daubed all over their faces, groaning and sighing continuously. Mother was grieved for them and brought out everything edible she could find in the house and gave it to them (Rankin, 1938).

Many survivors joined the Pahkanapil on the South Fork of the Kern or married into other nearby Tribes. Needless to say, the massacre is seared into the memories of descendants, who hold semi-yearly remembrance gatherings at the site today. By the 1930s, anthropologists studying the Tübatulabal were provided information mostly regarding Pahkanapil places, as most of the North Fork villages had been abandoned (Voegelin, 1938; Harrington, n.d., 1942 fieldwork). This skewing was heightened by the Dawes Act allotment locations and lands provided after Kelsey's survey of landless and homeless California Indians in 1906, where the great majority of lands allotted were on the SFKR.

Dawes Allotment Act

The Dawes Allotment Act of 1887 was meant to break up larger communal Native American landholdings, thereby making families the landowning unit. It was intended to encourage families to participate in the system as small farmers. Its less stated purposes were to break up social units and to appropriate most of the land held by reservations. In rural California, however, it meant that Indians could "own" land, though the lands were held in trust. Native Californians chose lands important to them, though they were only offered surplus lands with few assets. Allotments were provided to many of the surviving families from the massacre (Taylor. 2002:4).

A search of the BLM General Land Office files for Indian Allotments revealed that at least 86 Indian allotment claims were issued in Kern County. Among these, 6 were identified within T25S, R33E of the 5-mile study area. Five were located in Sections 4, 5, 8, and 9 just west and northwest of the KR3 Powerhouse on the west side of the NFKR. The other was located in Sections 23 and 26 on the east side of the NFKR and south of the present-day town of Kernville (Figure 7.11-4; Table 7.11-1). Four of the allotments/patents adjacent to the Project were sold to SCE and the fifth was sold to a Clare C. Miley. According to U.S. Census record, Miley was a white male born in Ohio in about 1902. The allotment in Sections 23 and 26 were sold to Cecil W. Pascoe, according to U.S. Census records Pascoe was a white male born in California about 1905 (Figure 7.11-4; Table 7.11-2).

SCE no longer owns any of the allotments. Portions of the allotments are now Forest Service, BLM, or other private property. The Allotment program was not a complete success for the government or the Indian Allottees. The parcels were taxed beginning 25 years after they were obtained, and many were lost for non-payment of taxes at that time (Table 7.11-2). The program was not participated in by all families, as knowledge of the available lands was not universally conveyed. The government's attempt to create yeoman farmers by the program was stymied by the poor lands offered, and by the fact that people chose their allotments adjacent to one another, in effect re-forming old communities. The result was a large number of destitute and landless Indian people.

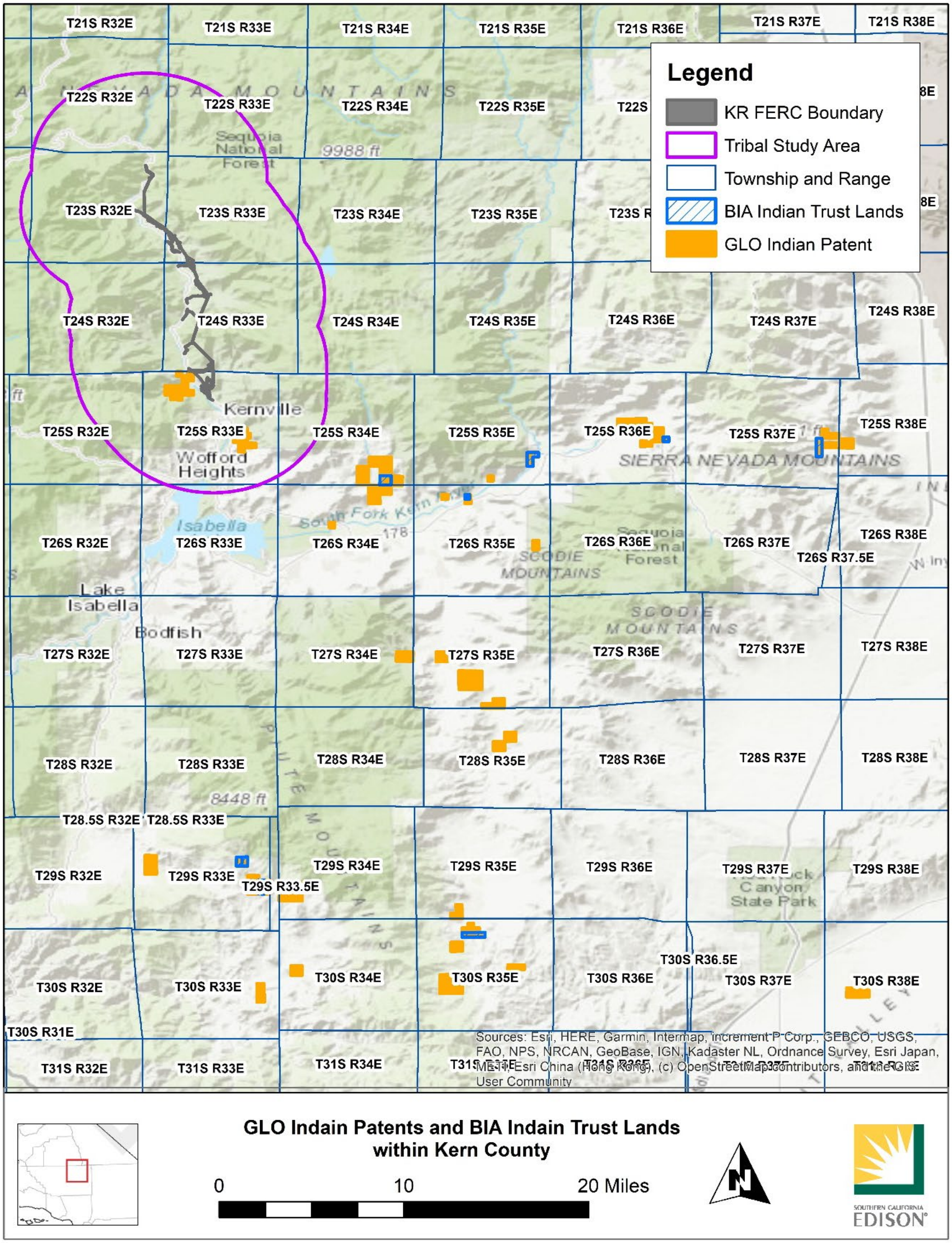


Figure 7.11-4. Map Depicting Locations of Indian Allotments and Current Bureau of Indian Affairs Indian Trust Lands in Kern County.

Table 7.11-1. Original Indian Patent Allotments Within the Study Area

Accession	Names	Date	Doc#	State	Meridian	Twp, Rng	Aliquots	Sec	County
IA-0528-074	Chico, Jose	08/07/1893	N/A	CA	Mount Diablo	25S, 33E	SE¼NE¼	5	Kern
						25S, 33E	SW¼NW¼	4	Kern
IA-0528-075	Chico, Martha	08/07/1893	N/A	CA	Mount Diablo	25S, 33E	NE¼NE¼	5	Kern
						25S, 33E	NW¼NW¼	4	Kern
IA-0537-050	Nicholas, Lottie	01/28/1895	N/A	CA	Mount Diablo	25S, 33E	E½SE¼	5	Kern
						25S, 33E	SW¼SE¼	5	Kern
						25S, 33E	SE¼SW¼	5	Kern
IA-0537-051	Nicholas, Ida	01/28/1895	N/A	CA	Mount Diablo	25S, 33E	N½NW¼	8	Kern
						25S, 33E	SE¼NW¼	8	Kern
						25S, 33E	SW¼SW¼	5	Kern
IA-0537-052	Merriana, Charles	01/28/1895	N/A	CA	Mount Diablo	25S, 33E	W½NE¼	8	Kern
						25S, 33E	NE¼NE¼	8	Kern
						25S, 33E	NW¼NW¼	9	Kern
IA-0537-053	Nicholas, John	01/28/1895	N/A	CA	Mount Diablo	25S, 33E	NE¼NW¼	26	Kern
						25S, 33E	SE¼SW¼	23	Kern
						25S, 33E	S½SE¼	23	Kern
955591 (Indian Reissue Trust)	Nicholass, John (incorrect spelling of last name)	03/19/1925	04231	CA	Mount Diablo	25S, 33E	N½SW¼	23	Kern
						25S, 33E	NW¼NW¼SE¼	23	Kern
						25S, 33E	SW¼NE¼	23	Kern
						25S, 33E	W½NW¼NE¼	23	Kern

CA = California; E = east; N = north; N/A = data not available; NE = northeast; NW = northwest; Rng = Range; SE = southeast; Sec = Section; SW = southwest; Twp = Township; W = west

Table 7.11-2. Sale of Original Indian Patent Allotments within the Study Area

Accession	Names	Date	Doc#	State	Meridian	Twp, Rng	Aliquots	Sec	County
777574 (previously IA-0528-074)	SCE Chico, Jose	10/14/1920	941563	CA	Mount Diablo	25S, 33E	SW¼NW¼	4	Kern
						25S, 33E	SE¼NE¼	5	Kern
777573 (previously IA-0528-075)	SCE Chico, Martha	10/14/1920	941562	CA	Mount Diablo	25S, 33E	NE¼NE¼	5	Kern
						25S, 33E	NW¼NW¼	4	Kern
777575 (previously IA-0537-050)	SCE Nicholas, Lottie	10/14/1920	941564	CA	Mount Diablo	25S, 33E	E½SE¼	5	Kern
						25S, 33E	SW¼SE¼	5	Kern
						25S, 33E	SE¼SW¼	5	Kern
777572 (previously IA-0537-051)	SCE, Nicholas, Ida	10/14/1920	941561	CA	Mount Diablo	25S, 33E	SW¼SW¼	5	Kern
						25S, 33E	N½NW¼	8	Kern
						25S, 33E	SE¼NW¼	8	Kern
1122639 (previously IA-0537-052)	Miley, Clare C. Merriana, Charles	08/20/1947	2141973	CA	Mount Diablo	25S, 33E	W½NE¼	8	Kern
						25S, 33E	NE¼NE¼	8	Kern
						25S, 33E	NW¼NW¼	9	Kern
1103417 (previously IA-0537-053; 955591)	Pascoe, Cecil W., Nicholas, John	06/23/1939	020110	CA	Mount Diablo	25S, 33E	N½SW¼	23	Kern
						25S, 33E	NW¼NW¼SE¼	23	Kern
						25S, 33E	W½NW¼NE¼	23	Kern
						25S, 33E	SW¼NE¼	23	Kern
						25S, 33E	SE¼NW¼NE¼	23	Kern

CA = California; E = east; N = north; NE = northeast; NW = northwest; Rng = Range; S = south; SCE = Southern California Edison; SE = southeast; Sec = Section; SW = southwest; Twp = Township; W = west

Kelsey's Survey

C. E. Kelsey's 1906 Special Indian Census was commissioned by the Office of Indian Affairs to identify homeless/landless Indians in California. The census was used to guide the acquisition of lands to be purchased by the government as trust lands for groups in need. Data from the Kelsey Survey for the vicinity of the Project are listed in Table 7.11-3, which illustrates the degree of post-massacre displacement of Tübatulabal groups from the North Fork Valley to South Fork Valley.

All of the families were listed as "without land." The largest number of Native people in Kern County congregated in South Fork, Tejon, Kelso, Aguacaliente, and Scodie. Kernville is potentially the only community within the 5-mile study area. In the 20th century, many of the surviving families moved to the Tule River Reservation, north of the Project in Tulare County near Porterville.

Table 7.11-3. Kelsey Survey: 1906 Special Indian Census Data of Tribal Inhabitants in the Vicinity of the Project

Location	Name	Family Members
Kernville	Mrs. Jose Chico	2 children
	Piatra	None
	Juana	2 children, 2 grandchildren
Scodie	Bill Chico and wife	2 children
	Frank Chico and wife	5 children
	Jim Chico and wife	2 children, other
	Mrs. Sam (?)	5 children
	Mrs. Pete Salazar	5 children
Walker's Basin	Jack Philip and wife	4 children, mother-in-law
	James Manuel and wife	2 children
	Madeline	4 children
	Tom and wife	5 children, mother-in-law
South Fork	Johnnie Roberts	None
	Pablo Miranda and wife	6 children
	Santos Jack	None
	Stephen Miranda and wife	3 children
	Antonio and wife	1 child
	Joe Antonio and wife	None
	Tian(?) and wife	3 children
	Mrs. Frances Miranda	8 children

Location	Name	Family Members
	Henry Joaquin and wife	3 children
	Charley and wife	5 children
	Mrs. Leon	4 children
	Mrs. Jesus	4 children
	Fernando Jesus and wife	None
	Mrs. Mendoza	5 children
	Tom Pope	1 child
	Mrs. Pete Fernando	2 children
	Felipi and wife	None
	Louis Seco	None
Weldon	Antonia	1 child
	Louisa Sieto	3 children

Tribal Lands in the Vicinity of the Project

The area just south of the Project, where the mainstem of the Kern and SFKR met (now inundated by Isabella Lake), was the core homeland for the Tübatulabal. Rich in archaeological sites and ancestral places, after inundation in the 1950s, people began to move elsewhere, into the SFKR area, upriver beyond Kernville on the mainstem of the Kern River, and elsewhere for work and education. No Tribes in the study area have been recognized by the federal government, leaving small, isolated groups in various communities like Bakersfield, Kernville, Weldon, Lake Isabella, or Onyx to name a few. The Tejon Indian Tribe is the only federally recognized Tribe in Kern County, but the U.S. 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 its reservation lands of nearly 50,000 acres, and is the closest federally recognized Tribe to the Project, roughly 25 miles northwest. Some Indian allotment (federal trust) lands remain in Kern County outside the study area as shown on Table 7.11-2.

7.11.3. Study Approach

7.11.3.1. Archival Studies

The background research task includes the review of documents pertaining to Tribal resources within the study area to facilitate knowledge about past settlement and subsistence practices, past land use, and to capture data about the ethnographic, ethnohistoric and present-day Tribal practices.

Archival materials were accessed from the following repositories:

- Annie Mitchell Local History Research Room, Tulare County Library, Visalia

- California State Library, California History Room
- Harrington (n.d.) fieldnotes
- Huntington Library
- Kern Valley Historical Society and Museum, Kernville
- Tulare County Historical Society, Visalia
- SQF
- SCE Archive (Huntington Library)
- University of California, Berkeley, Bancroft Library many publications online; (Waterman, n.d.)
- Davis-King & Associates reference library

These sources, together with interviews and field visits, provided the context for the cultural importance of the identified sites and areas.

Existing Information

- NAHC Sacred Lands File and Native American Consultation List (NAHC, 2020) identified 13 Tribal groups with affiliation to the vicinity of the Project.
- Nineteen cultural affiliations/heritage associations have been identified by extracting data from mid- to late-20th century ethnographic work in the vicinity.
- An ethnographic background for the existing license (Blount, 1990; Blount and McCarthy, 1990) provided some information about resources. Other available ethnographic literature includes Davis-King et al., 2010; Gehr and Conlan, 1984; Harrington notes, n.d.; Stephen Powers, 1976; Smith, 1978; C. Voegelin, 1935a, 1935b; and E. Voegelin, 1938.
- Local historian, Bob Powers (1974, 1979, 1980, 1989, 1999, 2003) 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.
- Numerous named places known in the study area have been identified to include villages, a massacre site, gathering locales, sacred areas, burial grounds, fishing locales, hunting grounds, and more.

7.11.3.2. Tribal Outreach and Engagement

Identification of Tribes

The California NAHC was contacted via a letter from DKA on behalf of SCE on May 1, 2020. The NAHC responded with a list of Tribal contacts on May 5, 2020. The list was refined by DKA and SCE on May 26, 2020.

Thirteen Tribal groups were identified on the NAHC list, which provides the names of all groups within the topographic quadrangle(s) upon which the Project is situated. The diversity of the groups is indicative of the major transportation corridor, which passed through the Kern River Valley, connecting the Great Basin/eastern Sierra Nevada with the Pacific Ocean. Within these 13 Tribal groups are representatives of at least 19 various bands, Tribelets, and cultural groups, in alphabetical order: the Bankalachi, (Toloim), Chumash, Chunuts, Kawaiisu, Kaweah, Kitanemuk, Koyeti, Kumachisi, Owens Valley Paiute, Pahkanapil, Palagewan, Punkalachi, Tachi, Tübatulabal, Wukchumne, Wuksache, Yaudanchi, Yokodo, and Yowlumne. Several of the groups have participated in working groups and have communicated their interests to SCE. FERC communicates with recognized and unrecognized Tribal groups; this policy is followed by SCE as well.

Tribal Interests

Little field investigation of Tribal groups or interests has occurred in the Project and even the earlier relicensing ethnographic overview was largely an archival review with no in-person ethnographic interviews or field studies (Blount and McCarthy, 1990). Nonetheless, via telephone and U.S. mail, the previous team noted:

> Native American groups in the Project vicinity are very concerned about the preservation of traditionally important sites and locales and have and will continue to take an active role in the management of these resources…In the view of the representative of the Kern River Indian Council, the preservation of traditional sites is linked to the preservation of tribal identity and values of the traditional lifeway [Blount and McCarthy 1990:12].

All of this remains true today. Robert Gomez, in his letter dated August 3, 2021, regarding this Project stated:

> The key take-away here is that the projects (Borel and Kern 3) literally slice through the heart of TTKV Traditional Cultural Places (TCPs). Many of the cultural features, sites and burial areas have been greatly impacted and destroyed after 150 plus years. Whatever remains is sparse and is of great importance as last of its kind by the tribal community.

Field Visits and Interviews

Both Shelly Davis-King and Shelly Tiley communicated regularly with Robert Gomez, Tübatulabal chair, and visited the study area with him. A consultation log is included in the TRI-1 Draft TSR (included in Volume IV of this License Application), which is filed as

Confidential and Privileged (**CUI//CEII/PRIV**). Interviews were conducted in the field and clarified during a debriefing afterward. Shelly Davis-King visited the field with Robert Gomez, Sonny Allen, and Bert Eller between April 14 and 16, 2022. Shelly Tiley met with Robert Gomez in the field on July 6 and 7, 2023.

7.11.3.3. Previous Studies

The recently conducted Tribal and archaeological studies conducted in support of SCE's application to FERC for surrender of SCE's Borel Hydroelectric Project (FERC No. 382) identified and evaluated the NRHP-eligible PHD. The SHPO concurred with the evaluation of the PHD in a letter dated March 5, 2024 (FERC_2023_0920_001).

<u>Palegewan Heartland District</u>

As stated above, the NRHP-eligible PHD (P-15-020634 [CA-KER-11222]) overlaps within the current study area. Tiley and Ruth (2024) identified 76 contributing elements:

> Through information shared by traditional Tübatulabal knowledge bearers and information from ethnographic, ethnohistoric, archaeological, and archival sources, the Palegewan Heartland District is identified as a place of traditional religious and cultural importance that corresponds to the NRHP property type "historic district" with Traditional Cultural Landscape (TCL) significance. The Palegewan Heartland District expands (and renames for clarity) the previously identified and NRHP-eligible Tübatulabal Cultural Landscape District and assumes its previously assigned California Historical Resources Information System resource numbers (P-15-020634 [CA-KER-11222]). The four previously determined NRHP-eligible contributing elements of the Tübatulabal Cultural Landscape District retain their significance at both the individual and district level under the current analysis.
>
> This property can functionally be characterized as a "component landscape" (NPS, 2009) of the larger Tübatulabal ancestral and territorial traditional cultural land/waterscape. The historical significance and ongoing integrity of association, location, setting, and feeling the Tübatulabal people have to the District are defined most directly through living practices and beliefs rooted in Tübatulabal history, traditional practices, and the roles the District's functionally interconnected and holistic traditional cultural land/waterscape plays in helping to sustain and maintain the identity and lifeways of Tübatulabal peoples.
>
> The numerous resources and elements that contribute to the District's historical functions and significance, also help comprise the extent of its boundaries. These include the mountain, canyon, and river features of kuyuluy pann (Kern [River] Canyon) and palage wan (North Fork Kern River) and extends from the District's southern end at lela mup (Miracle Hot Springs), through the Kern River Canyon to its northern end at haxlamup

> near Kernville along the North Fork of the Kern River, Kern County, California. Above yaha waban—the confluence of the North and South Forks of the Kern River—from Wofford Heights, the District extends west into the Greenhorn Mountains along hamboyan (Cane Creek) and pasiwat (Tillie Creek). The historically and functionally interconnected natural and cultural resources of the District serve as contributing elements that help produce and sustain the integrity of association to the Tübatulabal traditional cultural land/waterscape for present and future generations of Tübatulabal.
>
> A total of 76 specific culturally important and interconnected places, including the land/waterscape of the District, which help produce and sustain integrity of location, setting, feeling, and association have been identified as contributing elements of the District. These Tübatulabal ancestral places that continue to convey significance include known villages, a geographical area ethnohistorically recorded as a possible camp site, petroglyph/pictograph features, fishing locations, a gathering area, milling sites, an ancestral navigation and trail complex segment that was also historically used as a road to Keyesville, and the Keyesville Fort. The District also includes the site of the 1863 Keyesville Massacre (previously designated as a TCP named "the 1863 Massacre TCP"), an event that caused the loss of life not only for local Tübatulabal, but also neighboring Kawaiisu, Yokuts, and Owens Valley Paiute people and abandonment of much of the Palegewan heartland. The 1863 Massacre TCP corresponds to the NRHP property type "historic district" with TCP significance, rendering it a functional "component landscape" of the larger District.
>
> Each of these 76 places contribute to the significance of the District under Criteria A and D. Additionally, one place is also eligible as a standalone site with TCP significance under Criteria A, B, C, and D; two places are individually eligible under Criterion C; and one place is recommended eligible individually under Criterion D (see Lloyd et al. 2024 for additional information on standalone eligibility recommendations for archaeological components). It is important to clarify that many Tübatulabal properties of traditional religious and cultural importance (36 CFR 800.16(l)(1)), including North Fork Kern River, have multiple lines and attributes of interconnected function and significance to and for Tübatulabal people. The evaluation of the District recommends that as a historic property, it retains integrity of location, setting, feeling, and association, and is eligible for the NRHP under Criteria A, B, C, and D with individual contributing elements also eligible under Criteria A, C, and D. The District is not excluded from NRHP eligibility by any of the NRHP Criteria. Considerations and its significance extends well over 50 years, from time immemorial [Tiley and Ruth, 2024:26–27].

Tiley and Ruth (2024) further describe the District as:

> In Pahka'anil, the District is known as Paal ege wan ap (Palegewan), or "place of the big river." It is comprised of at least 76 identified Tübatulabal ancestral places, including the District's overall land/waterscape…. This diverse yet unified land/waterscape includes a wide variety of natural and cultural resources that are historically and functionally interrelated and interconnected. Several of these culturally important places are found on both sides of the North Fork of the Kern River from Miracle Hot Springs north to Wofford Heights (the northern terminus of the Project). At Wofford Heights, the District extends west into the Greenhorn Mountains. As part of Tübatulabal cultural practices of movement and return to places of intensive dwelling and homecoming, all identified contributing elements are interconnected networking parts comprising a spatial whole.
>
> Importantly, the previously determined NRHP-eligible 1863 Keyesville Massacre TCP is considered a contributing element to the District. In addition, the District augments the previously determined NRHP-eligible Tübatulabal Cultural Landscape District and its four contributing elements.
>
> The augmentation of the Tübatulabal Cultural Landscape District into the Palegewan Heartland District necessarily involves some updates to the temporal assignment and eligibility determinations. The Tübatulabal Cultural Landscape District has a Period of Significance defined as 2100 YBP [years before present] to ca.1850 and is tied to the Medieval Climatic Anomaly event. The Palegewan Heartland District does not have a strict Period of Significance but is generally defined as "from time immemorial" to the present to encompass the breadth of Tübatulabal history up to and including the present day. Therefore, the more expansive Palegewan Heartland District definition is retained [Tiley and Ruth 2024:64].

Integrity of the Palegewan Heartland District

Tiley and Ruth (2024) discuss the integrity of the PHD as such:

> While the non-contributing elements within and around the District have changed since the contact period, the property retains integrity of location, setting, feeling, and association. The District may also retain integrity of design, materials, and workmanship. The sweeping views from the hillsides afford a view of the Tübatulabal landscape, including villages, places in traditional stories, petroglyphs and pictographs, burial areas, and fishing and gathering places. From the Palegewan village site (KER-410/411/H), one can see the Greenhorn Mountains; the acorn grounds of Tillie Creek and Wagy Flat; and the area south of the massacre site along the North Fork. ho lit hoh lam, hoh lam, Chuk ka yl, and ha ha lam villages are visible from the hilltop.
>
> There are obvious changes to the landscape, the most important of which was the damming of the Kern River, which has inundated parts of the site

and the concomitant wave action, along with erosion, has likely obliterated evidence of the massacre down on the flats. The site may have been disturbed earlier by the construction of the original Borel Canal as well. Nevertheless, the presence of the empty village with the broken ground stone below remains as a testament to the events that transpired here.

There is also integrity of the route of the roads, themselves following old Indian trails. In terms of the massacre landscape, it has also been shown how the convergence of the old road from Visalia to Kernville and the road Keyesville-Kernville Road made the massacre village location into a central place. The descent of the old wagon road to the flats occurs along Tillie Creek and ends adjacent to the village site. At Keyesville, the earthen ditch on the hill behind is the area of the old wagon road. One can easily envision the large groups of soldiers and their equipment being visible at some distance.

Bulletin 38 emphasizes that fundamental to the eligibility identification and evaluation of historic properties with TCP/TCL significance is an understanding that tangible properties, or places, require an accounting for and appreciation of the intangible (i.e., emotional, spiritual, historical, perspectival) qualities that make them culturally significant. “It is vital to evaluate properties thought to have traditional cultural significance from the standpoint of those who may ascribe such significance to them, whatever one’s own perception of them, based on one’s own cultural values, may be” (Parker and King 1998:4). As this suggests, TCPs/TCLs are as much about places that can be felt as they are feelings about places. The property retains sufficient levels of integrity of setting, location, feeling, and association to convey cultural significance.

Rather than taking away from the significance of these resources, post-contact change in the valley has enhanced their importance. Through personal communication, Chairman Gomez has emphasized the importance of place for continuity of cultural traditions as well as the vital importance of healing historical wounds (Robert Gomez, personal communication with Monica Ruth, December 27, 2022). Another project participant stated “Many of the cultural features, sites and burial areas have been greatly impacted and destroyed after 150 plus years. Whatever remains is sparse and is of great importance as last of its kind by the Tribal community.”

The continued relationship with the homeland is illustrated by the current importance of allotment lands. The retention of some Tübatulabal allotment lands has been important in maintaining a relationship with their ancestral territory and their identity. Elton’s 2009 study on the strength and resilience of Tübatulabal people stated that according to Weaver (1998:208) “a sense of connection to the land is a primary factor in the psychological make-up of Indian people…connection to the land is intimately intertwined with Native religion, values, culture, and lifestyle." Today these lands continue to provide source of rootedness in the past and strength in the present. During field visits in March 2022, continued connection of Tübatulabal people to heartland was made evident in several ways, notably when Tübatulabal past-Chairperson Dr. Donna Miranda Begay, Paka'anil Instructors Betsy Johnson and Tina Guerrero, and Chairman Robert Gomez sang a song about yitiyamap, the village site on the Miranda allotment near Weldon, which repeated "yitiyamap swala," swalas meaning "our land" [Tiley and Ruth 2024:72–73].

Significance

The landscape's significance is taken directly from Tiley and Ruth (2024):

> Analysis and synthesis of archaeological records and site forms, available archives and literature, and previous ethnographic studies of the Tübatulabal traditional cultural land/waterscape coupled with insights from Tübatulabal representatives offered during this Study demonstrate that the District is a uniquely important and defined land/waterscape of Tübatulabal ancestral territory. The District is comprised of a wide variety of resources that have historical and traditional religious and cultural inter-functionality and unity, and imbued with Cultural Stories, named places, and sacred geographies. The land/waterscape of the District as a total environment is essential to and for the perseverance and flourishing of the living beliefs, identity, and traditional religious and cultural practices and lifeways of the Tübatulabal people and Tübatulabal Tribe.
>
> Wagi nap u ban, haxlamup, cuhka yl and numerous other named places and geographical landmarks in and of the land/waterscape are historically significant and traditionally important both as standalone features and in their contributions to the sacred geographies of the District's cultural land/waterscape that have endured since time immemorial. They collectively retain the integrity of condition and association necessary to convey their historical significance and ongoing traditional religious and cultural importance. The District and its wide variety of contributing elements convey continued association of the broad patterns of Tübatulabal history including residential patterns, subsistence practices (including plant gathering and fishing), places in and of traditional stories and songs, historic family ties between hamlets, and a cemetery. The District also conveys association with the historical 1863 Keyesville Massacre through several contributing elements, including the portion of the historic road between Keyesville and the massacre site; the pictograph site depicting the military involvement in the massacre (KER-19); the previously determined TCP (the village site, KER-410/411/H, and the approximate location of the massacre and potential graves associated with this event). These District elements also convey difficult histories and geographies and serve as places of the

tragic outcome of early conflict between Native inhabitants and white settlers.

The District conveys both positive and negative interactions with Anglo settler society and the associated events that occurred within the District have made significant contributions to the broad patterns of Tübatulabal history. The District is not excluded from NRHP eligibility by any of the NRHP Criteria Considerations and its significance extends well over 50 years, from time immemorial. As a district of intensive past, present, and future historical and cultural importance that is associated with events that have made significant contributions to the broad patterns of Tübatulabal history and identity since time immemorial and which continues to express and convey traditional histories and sacred geographies of and for the Tübatulabal people, following the NRHP evaluation Criteria and guidance outlined in Section 2.1 [of Tiley and Ruth (2024)] the Palegewan traditional cultural land/waterscape meets Criterion A of the NRHP as a historic district with TCP and TCL significance.

The District is also eligible for the NRHP under Criterion B. Criterion B provides that a property is eligible if it is associated with the lives of persons significant in our past, "our" referring to the people who regard the property as significant. Per information provided by Tübatulabal Chairman Robert Gomez in a letter dated March 6, 2023, individuals who figure importantly in the Tribe's history are intimately associated with the District. This includes individuals who served as community historians, documentarians, cultural practitioners, knowledge bearers, and shamans who offered rare experiential insights into and recordings of the interconnected and holistic traditional cultural land/waterscape of the District and of the events surrounding the 1863 Keyesville Massacre. Chairman Gomez identified eight individuals—Esteban Miranda, Willie Miranda, wišimlïʼt (Wisimlet), Solo'bul, Jose Chico, Petra Miranda, and the unnamed lone Tule River Indian survivor and an Owens Valley Indian survivor of the 1863 Keyesville Massacre. It is also important to note, as Anthropologist Tom King identifies, "…if a community believes that the places where its ancestors lived must be respected in order to respect the ancestors—or perhaps because such places retain the power of the ancestors—and if this belief is important to the community's cultural integrity, then the archeological remains of any ancestral living place surely comprise a traditional cultural property for that community, regardless of whether the community's oral history specifically mentions that particular site […] [and i]f the community reveres its traditional ancestors, surely their living sites can be eligible under Criterion B" (King 1993:63).

The District is eligible under Criterion C as a unique cultural landscape that includes many features representing work of high artistic cultural values via rock art and other specialized items (e.g., broken ground stone).

> The District is also a unique place to learn and teach about processes of Tübatulabal tradition, identity, and practice as well as settler colonial society and government actions of exclusion, disenfranchisement, marginalization, displacement, and alienation of Tübatulabal people, and how Tübatulabal people persevered in the face of this imposed change to protect the integrity and sanctity of Palegewan. As an intensive and unique land/waterscape of historical and cultural importance that supports the perseverance and development of intergenerational education and teaching of the time period of 1863 and associated positive and painful events that convey how Tübatulabal people have negotiated and navigated continuity in the face of alienating and often violent imposed changes from colonial settler society, governance, and industry, the District is eligible for listing on the NRHP as a historic district with TCP and TCL significance under Criterion D…[Tiley and Ruth 2024:74–75].

7.11.4. Study Results

As noted above, the TRI-1 and the Borel Tribal study areas overlapped. Several Tribal resources identified during implementation of the TRI-1 Study were also identified during the Borel Tribal and Archaeological Studies and were previously identified as contributing elements to the PHD.

As outlined Tiley and Ruth (2024) and in Section 7.11.3.3, *Previous Studies*, the PHD was identified via archival ethnographic and archaeological studies and incorporated multiple previously determined eligible NRHP properties, including but not limited to the 1863 Massacre Site TCP and the Tübatulabal Cultural Landscape District. A crucial item in developing the PHD was the ethnographic map provided by Robert Gomez, Tübatulabal Chairman, that includes Tribal places identified from various sources including Tribal members.

The previous study identified 76 contributing elements to the PHD, of which 26 fall within the study area of TRI-1 Study. The SHPO in a letter dated March 5, 2024, concurred with the findings presented in the Borel Study that the PHD is eligible for listing on the NRHP under Criteria A, B, and D and requested additional information in support of Criterion C (Polanco, 2024; SHPO Reference No. FERC_2023_0920_001).

7.11.4.1. Expansion of the Palegewan Heartland District

The current study identified 41 contributing elements to the PHD within the study area of the TRI-1 Study. Of these 41, 15 are newly identified contributing elements to the PHD, 7 are within the APE, and 8 are within the ADI. Of the 15 newly identified contributing elements, 9 elements are archaeological sites, 4 are ethnographic locations, and 1 is an ethnohistoric location with archaeological remains. In addition, to information on the newly identified ethnographic contributing elements, this study produced additional Tribal information about one of the previously identified contributing elements within the current study area. All newly identified contributing elements are listed in Table 7.11-4.

Table 7.11-4. Identified Contributing Elements of the Palegewan Heartland District

PHD Count	Name(s)	Translation/Comments	Map No. [a]	Standalone NRHP Eligibility	Contributes to NRHP Eligibility of District under Criteria A and D [b]	In Relation to the Project [b]
1	*kuyuluy pann*	Kern River Canyon—geographic feature	-	Undetermined	Yes	Within study area
2	*palage wan*	Unaugmented and augmented North Fork of Kern River—geographic feature	-	Undetermined	Yes	Within study area
3	*paal ege wan ap*	"place of the big river;" the PHD (P-15-020634 [CA-KER-11222])	-	Eligible under A, C, and D[c, d]	-	Within study area
4	*pauwita, pawi taal halapp, pawa cha hal lap, kathinapalaz az-hani-liz*	Acorn grounds; Last name means "where people were killed;" archaeologically designated P-15-000410/000411 (CA-KER-410/411H)	18	Eligible as a TCP under A,[e] B, and D[d]	Yes, and B, C	Within study area
5	-	Archaeologically designated P-15-000413 (CA-KER-413)	27	Undetermined	Yes	Outside
6	-	Archaeologically designated P-15-001686 (CA-KER-1686)	28	Undetermined	Yes	Outside
7	-	Archaeologically designated P-15-001687 (CA-KER-1687)	29	Undetermined	Yes	Outside
8	-	Archaeologically designated P-15-000681 (CA-KER-681/H)	34	P—eligible under D, H—not Eligible [d]	Yes	Outside
9		May correspond with *pa ha pi tap* (map #37 below); Archaeologically designated P-15-021408 (CA-KER-11495)	42	Undetermined	Yes	Outside
10	-	Archaeologically designated P-15-015660 (CA-KER-8644)	59	Undetermined	Yes	Outside
11	*hamboyan*	Cane Creek	-	Undetermined	Yes	Within study area
12	*palu-hi-yam*	"Little Water," South Fork Kern River	-	Undetermined	Yes	Outside

PHD Count	Name(s)	Translation/Comments	Map No. [a]	Standalone NRHP Eligibility	Contributes to NRHP Eligibility of District under Criteria A and D [b]	In Relation to the Project [b]
13	*pasiwat*	Tillie Creek	-	Undetermined	Yes	Within study area
14	*wagi nap u ban*	Split Mountain; "bullet hawk mountain" "That mountain over there, that is split mountain where Raven and Hawk were having a race and raven decided to cut a hole in the mountain so he could be to the other side faster, but Hawk still won" (Robert Gomez, interview notes, 2021)	1	Undetermined	Yes	Within study area
15	*haxlamup*	Unknown/none	2	Undetermined	Yes	Within study area
16	*packictop*	Caldwell Canyon; story of magic dogs	3	Undetermined	Yes	Within study area
17	*tucukal*	Means "cemetery"	4	Undetermined	Yes	Within study area
18	*cuhka yl; tcuxcayl*	Village at hot springs; the birthplace of Robert Gomez's mother (Robert Gomez, interview notes, 2021).	5	Undetermined	Yes	Within study area
19	*tumhupul*	Cane Peak	6	Undetermined	Yes	Within study area
20	*mokkilap; tsu kayl*	Big Blue Mine	7	Undetermined	Yes	Within study area
21	*ho hlam; hohlam*	Later Quartzburg, established 1873; "in canyon of unaugmented Kern between Kernville and Cowell Creek" (Voegelin, 1938:41).	8	Undetermined	Yes	Within study area
22	*wewexyu'lle*	Bath house in a meadow, now inundated; houses all along this area	9	Undetermined	Yes	Within study area
23	*pi li wi ban; piliwinipan*	Village	10	Undetermined	Yes	Within study area
24	*tex x kay'l*	Hot springs by Old Kernville	11	Undetermined	Yes	Within study area
25	*xaxlam*	Lake in river; identified as near both the old and new Kernville locations	12	Undetermined	Yes	Within study area

PHD Count	Name(s)	Translation/Comments	Map No. [a]	Standalone NRHP Eligibility	Contributes to NRHP Eligibility of District under Criteria A and D [b]	In Relation to the Project [b]
26	*la la-nup pa sil; nalamup*	Place to gather chia seeds	13	Undetermined	Yes	Within study area
27	*pawacahalap*	Acorn grounds of Tilley Creek	14	Undetermined	Yes	Within study area
28	*picki pitap*	Close to massacre-associated hill?	15	Undetermined	Yes	Within study area
29	*pal-ca-wahn*	"in the willows" is this the actual massacre location?	16	Undetermined	Yes	Within study area
30	*nemi es*	Named place	17	Undetermined	Yes	Within study area
31	*mui na pan*	Named place	19	Undetermined	Yes	Outside
32	*xaxlam*	Lake In riverbed; location contradicts Gehr and Conlon, location 18	20	Undetermined	Yes	Within study area
33	*[unknown]*	Possible camp	21	Undetermined	Yes	Outside
34	*lonat*	Named place	22	Undetermined	Yes	Within study area
35	*walwiyawilat*	Hill: "place where the winds fight"	23	Undetermined	Yes	Outside
36	*to labupun*	Named place	24	Undetermined	Yes	Outside
37	*mox wop*	Named place	25	Undetermined	Yes	Outside
38	*kunul*	Named place	26	Undetermined	Yes	Outside
39	*pa wit aa*	Note similarity with item #18, but both sources identify this as a separate place	30	Undetermined	Yes	Outside
40	-	Archaeologically designated P-15-000682 (CA-KER-682 [FS 05-13-54-00775])	31	Undetermined	Yes	Outside
41	-	Archaeologically designated P-15-000415 (CA-KER-415)	32	Undetermined	Yes	Outside
42	-	Archaeologically designated P-15-021395 (FS 05-13-54-00361)	33	Undetermined	Yes	Outside

PHD Count	Name(s)	Translation/Comments	Map No. [a]	Standalone NRHP Eligibility	Contributes to NRHP Eligibility of District under Criteria A and D [b]	In Relation to the Project [b]
43	-	Archaeologically designated P-15-000689 (CA-KER-689 [FS 05-13-54-00781])	35	Undetermined	Yes	Outside
44	-	Archaeologically designated P-15-000680 (CA-KER-680 [FS 05-13-54-00773)	36	Undetermined	Yes	Outside
45	*pa ha pi tap*	May correspond with archaeologically designated P-15-021408 (CA-KER-11495)	37	Undetermined	Yes	Outside
46	-	Archaeologically designated P-15-021416 (CA-KER-11503)	38	Undetermined	Yes	Outside
47	*an wa lap*	Unknown/None	39	Undetermined	Yes	Outside
48	-	Archaeologically designated P-15-021419 (CA-KER-11505)	40	Undetermined	Yes	Outside
49	-	Archaeologically designated P-15-021418 (CA-KER-11504/H)	41	Undetermined	Yes	Outside
50	*wa'lip*	Sitting Rock	43	Undetermined	Yes	Outside
51	-	Archaeologically designated P-15-000010 (CA-KER-10)	44	Undetermined	Yes	Outside
52	-	Archaeologically designated P-15-000009 (CA-KER-9 [05-13-54-00737])	45	Undetermined	Yes	Outside
53	*yaha waban, yaha wapan, yahuapan, poho mak, yu'mu gi wala'an pa I na* 'aban	Junction of North Fork and South Fork of the Kern River; Harrington's name is not a cognate. Kroeber calls Yahuapan a village, this is not supported by others; last term refers to mythological creatures. There are several mentions of *yumugiwal* in the Charles Voegelin text for the "Blood-Clot Boy" story (1935:213). *Yumugiwal* are Brownies (Voegelin, 1938:61), a set of creatures that live in remote places.	46	Undetermined	Yes	Outside

PHD Count	Name(s)	Translation/Comments	Map No. [a]	Standalone NRHP Eligibility	Contributes to NRHP Eligibility of District under Criteria A and D [b]	In Relation to the Project [b]
54	-	Archaeologically designated P-15-021420 (CA-KER-11506)	47	Undetermined	Yes	Outside
55	*loklam*	Isabella Auxiliary Dam area	48	Undetermined	Yes	Outside
56	*ob papa toy*	West side Yankee Canyon near mouth	49	Undetermined	Yes	Outside
57	*pazit*	Springs 2 miles northeast of *mohamabala* (Cook Peak)	50	Undetermined	Yes	Outside
58	-	Soldiers and horses pictograph; archaeologically designated P-15-000019 (CA-KER-19)	51	Undetermined	Yes, and C	Outside
59	*ho kaip*	West of canal in Lake Isabella city	52	Undetermined	Yes	Outside
60	*hog'up'*	Hogeye Gulch	53	Undetermined	Yes	Outside
61	*kish-willa*	Possible cognate of Keyesville?	54	Undetermined	Yes	Outside
62	-	At Keyesville	55	Undetermined	Yes	Outside
63	*loxlam*	Mammoth Mine	56	Undetermined	Yes	Outside
64	*'u puwa gannam*	Ridge between Scovern hot springs and Kern River Canyon	57	Undetermined	Yes	Outside
65	*pasgestap; paskixt; kamma pan paci lau*	At Scovern Hot Springs; Harrington notes "lots of Indians" lived at foot of hill	58	Undetermined	Yes	Outside
66	*mohomabala*	Cook Peak	60	Undetermined	Yes	Outside
67	*palakuc*	Archaeologically designated P-15-000017 (CA-KER-17)	61	Undetermined	Yes, and C	Outside
68	*'u kat'lap*	Erskine Canyon	62	Undetermined	Yes	Outside
69	*lela mup*	Miracle Hot Springs	63	Undetermined	Yes	Outside
70	*ukatap*	Unknown/None	64	Undetermined	Yes	Outside

PHD Count	Name(s)	Translation/Comments	Map No. [a]	Standalone NRHP Eligibility	Contributes to NRHP Eligibility of District under Criteria A and D [b]	In Relation to the Project [b]
71	*'m katap*	Havilah Canyon	65	Undetermined	Yes	Outside
72	-	Archaeologically designation P-15-020620 (CA-KER-11210)	66	Eligible under A [f]	Yes	Outside
73	-	Archaeologically designation P-15-000012 (CA-KER-12 [05-13-54-00740])	67	Eligible under A [g]	Yes	Outside
74	-	Archaeologically designation P-15-018205 (CA-KER-9954)	68	Eligible under C [h]	Yes, and C	Outside
75	-	Archaeologically designated P-15-002528 (CA-KER-2528)	69	Eligible under C [h]	Yes, and C	Outside
76	-	Trail and/or road from Keyesville; archaeologically designated P-15-021417	70	Not Eligible [d]	Yes	Within study area
77	*Wuit*	Name of creek, Gomez Map No. 101	71	Undetermined	Yes	Within the APE
78	*Holo'odap*	Fishing site on the Kern, Gomez Map No. 74	72	Undetermined	Yes	Within the APE
79	*Hohokanan*	Pregnant women's rock, Gomez Map No. 103	73	Undetermined	Yes	Within the APE
80	*Holit*	Chico Ranch; archaeological designated P-15-002398 (CA-KER-2398 [05-13-56-00021]), Gomez Map No. 73	74	Undetermined	Yes	Within the APE
81	*Iohlam*	Bull Run Creek, Gomez Map No. 102	75	Undetermined	Yes	Within the APE
82	-	Archaeologically designated P-15-002527	76	Eligible under D[i]	Yes	Within the APE
83	-	Archaeologically designated P-15-002517 (CA-KER-2517 [FS 05-13-566-00823])	77	Eligible under D[i]	Yes	Within the APE
84	-	Archaeologically designated P-15-018562 (CA-KER-10157)	78	Undetermined	Yes	Within the ADI

PHD Count	Name(s)	Translation/Comments	Map No. [a]	Standalone NRHP Eligibility	Contributes to NRHP Eligibility of District under Criteria A and D [b]	In Relation to the Project [b]
85	-	Archaeologically designated P-54-000868 (CA-TUL-868/H [FS 05-13-56-00239/H]; FS 05-13-56-00067)	79	P—unevaluated [j] H—non-CE to KR3HD, not individually eligible	Yes	Within the ADI
86	-	Archaeologically designated P-54-000875 (CA-TUL-875/H, [FS 05-13-56-00228])	80	P—unevaluated [j] H—CE to KR3HD, individually eligible	Yes	Within the ADI
87	-	Archaeologically designated P-54-004636/P-54-005414 (CA-TUL-2889H [FS 05-13-54-00708]; CA-TUL-3164/H)	81	P—unevaluated [j] H—CE to KR3HD, individually eligible	Yes	Within the ADI
88	-	Archaeologically designation P-54-004637 (CA-TUL-2890/H [FS 05-13-54-00709]; 05-13-54-00855)	82	P—eligible under Criteria C and D [j] H—CE = to KR3HD, individually eligible	Yes, and C	Within the ADI
89	-	Archaeologically designation P-54-004819 (CA-TUL-2993/H; P-54-004646 [CA-TUL-2889H; FS 05-13-54-00719]; P-54-004647 (FS 05-13-54-00720); P-54-004648 [CA-TUL-2900/H; FS 05-13-54-00721]; P-54-004649 [CA-TUL-2901H; FS 05-13-54-00722])	83	P—eligible under Criteria C and D [j] H—CE to KR3HD, individually eligible	Yes, and C	Within the ADI
90	-	Archaeologically designation: P-54-000865 (CA-TUL-865/H [FS 05-13-56-00236])	84	H—CE to KR3HD, individually eligible P—unevaluated	Yes	Within the ADI
91	-	Archaeologically designation: P-54-001477 / P-54-004641 (CA-TUL-1477; CA-TUL-2894/H [FS 05 13 54 713])	85	H—non-CE to KR3HD, not individually eligible P—CE to the PHD, individually unevaluated	Yes	Within the ADI

ADI = Area of Direct Impact; CE = contributing element; H = historic era; KR3 = Kern River No. 3; KR3HD = Kern River No.3 Hydroelectric Project Historic District; NRHP = National Register of Historic Places; P = precontact; PHD = Palegewan Heartland District; SHPO = State Historic Preservation Officer; TCP = Traditional Cultural Property

Notes:

[a] Map number correspond to the District map legend (see the TRI-1 Draft TSR included in Volume IV of this License Application). Places without a number are identified as landscape features on the map.

[b] Contributing elements within or outside the study area identified by Tiley and Ruth (2023) and/or Llyod et al. (2023). Contributing elements within APE and ADI identified in the TRI-1 Draft TSR and/or the CUL-1 Archaeology Draft TSR (both provided in Volume IV of this License Application).

[c] Eligibility recommendations as described in Tiley and Ruth (2024). SHPO concurrence in a letter dated March 5, 2024.

[d] Eligibility recommendations as described in Lloyd et al. (2024). SHPO concurrence in a letter dated March 5, 2024.

[e] SHPO concurrence in a letter dated March 25, 2004.

[f] SHPO concurrence in a letter dated August 5, 2021.

[g] SHPO concurrence in a letter dated February 14, 2017.

[h] SHPO concurrence in a letter dated April 16, 2015.

[i] SHPO concurrence in a letter dated March 6, 1991.

[j] Eligibility determinations or recommendations as described in the CUL-1 Archaeology Draft TSR (provided in Volume IV of this License Application).

7.11.4.2. Summary of Results

The study conducted in consultation with Tribes identified 15 additional contributing elements to the NRHP-eligible PHD (P-15-020634 [CA-KER-11222]). The PHD now includes 91 specific locations plus the land-waterscape of the District itself, of which 41 are located within the study area for the TRI-1 Study; of those, 15 are located within the Project APE, while only 8 are within the Project ADI. The District's contributing elements located within the Project APE consist of ethnographic places including villages, fishing locations, and geographic features along with archaeological and rock art resources.

7.11.5. Proposed Environmental Measures

SCE proposes to implement the following environmental measure related to Tribal resources:

- Measure CR-1, *Historic Properties Management Plan*

The proposed measure and its key features related to Tribal resources are described below. Refer to Appendix E.1 for the complete description of measures SCE proposes to include in any new license issued for the Project.

7.11.6. Potential Project Effects

FERC's decision to issue a new license is considered an "undertaking" pursuant to 36 CFR 800.16(y), and the NHPA requires federal agencies to consider the effect of undertakings on historic properties and provide the Advisory Council on Historic Preservation an opportunity to comment. Project O&M activities have the potential to affect cultural and Tribal resources, TCPs, and other resources of traditional, cultural, or religious importance to the Native American community.

The purpose of identifying effects is to determine which resources may have heritage values compromised or altered and aid in the development of management/protection measures that would be incorporated into the HPMP for the Project. The following sections describe the potential effects of the proposed Project, including the proposed environmental measures, on Tribal resources. Unavoidable adverse effects on Tribal resources are discussed at the end of this section and summarized in Section 10.0, *Conclusions and Recommendations*.

7.11.6.1. No-Action Alternative

Under the No-Action Alternative, the Project would continue to operate under the terms and conditions of the current license, as described in Section 5.1, *No-Action Alternative*. The No-Action Alternative is considered the environmental baseline for this analysis of potential effects. Potential effects on Tribal resources were identified in FERC's SD2 (FERC, 2022) and were based on an evaluation of continued O&M activities described as part of the proposed Project (Section 5.2, *Proposed Action Alternative*). Potential effects identified in FERC's SD include the following:

- Effects of continued Project O&M on historic or archaeological resources in the Project-affected area, including TCPs that may be eligible for inclusion in the NRHP, or on other areas or places of religious, cultural, and traditional importance to Indian Tribes.

Project-Related Effects on Tribal Resources

The current study identified eight contributing elements to the PHD within the ADI, all of which are archaeological resources and Tribal resources. Section 7.10, *Cultural Resources*, identifies and addresses potential effects on the archaeological component of those resources. Currently, no additional potential effects on the 8 contributing elements have been identified.

Current Cultural Resources Management Plan

As part of the previous relicensing, SCE prepared a document titled *Cultural Resources Management Plan for Southern California Edison Company's Kern River No. 3 Hydroelectric System Kern and Tulare Counties, California FERC Project No. 2290* (Taylor, 1991). The plan identifies specific measures undertaken by SCE to avoid adverse effects on the NRHP-eligible properties located within the FERC Project Boundary and various programmatic measures that SCE is required to implement. Resource monitoring and recordation of the NRHP within the FERC Project Boundary is required to occur in three 5-year increments to determine the success of current measures and evaluate the need for additional treatment.

7.11.6.2. Proposed Action Alternative

Under the proposed Project, SCE would continue to operate the Project as described in Section 5.1, *No-Action Alternative*. However, SCE proposes minor adjustments to Project O&M with the implementation of new or modified environmental measures, which are described in Section 5.2, *Proposed Action Alternative*, and summarized below.

Proposed Historic Properties Management Plan

Under proposed Measure CR-1, SCE would draft a new HPMP in consultation with the Cultural Resources TWG to address potential effects from Project O&M activities on NRHP-eligible and unevaluated properties located within the FERC Project Boundary and submit the HPMP to FERC with the FLA.

The HPMP would provide a guiding philosophy and specific steps for how SCE can assess potential Project-related effects on the historic properties under its control with the overarching goal of avoiding adverse effects to those properties whenever possible or minimizing those effects when they are unavoidable. The HPMP will address how to appropriately manage both archaeological and built-environment resources.

Furthermore, the HPMP would establish procedures for avoiding and minimizing adverse effects on both archaeological and built-environment resources that are unevaluated or determined eligible for listing in the NRHP, either as a contributing resource to one of the historic districts or as individually eligible for listing in the NRHP.

FERC Project Boundary Modifications

Pursuant to 18 CFR § 4.41, the FERC Project Boundary must encompass all lands necessary for Project purposes, including the Project O&M, over the term of the FERC license. The FERC Project Boundary would be modified (increased and/or decreased) under the proposed Project to (1) include all lands necessary for Project O&M; (2) remove lands no longer necessary for Project O&M; and (3) correct known errors in the current Exhibit G for the Project. These revisions will be depicted on the maps provided in Exhibit G as part of the FLA.

SCE is currently working with the SQF to obtain approval and reach agreement on terms of the modifications and would file a complete set of revised Exhibit G drawings in accordance with the regulations at 18 CFR § 4.39 and §4.41(h). Proposed changes to the FERC Project Boundary will be described and addressed as part of the Final License Application.

Project Facilities

Existing Project facilities are described in Section 5.1.2, *Existing Project Facilities*. These facilities would remain unchanged under SCE's proposed Project. SCE does not propose any changes to existing storage/generation capacity under the Proposed Action.

Project Operations

Under the proposed Project, SCE would continue to operate the Project to generate power for its customers consistent with regulatory requirements (i.e., FERC License Articles as modified by conditions included under the proposed Project and existing water rights held by SCE). In addition, SCE would continue to operate the Project in run-of-river mode generally consistent with water management practices, described in Section 5.1.7.1, *Project Operations and Maintenance*, with the changes that include minor adjustments in response to the implementation of environmental measures, as described in the following subsections.

Project Maintenance

Under the proposed Project, routine inspection and maintenance activities would continue to be implemented as described for the No-Action Alternative in Section 5.1.5, *Project Maintenance*.

7.11.6.3. Effects on Tribal Lands

No federally recognized Tribal lands are located within or near the FERC Project Boundary. Therefore, implementation of the proposed Project would have no effect on Tribal lands.

7.11.6.4. Unavoidable Adverse Effects

Additional Tribal resources field work and analysis is required to fully assess potential effects under the proposed Project. This additional analysis will be completed prior to and described in the FLA.

7.12. SOCIOECONOMIC RESOURCES

This section describes the assessment for socioeconomic resources, including the population and employment in Kern and Tulare Counties and applicable management direction regarding socioeconomic resources within the FERC Project Boundary, surrounding lands, and Project bypass reaches. Section 7.12.1 discusses the affected environment and resource conditions under current Project O&M (i.e., baseline condition). Section 7.12.2 identifies environmental measures, management plans, and programs that are included in the proposed Project. Section 7.12.3 includes an analysis of ongoing or new environmental effects of O&M activities from the proposed Project, including potential effects from proposed measures. The full description of proposed measures is provided in Appendix E.1.

The descriptions in this section were developed using existing, relevant, and reasonably available information and includes the following additional sources:

- U.S. Census Bureau data on population and housing (U.S. Census Bureau, 2010, 2022a, 2022b, 2022c, 2022d, 2022e)
- Federal Reserve Bank of St. Louis data on unemployment (U.S. Census Bureau of Labor Statistics, 2024a, 2024b)
- Financial and employment information for Tulare and Kern Counties (County of Kern, 2023; County of Tulare, 2021; Dean Runyan Associates, 2024)
- California Department of Finance reports on population and income (California Department of Finance, 2020)

This assessment also includes results from the following relicensing studies where additional information was collected to further describe the resources:

- REC-2 Recreation Facilities Use Assessment
- EJ-1 Environmental Justice

The REC-2 and EJ-1 Technical Memoranda that include information to support the socioeconomic analysis are provided in Appendix E.2. Related resource information pertinent to the discussion of socioeconomic resources is summarized herein with additional information provided in Section 7.7, *Recreation Resources*; Section 7.8, *Land Use Management and Resources*; and Section 7.13, *Environmental Justice*.

7.12.1. AFFECTED ENVIRONMENT

7.12.1.1. Population Patterns

Key demographic variables considered in this section are population, housing, income and poverty, key industries, and employment. Per the 2022 U.S. Census Bureau American Community Survey (ACS) 5-year estimates (the most recent year for which data have been published), Kern County has a population of 906,883 people, and Tulare County has a population of 473,446 people. Between 2010 and 2022, the total population of Kern County increased by 7.7 percent, and the population of Tulare County increased by 6.7 percent. The total population within the two-county area increased by 7.3 percent between 2010 and 2022 (Table 7.12-1).

In 2022, the median age of Kern and Tulare County residents was 32.2 and 31.8, respectively. Both counties have a lower median age than the state of California, which has a median age of 37.9 (U.S. Census Bureau, 2022a). In 2022, the largest racial group in the two-county area was Hispanic, representing approximately 59 percent of the area's population (U.S. Census Bureau, 2022c).

The population of Kern County is projected to grow to 940,257 by 2030 and 954,655 by 2060, a 3.7 percent increase by 2030 and 5.3 percent increase by 2060, relative to 2022. Tulare County's population is projected to grow to 487,378 by 2030 and then decline to 446,588 by 2060, a 2.9 percent increase by 2030 and then 5.7 percent decrease by 2060, relative to 2022 (California Department of Finance, 2020).

Table 7.12-1. Population and Racial Demographics in Kern and Tulare Counties

Population	**Kern County**	**Tulare County**	**Total**
2022 population	906,883	473,446	1,380,329
2010 census population	842,207	443,688	1,285,895
Median age	32.2	31.8	N/A
Racial demographics	**Kern County**	**Tulare County**	**Weighted Total**
White	285,219	125,362	410,581
Black or African American	44,199	6,183	50,382
American Indian and Alaska Native	3,429	2,100	5,529
Asian	43,481	16,306	59,787
Native Hawaiian and Other Pacific Islander	1,044	568	1,612
Two or more	24,493	8,265	32,758
Other	3,313	1,708	5,021
Hispanic	501,705	312,954	814,659

Sources: U.S. Census Bureau, 2022b, 2022c

N/A = data not available

7.12.1.2. Housing

The closest city/town to the Project is Kernville, which is adjacent to Project facilities. Other nearby communities are Wofford Heights (4 miles) and Johnsondale (4 miles).

Between 2018 and 2022, the average household size was 3.19 persons per owner-occupied household in Kern County and 3.28 persons in Tulare County (Table 7.12-2). A total of 452,877 housing units were located in Kern and Tulare Counties. Across the counties, Kern had a total vacancy rate of around 8 percent; Tulare had a total vacancy rate of around 7 percent. The rental vacancy rate for Kern County was 3.7 percent, and the rental vacancy rate for Tulare County was 2.5 percent (Table 7.12-3). For both counties, the main population centers are in the western portions of the counties within the Central Valley, which is also where most of the housing stock is located. Vacancy rates at the town level were recorded by the U.S. Census Bureau as being between 32 and 51 percent. However, the high margins of error on these small population areas led to the exclusion of these areas from Table 7.12-3; detailed information on vacancy rates for the two-county area would require a standalone housing study, which was not deemed necessary for this Project.

Home prices in Kern and Tulare Counties are lower than those in California overall. In 2022, the median price for a single-family home was $282,800 in Kern County and $280,900 in Tulare County, while the median price for California was $659,300.

Table 7.12-2. Housing Demographics in Kern and Tulare Counties

Housing Information	Kern County	Tulare County
Average household size of owner-occupied unit (2018–2022)	3.19	3.28
Average household size of renter-occupied unit (2018–2022)	3.15	3.39

Source: U.S. Census Bureau, 2022d

Table 7.12-3. Housing Units, Vacancy Rates, and Home Prices in Kern and Tulare Counties

County and Town	Total Housing Units (number)	Total Vacancies (number) [a]	Rental Vacancy Rate (%) [a]	Median Home Prices
Kern County	301,687	24,188	3.7	$282,800
Kernville	682	297	NA	$240,300
Wofford Heights	1,792	581	NA	$148,900
Tulare County	151,190	10,520	2.5	$280,900
Johnsondale	3,993	2,051	NA	$315,400

Source: U.S. Census Bureau, 2022d

NA = not applicable
Note:
[a] Vacancy rates for the towns have high margins of error (ranging from 5% for Johnsondale to 10.7% for Wofford Heights and 21.3% for Kernville). These high margins of error make the total vacancies in these towns unreliable without further information and was, therefore, excluded.

7.12.1.3. Economic Indicators

Key Industries and Employment

In Kern County, the top three employment industries are educational services (21.9 percent); agriculture, forestry, fishing and hunting, and mining (14.2 percent); and retail trade (10.6 percent) (Table 7.12-4). Similarly, in Tulare County, the top three employment industries are educational services (22.2 percent); agriculture, forestry, fishing and hunting, and mining (15 percent); and retail trade (10.2 percent) (U.S. Census Bureau, 2022e).

The top five employers for Kern County are Edwards Air Force Base, County of Kern, China Lake Naval Weapons Center, Grimmway Farms, and Dignity Health (Kern EDC, 2023). The top five employers for Tulare County are the County of Tulare, Kaweah Health Care, Sierra View District Hospital, Walmart, and College of the Sequoias (Tulare County Economic Development Office, 2024).

Table 7.12-4. Employment by Industry in Kern and Tulare Counties

Industry	2022 Employment by Industry	
	Kern County	Tulare County
Agriculture, forestry, fishing and hunting, mining	50,824	28,708
Construction	26,297	12,604
Manufacturing	19,559	15,820
Wholesale trade	8,204	5,548
Retail trade	37,880	19,391
Transportation and warehousing, and utilities	23,798	9,867
Information	3,299	1,654
Finance and insurance, and real estate and rental and leasing	12,416	5,619
Professional, scientific, and management, and administrative and waste management services	29,689	13,645
Educational services, and health care and social assistance	78,447	42,444
Arts, entertainment, and recreation, and accommodation and food services	29,312	15,605
Other services, except public administration	16,121	8,149
Public administration	23,115	11,829

Source: U.S. Census Bureau, 2022e

Table 7.12-5 shows the total tax revenues for the past 3 available fiscal years (2020 to 2022) for the two-county area. Both counties have experienced moderate economic growth over the last several years.

Table 7.12-5. Total Revenues in Kern and Tulare Counties

Tax Revenue	Fiscal Year 2020	Fiscal Year 2021	Fiscal Year 2022
Kern County revenue	$659,783	$676,980	$744,487
Kern County expenditures	$649,761	$648,163	$701,663
Kern County excess revenue	$10,022	$28,817	$42,824
Tulare County revenue	$884,953	$994,462	$1,007,460
Tulare County expenditures	$896,350	$957,801	$969,491
Tulare County excess revenue	($11,397)	$36,661	$37,969

Source: County of Tulare, 2021; County of Kern, 2023

In 2023, travel-related spending in Kern County reached an all-time high at $1.9 billion, which was primarily spent in food service and accommodation (Dean Runyan Associates, 2024). Travel spending in Tulare County also grew but at a lower rate than Kern County. Table 7.12-6 shows tourism-related revenue by county. Information was not available at a smaller scale and, therefore, cannot be fully extrapolated for all of Kern and Tulare Counties. Kern and Tulare Counties are geographically large, and the tourism spending and revenue are spread across the entire area, with high points being located in population centers such as Bakersfield in Kern County and Visalia in Tulare County.

Table 7.12-6. Tourism-Related Revenue in Kern and Tulare Counties

Revenue Source	Kern County	Tulare County
Travel-related spending	$1.99 billion	$594 million
State and local tax revenue	$174.1 million	$53.4 million
Travel-related jobs	20,190	6,100

Source: Dean Runyan Associates, 2023, 2024

7.12.1.4. Employment

As of December 2023, the unemployment rate was 8.7 percent in Kern County and 11.2 percent Tulare County. In 2019, prior to the start of the COVID-19 pandemic, the unemployment rate was 7.8 percent in Kern County and 9.8 percent in Tulare County. In 2020, it rose to 12.9 percent in Kern County and 13.4 percent in Tulare County (U.S. Bureau of Labor Statistics, 2024a, 2024b).

Median household income in both counties is below California's average. Kern County had a 5-year average median household income (2018 to 2022) of $63,883, while Tulare had a median household income of $64,474 for the same period. Both are below the state's median income of $91,905 for the same period (U.S. Census Bureau, 2022b).

7.12.1.5. Recreation Expenditures

The Project includes one non-fee day-use recreation facility, located downstream of the KR3 Powerhouse—the KR3 Powerhouse Put-in/Take-Out. Additionally, the Forest Service owns and maintains numerous non-Project recreation facilities along the Fairview Dam Bypass Reach. These sites include both fee-based (DCGs) and non-fee-based sites (day-use areas and dispersed camping areas). Refer to Section 7.7, *Recreation Resources*, for additional information on these recreation facilities.

As part of the REC-2 Study, recreation visitors were intercepted to provide feedback on their recreation experiences, including seeking information about their estimated recreation expenditures. The average and median amount spent per trip by survey respondents at study sites along the Fairview Dam Bypass Reach was $288 and $230, respectively. Based on the data collected, on average, people who visited DCGs spent more during their trip than any other site type (*REC-2 Recreation Facilities Use Assessment Final Technical Memorandum* [Appendix E.2]). According to the Forest

Service National Visitor Use Monitoring data from the SQF in Fiscal Year 2006, the average trip total per party was $761, with a median trip total of $250 (Forest Service, 2006). Data from the years 2010 to 2015 indicate that the average spending profiles for non-locals staying overnight in National Forest System lands was around $250, with locals staying overnight accounting for closer to $180 total for their stays. Day trip spending was approximately $68 for non-locals and $36 for locals (White, 2017).

7.12.2. Proposed Environmental Measures

SCE proposes to implement the following proposed environmental measures related to socioeconomic resources:

- Measure WR-5, *Recreational Boating Flows*
- Measure RR-1, *Recreation Management Plan*

These proposed measures and their key features are described below. Refer to Appendix E.1 for the complete description of measures SCE proposes to include in any new license issued for the Project.

7.12.3. Potential Project Effects

Under the No-Action Alternative, the Project would continue to operate under the terms and conditions of the current license, as described in Section 5.1. The No-Action Alternative is considered the environmental baseline for this analysis of potential effects. Potential effects related on socioeconomic resources were identified in FERC's SD2 (FERC, 2022) and based on an evaluation of continued O&M activities described as part of the proposed Project (Section 5.2, *Proposed Action Alternative*). Potential effects identified in FERC's SD2 include the following:

- Continued Project operations and flow diversions on the economy of the local communities in the Project-affected area, including tourism and water-based recreation expenditures in the NFKR watershed.

The following sections describe the potential effects related to socioeconomic resources from implementation of the proposed Project. Unavoidable adverse effects on socioeconomic resources are discussed at the end of this section and summarized in Section 10.0, *Conclusions and Recommendations*.

7.12.3.1. Effects of Project Operations on Socioeconomic Resources

The proposed Project would result in no material change for the population and would have no adverse effects on and may benefit socioeconomic resources. SCE would continue to operate the proposed Project under the terms and conditions of the current license with no major construction or changes to infrastructure or operations.

SCE proposes Measure WR-5 and Measure RR-1, which are designed to maintain and enhance recreation conditions and opportunities that may benefit socioeconomic resources.

Proposed Measure WR-5 is a preliminary measure designed to address the need for a predictable schedule of whitewater boating opportunities, which has been requested by the community, as well as provide a variable range of flows for whitewater boating opportunities, thereby providing a benefit to local socioeconomic resources. Refer to Section 7.7, *Recreation Resources*, for additional information on whitewater boating opportunities.

Proposed Measure RR-1 would include measures for the continued O&M of KR3 Powerhouse Put-in/Take-out to support ongoing non-fee-based recreation activities. The measure would also include provision for continued access and use by commercial whitewater outfitters via permit system. Continued discussions with the SQF on measures related to recreational resources will occur once additional data collection has been completed; however, any proposed changes are not expected to adversely affect the existing Project facility.

Therefore, implementation of proposed Measures WR-5 and RR-1 would have no effect on, and in some instances benefit, socioeconomic resources.

7.12.3.2. Unavoidable Adverse Effects

The proposed Project would not result in unavoidable adverse effects on socioeconomic resources.

7.13. ENVIRONMENTAL JUSTICE

This section describes the environmental justice (EJ) communities and applicable management direction regarding EJ resources within the FERC Project Boundary and lands surrounding the Project. Section 7.13.1 discusses the affected environment and resource conditions under current Project O&M (i.e., baseline condition). Section 7.13.2 identifies environmental measures, management plans, and programs that are included in the proposed Project. Section 7.13.3 includes an analysis of ongoing or new environmental effects of O&M from the proposed Project, including potential effects from proposed measures. The full description of proposed measures is provided in Appendix E.1.

Information presented in this section was developed using existing, relevant, and reasonably available information and includes the following:

- U.S. Census Bureau data (U.S Census Bureau, 2022a, 2022b, 2022c, 2022d, 2023)
- U.S. Environmental Protection Agency (USEPA) Environmental Justice Screening and Mapping Tool (EJScreen) (USEPA, 2023 and 2024)
- California Environmental Protection Agency (CalEPA) CalEnviroScreen 4.0 (CalEPA, 2021a)

This assessment also includes results from the following relicensing study where additional information was collected to further describe the resources:

- EJ-1 Environmental Justice

The EJ-1 Technical Memorandum is provided in Appendix E.2. Related information pertinent to the discussion of EJ resources is summarized herein with additional information provided in Section 7.7, *Recreation Resources*; Section 7.8, *Land Use Management and Resources*; Section 7.11, *Tribal Resources*; and Section 7.12, *Socioeconomic Resources.*

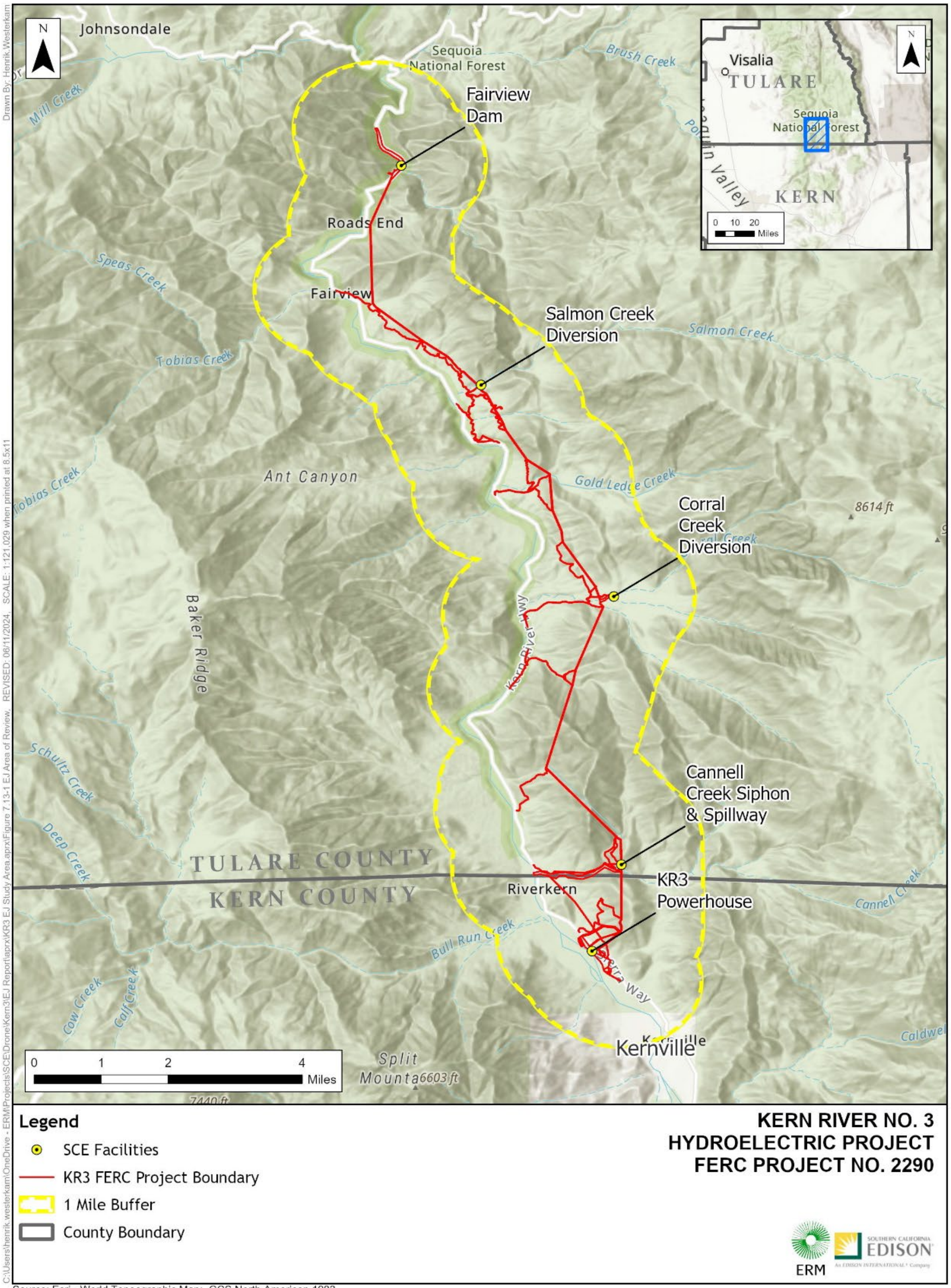
7.13.1. AFFECTED ENVIRONMENT

This section provides a description of the EJ conditions within 1 mile of the Project, which is a largely unoccupied area that includes only the communities of Kernville and Camp Owens. The methodology used in the EJ-1 Study is consistent with guidance from USEPA's *Promising Practices for EJ Methodologies in NEPA Reviews* (NEPA Committee and EJ IWG, 2016). The analysis was accomplished through a desktop review of available EJ data, including but not limited to population, health, racial and economic composition, minority groups, low-income individuals, and non-English-speaking groups.

The term "environmental justice" refers to the fair and equitable treatment of individuals regardless of race, ethnicity, or income level in the development and implementation of environmental management policies and actions. Executive Order 12898, *Federal Actions to Address Environmental Justice in Minority Populations and Low-Income*

Populations, requires each federal agency to "make achieving environmental justice part of its mission by identifying and addressing, as appropriate, disproportionately high and adverse human health or environmental effects of its programs, policies, and activities on minority populations and low-income populations" (CEQ, 1997). The Executive Order was accompanied by a memorandum that directs federal agencies to analyze the environmental effects (including human health, social, and economic concerns) of their actions where such analysis is required by the National Environmental Policy Act (NEPA).

The Area of Review (AoR) for the EJ-1 Study included the Project with a 1-mile buffer. The AoR is a largely unoccupied area that includes only the communities of Kernville and Camp Owens (Figure 7.13-1). Applicable Census Block Groups (CBGs) overlapping the AoR are referenced throughout this section. A CBG is a geographical unit used by the U.S. Census Bureau and is the smallest entity for which the Census tabulates and publishes sample data. A CBG generally contains between 600 and 3,000 people.



KR3 = Kern River No. 3; SCE = Southern California Edison

Figure 7.13-1. Environmental Justice Area of Review.

7.13.1.1. Description of Environmental Justice Populations Within the FERC Project Boundary

Environmental Justice Demographic Data

In accordance with federal guidelines, the EJ assessment includes demographic and poverty-level data for the geographical area potentially affected by the Project to determine whether EJ populations are present. EJ populations have been identified by applying the methods included in USEPA's *Promising Practices for EJ Methodologies in NEPA Reviews* (NEPA Committee and EJ IWG, 2016).

Individuals who identify as any race other than White and/or list their ethnicity as Hispanic or Latino are considered minority (USEPA, 2022). According to federal guidelines, an area where the minority population exceeds 50 percent of the total population or where the minority population percentage is "meaningfully greater" than the minority population of an appropriate unit of geographic analysis, referred to as a reference population, is determined to be an EJ population (CEQ, 1997); for the purpose of this section of Exhibit E, and as recommended by FERC in its Study Plan Determination, "meaningfully greater" has been set as 10 percent greater than the reference population percentage.

Unlike federal guidance on minority populations, there is no quantitative definition of what proportion of low-income populations constitutes an EJ population. Guidelines suggest using an appropriate poverty threshold and comparing the low-income population in an affected area to a reference population (NEPA Committee and EJ IWG, 2016). In this section, low-income percentages of CBGs are compared with the relative county percentage, and any equal to or greater than that percentage is designated a low-income EJ population. Low-income is defined by USEPA as households where the income is less than or equal to twice the federal poverty level (USEPA, 2022). The poverty threshold is calculated as a percentage of those for whom the poverty ratio was known, as reported by the U.S. Census Bureau. In 2022, the federally defined poverty threshold for an individual under age 65 was $15,230 (U.S. Census Bureau, 2023).

To define an analysis area and identify potentially affected EJ populations, federal guidance advises using an "appropriate unit of geographic analysis" that does not "artificially dilute or inflate" the population (CEQ, 1997). The selected area may be a neighborhood CBG, CT, a governing body's jurisdiction, or other similar geographic unit. The CBG is the smallest geographic unit for which U.S. Census Bureau demographic data are available.

The assessment defines the analysis area as the CBGs where the Project is located and any CBGs within 1 mile of the Project. A CBG was selected as the appropriate geographic unit for analysis for purposes of determining whether EJ populations are in the area that may be affected by construction and operation.

Using the U.S. Census Bureau data and the recommended FERC guidelines for identifying an EJ population, two CBGs within 1 mile of the Project are classified as EJ communities based on income (Table 7.13-1 and Table 7.13-2).

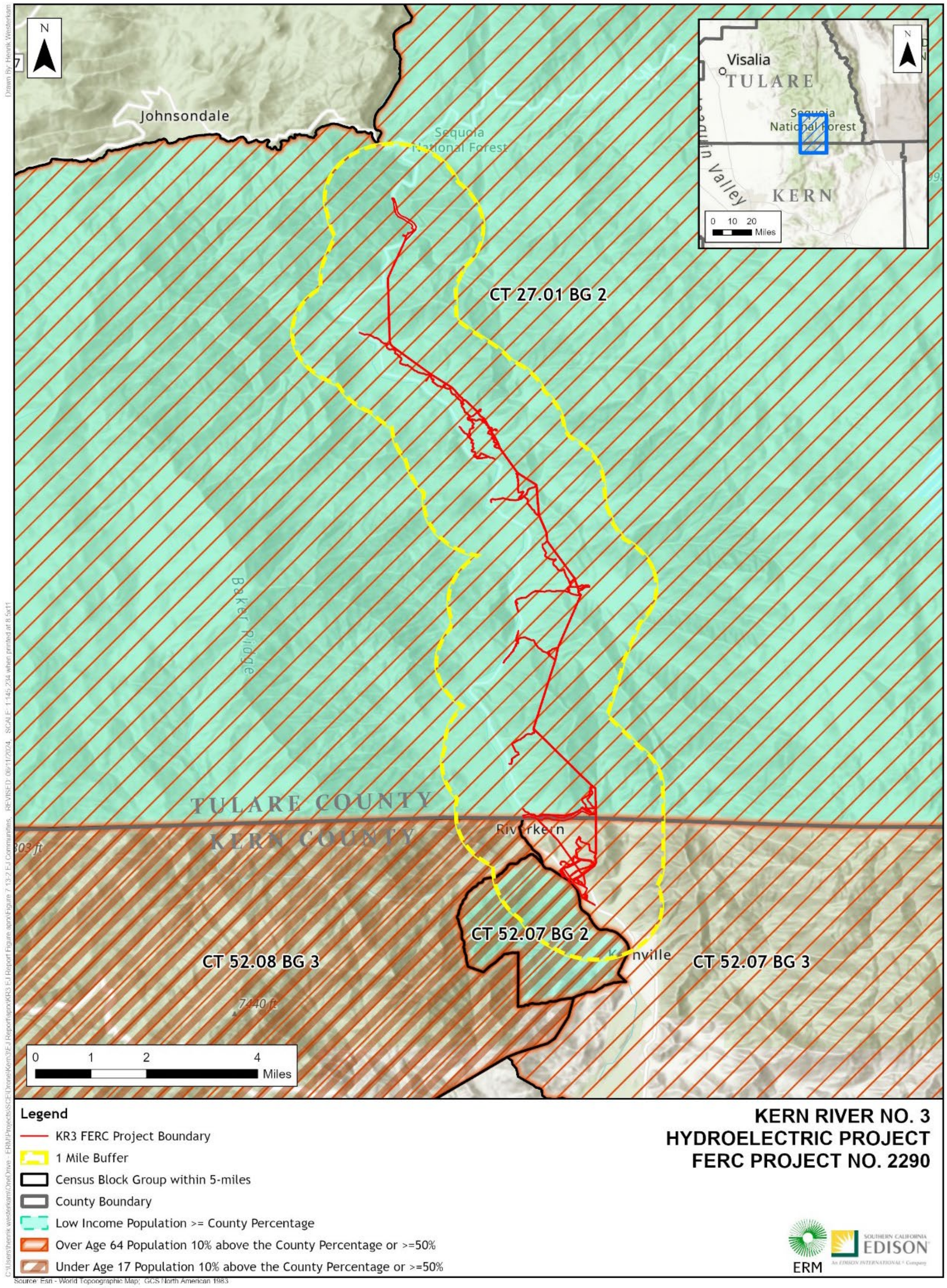
None of the CBGs within the study area have minority populations that are meaningfully greater than the county minority populations. Both Tulare and Kern Counties have total minority populations that are greater than 50 percent in addition to being greater than the minority population in the state of California; however, the CBGs in these portions of these counties have much lower populations of minority residents. Throughout most of the study area, the minority group with the highest populations are those identifying as Latino or Hispanic or American Indian. Refer to Table 7.13-1 and Figure 7.13-2 for a breakdown of the CBGs within the study area. Details of minority populations by race and low-income populations within 1 mile of the study area are summarized in Table 7.13-2.

Table 7.13-1. Census Block Groups Within 1 Mile of the Project [a]

County	CBGs Within 1-Mile Radius [b]
Kern County	CT 52.07, BG 3 CT 52.07, BG 2 [c] CT 52.08, BG 3
Tulare County	CT 27.01, BG 2 [b]

Source: U.S. Census Bureau, 2022a and 2022b

BG = Block Group; CBG = Census Block Group; CT = Census Tract; EJ = environmental justice
Notes:
[a] This table is a summary of the results presented in Table 7.13-2.
[b] The CBG is a subset of a CT referred to with the BG number.
[c] EJ community based on low-income population higher than the relative counties.



CT = Census Tract; FERC = Federal Energy Regulatory Commission; KR3 = Kern River No. 3

Figure 7.13-2. FERC Project Boundary with Identified Environmental Justice Communities.

Table 7.13-2. Minority Populations by Race and Low-Income Populations within 1 Mile of the Kern River No. 3 Hydroelectric Project

Location	White (Non-Hispanic)	Black or African American	Asian	American Indian and Alaskan Native	Native Hawaiian and Other Pacific Islander	Some Other Race	Two or More Races	Hispanic or Latino	Total Minority [a]	Total Population Below Poverty Level [b]
California	35.2%	5.3%	14.9%	0.3%	0.3%	0.4%	3.8%	39.7%	64.8%	11.8%
Tulare County	26.5%	1.3%	3.4%	0.4%	0.1%	0.4%	1.7%	66.1%	73.5%	17.0%
CT: 27.01 BG: 2 Project-occupied	94.9%	0.0%	0.0%	3.6%	0.0%	0.0%	1.4%	0.2%	5.1%	**26.2%**
Kern County	31.5%	4.9%	4.8%	0.4%	0.1%	0.4%	2.7%	55.3%	68.5%	18.2%
CT: 52.07 BG: 2	92.2%	1.1%	0.0%	0.0%	0.0%	0.3%	0.0%	6.4%	7.8%	**24.3%**
CT: 52.07 BG: 3 Project-occupied	69.5%	0.3%	7.5%	0.0%	0.0%	2.4%	0.3%	20.0%	30.5%	17.4%
CT: 52.08 BG: 3	76.5%	0.0%	0.0%	1.9%	0.5%	0.0%	15.0%	6.2%	23.5%	7.3%

Source: U.S. Census Bureau, 2022a, 2022b

BG = Block Group; CT = Census Tract
Notes:
[a] “Minority” refers to people who reported their ethnicity and race as something other than non-Hispanic White.
[b] Bold type and dark gray shading indicate minority or low-income populations exceeding the established thresholds. Due to rounding differences in the dataset, the totals may not reflect the sum of the addends.

Other Community Vulnerabilities

In addition to minority and low-income populations, EJ considers additional demographic and access vulnerabilities for communities: most common are non-English-speaking populations, large percentages of older or younger residents, lack of access to services, and health burdens.

Using FERC's recommendations for demographic indicators of age and language, data from the U.S. Census Bureau is used and the same method is applied as with low-income: percentages of CBGs are compared to the relative county percentage, and any equal to or greater than that percentage is designated a population with language or age EJ vulnerabilities.

Non-English-speaking groups are not identified within the 1-mile study area, although Tulare and Kern Counties have Spanish speakers categorized as speaking English "not well" or "not at all" (Table 7.13-3). None of the CBGs identify limited English speakers.

Table 7.13-3. Limited English-Speaking Groups and Age Census Data Within 1 Mile of the FERC Project Boundary [a]

	Vulnerable Age Groups		Limited-English-Speaking Groups				
	Age 17 and Under	Over Age 64	Spanish	Indo-European	Asian and Pacific Islands	Other	Total Limited English
California	5.7	16.6	6.2	0.5	2.1	0.1	8.9
Tulare County	7.5	12.9	12.0	0.1	0.5	0.1	12.7
CT: 27.01 BG: 2	3.2	**52.0**	0.0	0.0	0.0	0.0	0.0
Kern County	7.3	12.7	9.2	0.3	0.4	0.1	10.0
CT: 52.07 BG: 2	**12.4**	**37.7**	0.0	0.0	0.0	0.0	0.0
CT: 52.07 BG: 3	0.0	**86.8**	0.0	0.0	0.0	0.0	0.0
CT: 52.08 BG 3	**10.9**	**37.9**	0.0	0.0	0.0	0.0	0.0

Source: U.S. Census Bureau, 2022c, 2022d

BG = Block Group; CT = Census Tract; FERC = Federal Energy Regulatory Commission
Notes:
[a] Bold type and dark gray shading indicate populations exceeding the established thresholds.

A higher percentage of non-English-speaking residents over the age of 64 were identified in all four CBGs compared with their respective county percent averages. A high percentage of residents under the age of 17 compared with the respective county percentages were identified in CT 52.07, CBG 2, and 52.08 BG 3; these data may be partially explained by the presence of Camp Erwin Owen, which is a juvenile correctional facility located in Kernville.

Service Gaps and Health Burdens

In addition to demographic and environmental vulnerabilities, a community may experience gaps in critical services or a disproportionate share of health burdens. EJScreen (USEPA, 2024) includes layers showing key burdens for communities as percentile rankings.

Critical service gaps mapped by EJScreen are as follows:

- Broadband gaps—Areas with the lowest rate of households with a broadband internet subscription. EJScreen pulls this data layer from the U.S. Census Bureau's ACS 5-year summary estimates.
- Lack of health insurance—Percent of all persons without health insurance coverage. EJScreen pulls this data layer from the U.S. Census Bureau's ACS 5-year summary estimates.
- Housing burden—This dataset contains CT-level percentiles for housing cost, which is the share of households that are both earning less than 80 percent of Housing and Urban Development's Area Median Family Income and are spending more than 30 percent of their income on housing costs. The housing cost percentiles were adopted as "Housing Burden" for EJScreen. EJScreen sources this data layer from the Climate and Economic Justice Screening Tool.
- Transportation access—This dataset contains CT-level percentiles. The Average of Transportation Indicator uses an average of four transportation-related indicator percentiles, including Transportation Cost Burden, National Walkability Index, Percentage of Households with No Vehicle Available, and Mean Commute Time to Work. It was renamed "Transportation Access" for EJScreen. EJScreen pulls this data layer from the Department of Transportation's Transportation Disadvantaged CTs.
- Food desert—Low-income and low-access tract measured at 1 mile for urban areas and 10 miles for rural areas. These data are available at the CT level and are pulled from the U.S. Department of Agriculture.

Project facilities are located within two CBGs with limited broadband access. In Kern County, CT 52.07, BG 3 has limited broadband access of 22 percent, which is in the 78th percentile nationally and the 88th percentile for the state of California. In Tulare County, CT 27.01, BG 2 has limited broadband access of 28 percent, which is in the 86th percentile nationally and the 93rd percentile for the state.

Lack of health insurance does not appear as a gap in critical services for these block groups with CT 52.07, BG 3 in the 17th percentile nationally and in the 21st percentile for the state of California. In Tulare, CT 27.01, BG 2 is in the 23rd percentile nationally and the 28th percentile for the state.

Housing burden is not labeled as a concern in Kern County CT 52.07, BG 3 but is a concern in Tulare County CT 27.01, BG 2. Both CBGs are classified as food deserts and as having a lack of transportation access, which is not unusual for very rural communities (Table 7.13-4).

Table 7.13-4. Critical Service Gaps of Kern and Tulare Counties

Indicator	Value	State Average	State Percentile	U.S. Average	U.S. Percentile
Kern County CT 52.07, BG 3					
Broadband internet	22%	10%	88	14%	78
Lack of health insurance	3%	7%	21	9%	17
Housing burden	No	N/A	N/A	N/A	N/A
Transportation access	Yes	N/A	N/A	N/A	N/A
Food desert	Yes	N/A	N/A	N/A	N/A
Tulare County CT 27.01, BG 2					
Broadband internet	28%	10%	93	14%	86
Lack of health insurance	3%	7%	28	9%	23
Housing burden	Yes	N/A	N/A	N/A	N/A
Transportation access	Yes	N/A	N/A	N/A	N/A
Food desert	Yes	N/A	N/A	N/A	N/A

Source: USEPA, 2023

BG = Block Group; CT = Census Tract; N/A = data not available

Health disparities included in EJScreen are as follows:

- Low life expectancy—Average life expectancy data developed as a collaboration among the National Center for Health Statistics, the National Association for Public Health Statistics and Information Systems, and the Robert Wood Johnson Foundation. These data are available at the CT level; the same tract value is then assigned to all CBGs within the CT. EJScreen pulls this data layer from the U.S. Small-area Life Expectancy Estimates Project.

- Heart disease—Heart disease prevalence among adults aged 18 years or older. The term "heart disease" refers to several types of heart conditions. These data are available at the CT level; the same tract value is then assigned to all sub-CBGs. EJScreen pulls this information from the Centers for Disease Control and Prevention (CDC) Places Data.

- Asthma—Asthma prevalence among adults aged 18 or older. This data is available at the CT level; the same tract value is then assigned to all sub-CBGs. EJScreen pulls this information from the CDC Places Data.

- Cancer—Cancer (excluding skin cancer) prevalence among adults aged 18 or older. This data is available at the CT level; the same tract value is then assigned to all sub-BGs. EJScreen pulls this information from the CDC Places Data.

- Persons with Disabilities—Percent of all persons with disabilities. These data are derived from Census ACS data at the CT level. CBG values are calculated by multiplying the tract value by the block population weight. The weights are derived from the same Census source used by the EJScreen buffer reports and analysis. EJScreen uses data from the Census Bureau's ACS 5-year summary estimates for this map layer.

Both of the CBGs crossed by the Project facilities have various health indicators above the average on both national and statewide measurements. Kern County CT 52.07, BG 3 is in the 80th percentile and above for all five health indicators compared with the state of California, although asthma and low life expectancy are in the 70th percentile nationally. Tulare County CT 27.01, BG 2 is in the 80th percentile or above in all of the health indicators, except low life expectancy both in California and nationally. Overall, the Project overlaps with populations that exhibit high occurrence of heart disease, asthma, cancer, and persons with disabilities, which should be taken into account when considering impacts and mitigation measures.

Health vulnerabilities are present within the study area with rankings above the 80th percentile appearing either for the State of California or nationally for all the indicators in Kern County and for all but low life expectancy in Tulare County (Table 7.13-5).

Table 7.13-5. Health Indicators for Kern and Tulare Counties

Indicator	Value (Percentage OR Rate of Prevalence)	State Average	State Percentile	U.S. Average	U.S. Percentile
Kern County CT 52.07 BG 3					
Low life expectancy	22%	18%	86	20%	70
Heart disease	12.1	5.2	99	6.1	99
Asthma	10.9	9.5	86	10	77
Cancer	10.1	5.3	98	6.1	98
Persons with disabilities	31.9%	10.9%	99	13.4%	99
Tulare County CT 27.01 BG 2					
Low life expectancy	14%	18%	13	20%	7

Indicator	Value (Percentage OR Rate of Prevalence)	State Average	State Percentile	U.S. Average	U.S. Percentile
Heart disease	8.7	5.2	97	6.1	91
Asthma	11.1	9.5	89	10	81
Cancer	7.9	5.3	91	6.1	87
Persons with disabilities	25.4%	10.9%	98	13.4%	95

Source: USEPA, 2023

BG = Block Group; CT = Census Tract

<u>CalEnviroScreen 4.0</u>

In addition to using the U.S. Census Bureau demographics, information from the California-specific EJ tool, CalEnviroScreen (CalEPA, 2021a; CalEPA, 2021b), were reviewed. CalEnviroScreen shows cumulative impacts in California communities by CT. The Project is located within two CTs in Kern and Tulare Counties: CT 52.01 in Kern County and CT 27.00 in Tulare County. Because the CalEPA tool does not use CBGs, these two CTs make up the study area for the CalEnviroScreen data in this section.

CalEnviroScreen scores are calculated from the scores for two groups of indicators (i.e., Pollution Burden and Population Characteristics) and present a relative (rather than an absolute) evaluation of Pollution Burdens and vulnerabilities in California communities by providing a relative ranking of communities across the state. The model uses 21 statewide indicators to characterize Pollution Burden and Population Characteristics and uses percentiles to assign scores for each of the indicators in a given geographic area. The formula for calculating the CalEnviroScreen score is as follows:

Pollution Burden x Population Characteristics = CalEnviroScreen Score

Where Pollution Burden is the average of exposures and environmental effects (environmental effects score is weighted half as much as the exposures score) and Population Characteristics is the average of sensitive populations and socioeconomic factors.

A full description of the methodology for the tool can be found in the October 2021 CalEnviroScreen 4.0 Document on the CalEPA website (CalEPA, 2021b).

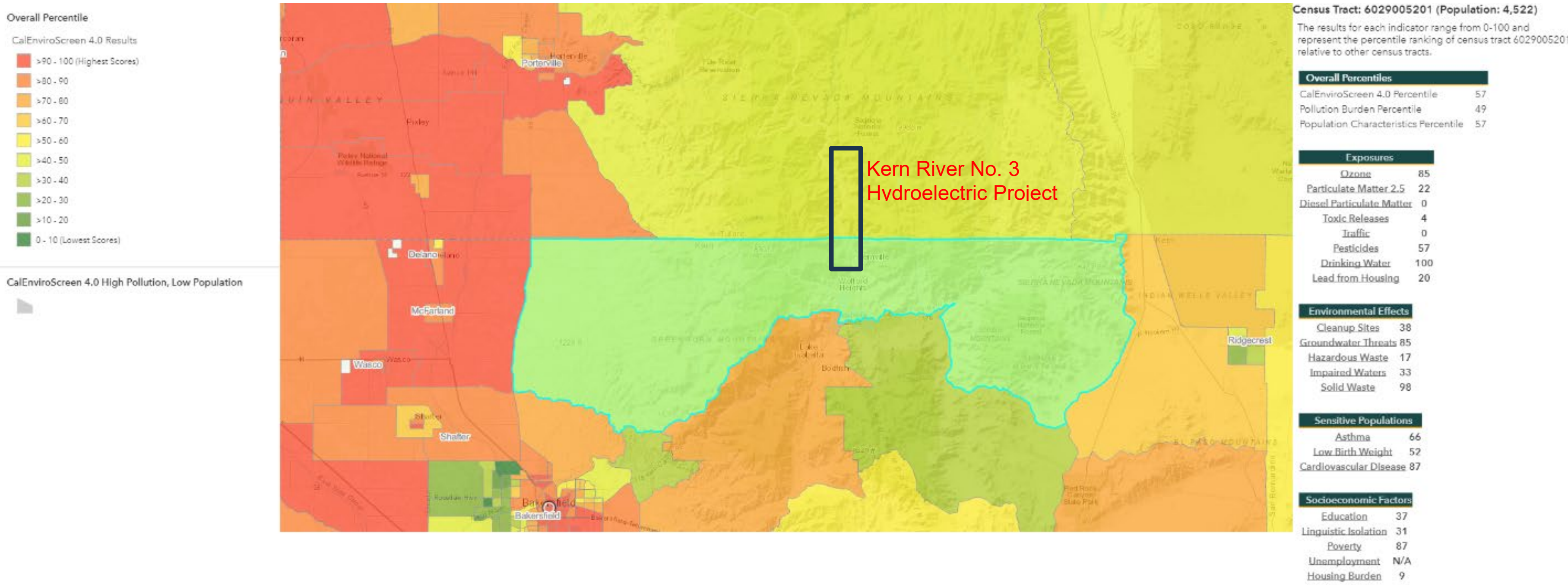
CalEnviroScreen's purpose is to help calculate the cumulative impact of multiple environmental and social burdens on communities. It is not intended to determine classification of a community as an EJ population. The tool has helped CalEPA and other local, state, and federal agencies ensure their activities address these Pollution Burdens and protect those communities from additional ones. CalEPA uses CalEnviroScreen to prioritize enforcement and outreach in vulnerable communities.

CTs with higher CalEnviroScreen scores have relatively high Pollution Burdens and population sensitivities and are shown in dark red; CTs with lower scores, and correspondingly lower Pollution Burdens and sensitivities, are shown as lighter green colors (Figures 7.13-3 through 7.13-4).

In Kern County CT 52.01, the CalEnviroScreen overall is in the 57th percentile, the Pollution Burden is in the 49th percentile, and the Population Characteristics is within the 57th percentile (Figure 7.13-3). In Tulare County CT 27.00, the overall CalEnviroScreen is in the 46th percentile, the Pollution Burden in the 34th percentile, and the Population Characteristics in the 52nd percentile (Figure 7.13-4).

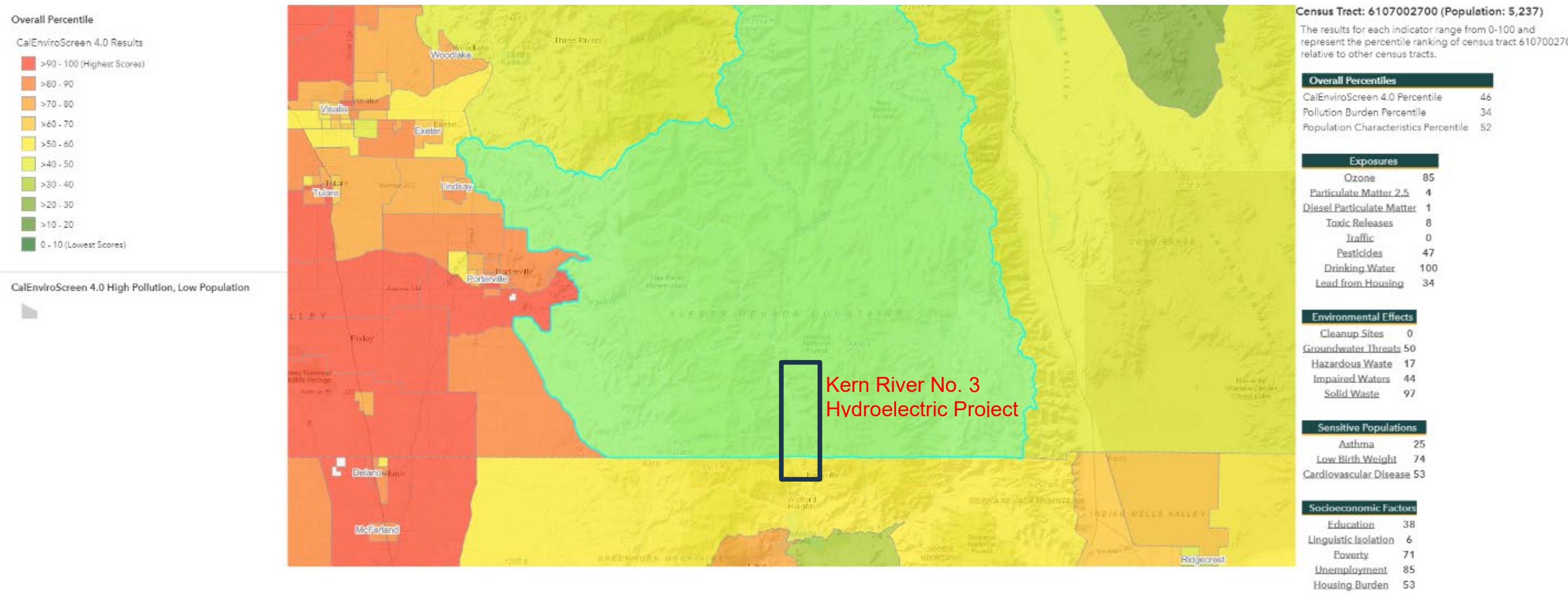
CalEPA also provides a mapping tool that identifies Disadvantaged Communities (DACs) in accordance with SB 535 established in 2012. SB 535 detailed initial requirements for minimum funding levels to DAC and gives CalEPA the responsibility for identifying those communities. The legislation states that CalEPA’s designation of DACs must be based on “geographic, socioeconomic, public health, and environmental hazard criteria” (CalEPA, 2023).

According to the CalEPA SB 535 map for the study area, the pollution and demographic burdens are in the low- to mid-range for the State of California. Within the 1-mile buffer established around the Project, no communities qualify as DACs following the designation established by CalEPA. The cumulative impacts to the communities within the study area are minimal, with the closest identified DAC being the Lake Isabella community south of the Project, which is outside the 1-mile radius of the study area (see Figure 7.13-5).



Source: CalEPA, 2021a

Figure 7.13-3. Kern County Census Tract 52.01 CalEnviroScreen Map of Area Surrounding the Project.



Source: CalEPA, 2021a

Figure 7.13-4. Tulare County Census Tract 27.00 CalEnviroScreen Map of Area Surrounding the Project.

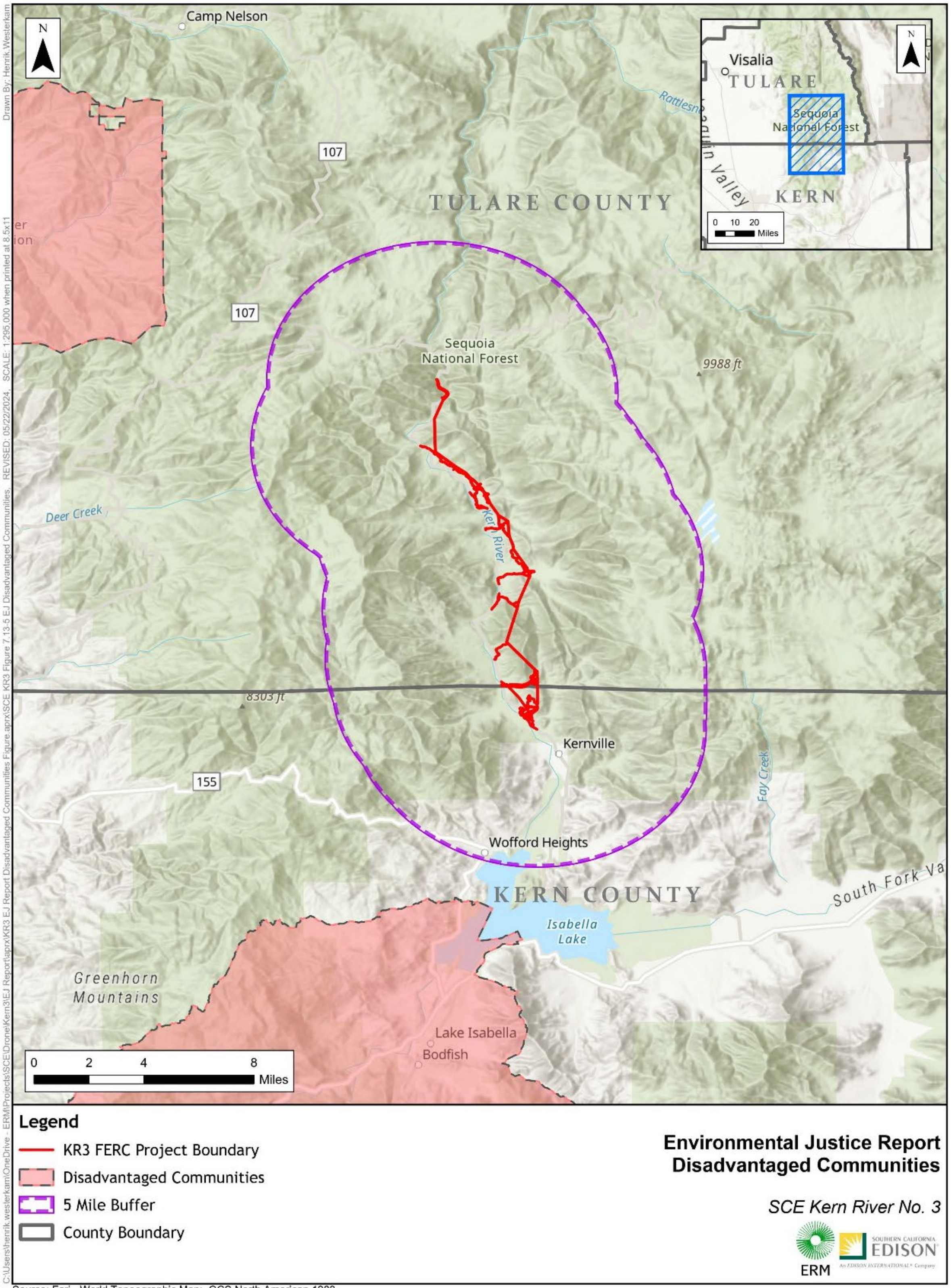


Figure 7.13-5. CalEPA-Identified Disadvantaged Communities Relative to the FERC Project Boundary.

Sensitive Receptors

A look at specific locations within a study area community that may be associated with sensitive populations were also also included in the assessment. Sensitive receptors include the following:

- Places where the community gathers such as community centers, senior facilities, or places of worship;
- Facilities where health vulnerable populations gather such as medical facilities; and
- Locations with large concentrations of children such as schools and daycare centers.

Sensitive receptors were identified using a combination of mapping tools (Google Earth Pro, EJScreen, and ArcGIS) to search the study area for the closest sensitive receptor facilities to the Project.

SCE does not propose any new construction or facility modifications; therefore, there are no new identified sensitive receptor locations within the geographic scope of analysis. For reference, previously identified sensitive receptors included the following:

- Camp Ewin Owen, a juvenile detention center in Kernville located across Sierra Way Road from the southern end of the Project;
- Kernville United Methodist Church located 0.8 mile south of the southern end of the Project; and
- Kernville Elementary School located 1.2 miles southeast of the southern end of the Project.

No newly identified medical facilities occur within the study area. The nearest hospital is Kern Valley Hospital located 9.96 miles south of the southern end of the FERC Project Boundary. The second closest medical facility is the Good Samaritan Hospital in Bakersfield located 54 miles from the southern end of the Project.

Public Outreach and Consultation

SCE has conducted outreach associated with the relicensing of the Project informally since August 2020, and formally noticed the Project relicensing proceeding with its September 2021 filing of the PAD and associated Notice of Intent. SCE is continuing to consult with participating stakeholders on the development of the measures and management plans to protect, maintain, and enhance environmental, recreational, and cultural resources.

Additional information on SCE's outreach and consultation is available in Exhibit E, Appendix E.3, *Consultation Documentation*. Documents have been made available to public at libraries in the vicinity of the Project, as well as on the FERC eLibrary and SCE's Project website. As part of other FERC-approved studies that include direct interactions with the public as part Study Plan implementation (e.g., Study REC-2 Recreation Facilities Use Assessment), bilingual (English and Spanish) information flyers, public questionnaires, and bilingual field staff have been deployed.

7.13.2. Proposed Environmental Measures

SCE has identified no adverse effects on EJ resources related to the proposed Project. However, SCE proposes to implement environmental measures, management plans, and programs that are anticipated to enhance resources of interest to EJ communities, including water quality, fisheries, and recreation. Refer to Appendix E.1, *Proposed Environmental Measures, Management Plans, and Programs*, for the complete description of measures SCE proposes to include in the new license.

7.13.3. Potential Project Effects

Under the No-Action Alternative, the Project would continue to operate under the terms and conditions of the current license, as described in Section 5.1. The No-Action Alternative is considered the environmental baseline for this analysis of potential effects. Potential effects on EJ communities were identified in FERC's SD2 (FERC, 2022) and were based on an evaluation of continued O&M activities described as part of the proposed Project (Section 5.2, *Proposed Action Alternative*). Potential effects identified in FERC's SD2 include the following:

- Minority and low-income communities that may occur in the Project-affected area could potentially be subject to disproportionately high adverse human health or environmental effects as a result of continued Project operation.

The following sections describe the potential effects of the proposed Project relative to ongoing and proposed changes in Project O&M and implementation of new environmental measures (i.e., proposed environmental measures, management plans, and programs) incorporated as part of the proposed Project. Unavoidable adverse effects related to EJ are discussed at the end of this section and summarized in Section 10.0, *Conclusions and Recommendations*.

No federally recognized Tribal lands are located within or near the FERC Project Boundary. Refer to Section 7.11, *Tribal Resources*, for additional information.

7.13.3.1. Effects of Continued Project Operation and Maintenance Related to Environmental Justice Communities

Two of the four CBGs within 1 mile of the Project are classified as EJ communities based on income (Table 7.13-1 and Table 7.13-2), which is not a disproportionate portion of the population. None of the CBGs within the study area have minority populations that are meaningfully greater than the county minority populations.

SCE proposes to continue to operate the Project without any major operational changes or new construction. Implementation of proposed Project O&M activities (described in

Section 5.2, *Proposed Action Alternative*) would have no direct or indirect effects related to EJ near the Project.

The proposed Project is not expected to result in material change for minority and low-income communities within areas that are potentially affected by the Project and that could potentially be subject to disproportionately high adverse human health or environmental effects on minority and low-income populations because SCE does not propose new construction or Project changes in the area of the Project, with the exception of minor adjustments to the FERC Project Boundary (refer to Section 7.8, *Land Use and Management*, for additional information).

While not proposing any specific measures related to EJ communities, SCE does propose to implement environmental measures that would address potential Project effects and, in many cases, provide an enhancement to biological, cultural, and social resources. Therefore, the proposed Project would not result in adverse effects on EJ communities.

7.13.3.2. Unavoidable Adverse Effects

The proposed Project would not result in unavoidable adverse effects related to EJ.

8.0 CUMULATIVE EFFECTS

According to the Council on Environmental Quality's regulations for implementing NEPA (40 CFR § 1508.7), an action may cause a cumulative effect if its effects overlap in space and/or time with effects of other past, present, and reasonably foreseeable future actions, regardless of what agency 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 development.

FERC did not note any specific resources in its SD2 (FERC, 2022) that have the potential to be cumulatively affected by the proposed Project's continued O&M in combination with other activities within the Kern River Basin. Any potential reasonably foreseeable impacts are discussed in individual resource sections.

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9.0 DEVELOPMENTAL ANALYSIS

As specified in the FERC's content requirements at 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 environmental measures, management and monitoring plans, and programs; and power generation between the alternatives.

The power and economic benefits of the Project will be refined as part of the FLA. In addition, the analysis in the FLA will include an estimate of the costs of environmental measures and a comparison of costs under SCE's 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. In most cases, electricity from hydropower would displace some form of fossil-fuels, solar, or wind generation, in which fuel cost is the largest component of the cost of electricity production.

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, SCE would not change its current Project O&M and would not provide any additional environmental programs or measures above those provided in the existing license.

The annualized operating costs associated with the existing Project is described in Table 9.1-1.

Table 9.1-1. Summary of Annual Costs for the No-Action Alternative

Cost Component	No Action
O&M [a]	$3,757,052
Depreciation [b]	$1,444,239
Property tax [c]	$217,455
Administrative and general	$289,086
Total expenses	$5,707,832

O&M = operations and maintenance
[a] Annual average O&M costs over the past 5-year period (2019–2023).
[b] Actual depreciation for 2023
[c] Actual property tax for 2023

9.2. PROPOSED ACTION ALTERNATIVE

Under the Proposed Action, SCE would implement new environmental measures, management plans, and programs 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 the new environmental measures, plans, and programs 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 effects analysis of air quality is not required.

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 the 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 (COMPREHENSIVE DEVELOPMENT AND RECOMMENDED ALTERNATIVE)

This section includes a comparison of the developmental and non-developmental effects (resource conditions) resulting from Project O&M under the Proposed Action and the No-Action Alternative.

10.1.1. PROPOSED ACTION ALTERNATIVE

Overall, the Proposed Action would protect and enhance resource conditions in the vicinity of the Project. The key consideration in developing the Proposed Action was to ensure that future Project O&M would protect power generation and system capability and reliability, while maintaining and enhancing 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 O&M activities would be memorialized in environmental measures, management plans, and programs (collectively referred to as measures), which are designed to protect, maintain, or enhance environmental and cultural resources over the term of a new license (see Appendix E.1, *Proposed Environmental Measures, Management Plans, and Programs*).

The proposed environmental measures include a continuation, modification, and in some instances new resource protection measures compared with the No-Action Alternative. The annual average energy generation under the No-Action Alternative will be compared to an estimate of the annual average generation under the Proposed Action in the FLA.

10.1.2. NO-ACTION ALTERNATIVE

The No-Action Alternative maintains the existing baseline conditions with no additional benefits 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. RECOMMENDED ALTERNATIVE

Section 4(e) of the 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 Project as the preferred alternative.

FERC could choose the No-Action Alternative with a few additional mitigation measures as the preferred alternative. The status quo would be maintained and resources in the area would remain at current conditions without any additional degradation, and existing power generation would be maintained. However, the proposed Project 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 Project would result in a better balance between developmental and non-developmental resources compared to the No-Action Alternative.

The Proposed Action Alternative is recommended as the preferred alternative because (1) issuance of a new hydropower license by FERC will allow SCE to continue operating the Project as a beneficial and dependable source of clean renewable electric energy; and (2) the recommended environmental measures would protect, maintain, or enhance 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, *Environmental Analysis*). The proposed Project would not result in unavoidable adverse effects on environmental resources.

10.4. 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 environmental measures.

10.5. Consistency with Comprehensive Plans

Section 10(a)(2)(A) of the FPA, 16 USC Section 803 (a)(2)(A), 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 CFR § 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, 2024) and a review of other relevant planning documents. The potential effects of the proposed Project activities 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 Project O&M 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 112 federal or state and Tribal CMPs for the State of California (FERC, 2024). Of these listed plans, 11 pertain to the Project, 2 of which have been updated since the FERC (2024) list was published. These updated plans are marked with an asterisk (*).

1. Bureau of Land Management. 2014. Bakersfield Field Office Resource Management Plan. Department of the Interior. Bakersfield, California. December.
2. California Department of Fish and Game. 2003. Strategic Plan for Trout Management: A Plan for 2004 and Beyond. Sacramento, California. November 2003.
3. California Department of Fish and Wildlife. 2015. California Wildlife: Conservation Challenges, California State Wildlife Action Plan. Sacramento, California.(*)[45]
4. California Department of Fish and Wildlife. 2008. California Aquatic Invasive Species Management Plan. Sacramento, California. January 18, 2008.
5. California Department of Parks and Recreation. 2012. Survey on Public Opinions and Attitudes on outdoor Recreation in California. Sacramento, California. January 2014.(*)[46]
6. California State Water Resources Control Board. 2018. Water Quality Control Plan for the Tulare Lake Basin. Sacramento, California.[47]

[45] SWAP Final 2015 Document (ca.gov)
[46] SCORP DRAFT (ca.gov)
[47] Revised May 2018 (with Approved Amendments)

7. 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.]

8. Forest Service. 2023. Land Management Plan for the Sequoia National Forest. Pacific Southwest Region. May.

9. Forest Service. No Date. Sequoia and Inyo National Forests Comprehensive Management Plan for the North and South Forks of the Kern River Wild and Scenic River. Department of Agriculture, Kernville California.

10. National Park Service. 1993. The Nationwide Rivers Inventory. Department of the Interior, Washington, D.C.

11. U.S. Fish and Wildlife Service. No Date. Fisheries USA: The Recreational Fisheries Policy of the U.S. Fish and Wildlife Service. Washington, D.C.

The relevant plan goals and objectives, applicability to the Project, and Project compatibility are summarized in Table 10.5-1. No inconsistencies between these plans and the proposed Project O&M were found.

Table 10.5-1. Relevant Comprehensive Management Plans

Comprehensive Plan Name	Relevant Plan Goals and Objectives	Applicability to Project	Project Compatibility
Bureau of Land Management. 2014. Bakersfield Field Office Resource Management Plan. Department of the Interior. Bakersfield, California. December.	Bakersfield 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 or on SCE-owned lands.	The Project is compatible with this plan because it is outside the geographic scope of the analysis.
California Department of Fish and Game. 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 stocks trout upstream and downstream of Fairview Dam, and the NFKR is heavily used by anglers during the spring through fall. The endemic golden trout and Kern River rainbow trout exist within the Upper Kern River watershed, outside the vicinity of the Project.	The NFKR supports both stocked and naturalized, self-sustaining non-native trout fisheries (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. 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 Fairview Dam Bypass Reach on the NFKR, into the Salmon Creek Diversion Bypass Reach on Salmon Creek, and into the Corral Creek Bypass Reach, respectively, that affect stream conditions.	The proposed Project includes streamflow releases into the NFKR 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 prisms (see Sections 7.3, *Water Resources*; 7.4, *Fish and Aquatic Resources*; and 7.5, *Wildlife Resources*).

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.	The multiple public access points and recreation facilities along the NFKR present a risk of the introduction of aquatic invasive species into Project-related waters along the NFKR and tributaries. To date, only the invasive Asian clam shells (also known as the basket clam; *Corbicula fluminea*) have been observed within the Fairview Dam Bypass Reach; however, no live specimens were observed. These shells may have been introduced as bait (Asian clams have also been documented downstream of the Project within Isabella Lake).	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 within 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 or on SCE-owned lands.	SCE coordinates with the SQF to ensure access to recreation (e.g., fishing, boating, camping) sites within the FERC Project Boundary. Section 7.7, *Recreation Resources*, and Section 7.8, *Land Use Management and Resources*, provide additional information regarding the use of the Project.

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.	SCE coordinates with the SQF to ensure access to recreation (fishing, boating, camping) sites within the FEC Project Boundary (see Section 7.3, *Water Resources*; Section 7.7, *Recreation Resources*; and Section 7.8, *Land Use Management and Resources*).
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 locations along the Fairview Dam Bypass Reach and at the KR3 Powerhouse Put-in/Take-out recreation facility. • Waterbodies within the FERC Project Boundary and affected reaches have beneficial use designations as COMM, WILD, and REC-1.	• Forest Service–developed recreation sites within and adjacent to 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 Resources*.

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 or on SCE-owned lands.	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 Sequoia National Forest Land and Resource Management Plan.
Forest Service. No Date. Sequoia and Inyo National Forests Comprehensive Management Plan for the North and South Forks of the Kern River Wild and Scenic River. Department of Agriculture, Kernville California.	SQF provides standards and guidelines for Wild and Scenic River management, such as establishing corridor boundaries, classifying each segment of the river, and addressing resource protection, development of lands and facilities, and user capabilities.	Some portions of the water conveyance system and Project access roads fall within the 0.25-mile buffer of the Wild and Scenic River corridor.	SCE coordinates with SQF to operate the Project in a manner consistent with the Wild and Scenic Act.
National Park Service. 1993. The Nationwide Rivers Inventory. Department of the Interior, Washington, D.C.	The National Wetlands Inventory is a listing of more than 3,200 free-flowing river segments in the United States that are believed to possess one or more *outstandingly remarkable* natural or cultural values judged to be at least regionally significant and, hence, are potential candidates for inclusion in the National Wild and Scenic River System.	No segment of waters within the FERC Project Boundary are listed in the Nationwide Rivers Inventory. However, Some portions of the water conveyance system and Project access roads fall within the 0.25-mile buffer of the Wild and Scenic River corridor.	SCE coordinates with the SQF to operate the Project in a manner consistent with the Wild and Scenic Act. If any segments of Project waters are listed in the National Wetlands Inventory, SCE would adhere to all regulatory requirements.

Comprehensive Plan Name	Relevant Plan Goals and Objectives	Applicability to Project	Project Compatibility
U.S. Fish and Wildlife Service. 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.	CDFW stocks trout upstream and downstream of Fairview Dam, and the NFKR is heavily used by anglers during the spring through fall. The endemic golden trout and Kern River rainbow trout exist within the Upper Kern River watershed, outside the vicinity of the Project.	The NFKR supports both stocked and naturalized self-sustaining non-native trout fisheries (see Sections 7.4, *Fish and Aquatic Resources*; 7.7, *Recreation Resources;* and 7.8, *Land Use Management and Resources*).

CDFW = California Department of Fish and Wildlife; COMM = Commercial and Sport Fishing; CUL = Tribal Tradition and Cultural; FERC = Federal Energy Regulatory Commission; Forest Service = U.S. Department of Agriculture, Forest Service; KR3 = Kern River No. 3; MAR = Marine Habitat; NFKR = North Fork Kern River; REC-1 = Water Contact Recreation; SCE = Southern California Edison; SQF= Sequoia National Forest; USFWS = U.S. Fish and Wildlife Service; WILD = Wildlife Habitat

10.6. FINDINGS

Continuing to operate and maintain the Project with the recommended environmental measures, management plans, and programs (collectively referred to as measures) included under the proposed Project will not be a major federal action significantly affecting the quality of the environment.

As discussed throughout Section 7, *Environmental Analysis*, the area within the FERC Project Boundary and Project-affected reaches do not contain any EFH as defined under the Magnuson-Stevens Fishery Conservation and Management Act or anadromous fish species. The only ESA-listed species detected within the FERC Project Boundary or in Project-affected stream reaches is the northwestern pond turtle (proposed as threatened under the ESA). The proposed Project may affect but is not likely to adversely affect populations of northwestern pond turtles within Cannell Creek and is not likely to adversely affect populations within the Fairview Dam Bypass Reach. Lastly, there is no critical habitat or proposed critical habitat for aquatic, wildlife, or botanical species within the FERC Project Boundary or in the Project-affected reaches.

In addition, implementation of the Proposed Action Alternative, including proposed measures, would result in no changes to environmental conditions or, in some cases, would provide a benefit with greater resource protections, thereby enhancing environmental and cultural resources as compared to baseline conditions (No-Action Alternative). These measures are provided in Appendix E.1, *Proposed Environmental Measures, Management Plans, and Programs*.

Additional assessments of Project-related effects will be discussed after all studies are completed.

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