

BIO-1 FOOTHILL YELLOW-LEGGED FROG TECHNICAL MEMORANDUM

**KERN RIVER No. 3 HYDROELECTRIC PROJECT
*FERC PROJECT No. 2290***

PREPARED FOR:



October 2024

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TABLE OF CONTENTS

	Page
1.0 Introduction.....	1
2.0 Study Goals and Objectives	1
3.0 Study Area and Study Sites.....	1
4.0 Methods.....	4
4.1. Variances from Study Plan	4
4.2. Phase I: Identification of Suitable Habitat and Selection of Survey Sites	4
4.3. Phase II: Conduct Field Surveys	5
4.3.1. Visual encounter surveys.....	5
4.3.2. Environmental DNA sampling	5
5.0 Data Summary.....	6
5.1. Phase I: Identification of Suitable Habitat and Selection of Survey Sites	6
5.2. Phase II: Conduct Field Surveys	6
6.0 Study Specific Consultation.....	9
7.0 Outstanding Study Plan Elements.....	10
8.0 References	10

LIST OF TABLES

Table 5.2-1. Foothill Yellow-legged Frog Visual Encounter Survey and Habitat
Characterization Results 7

LIST OF FIGURES

Figure 3-1. Kern River No. 3 Hydroelectric Project Map of Foothill Yellow-legged Frog
Survey Sites, 2023–2024..... 3

Figure 5.2-1. Incidental Herpetofauna Observed During Field Surveys: Southern
Alligator Lizard (*Elgaria multicarinata*) (top) and Northwestern Pond Turtle
(*Actinemys marmorata*) (bottom). 9

LIST OF ACRONYMS AND ABBREVIATIONS

eDNA	environmental DNA
FERC	Federal Energy Regulatory Commission
Forest Service	U.S. Forest Service
NFKR	North Fork Kern River
KR3	Kern River No. 3
Project	Kern River No. 3 Hydroelectric Project
qPCR	quantitative polymerase chain reaction
RM	river mile
SCE	Southern California Edison
USDA	U.S. Department of Agriculture

1.0 INTRODUCTION

SCE filed an Interim Technical Memorandum as part of the Initial Study Report on October 9, 2023, which included a summary of data collection efforts conducted in 2023 and a summary of variances to the Federal Energy Regulatory Commission (FERC)-approved BIO-1 Foothill Yellow-legged Frog Study Plan (SCE, 2022). This updated Technical Memorandum provides the complete methods and findings of field surveys associated with the BIO-1 Study Plan, and any remaining study plan variances, in support of Southern California Edison's (SCE) Kern River No. 3 (KR3) Hydroelectric Project (Project) relicensing, FERC No. 2290.

The BIO-1 Study Plan was included in SCE's Revised Study Plan submitted on July 1, 2022 (SCE, 2022). In the October 12, 2022, Study Plan Determination, FERC approved the BIO-1 Study Plan with modifications. Specifically, FERC stipulated that SCE conduct one additional field survey, for a total of two field surveys. One survey was conducted in late spring/early summer to observe egg oviposition sites, and the other survey was conducted in late summer prior to larvae (tadpole) metamorphosis. FERC also stipulated that SCE consult with the U.S. Fish and Wildlife Service and U.S. Forest Service (Forest Service) in selecting appropriate survey sites.

Biologists conducted a reconnaissance and site-selection field visit on August 29 to 31, 2022. Field surveys were conducted on June 20 to 21, 2023; September 6 to 7, 2023; and June 18 to 20, 2024. Methods and results are discussed below.

Results of this study will be used to examine Project operations and maintenance activities and inform the assessment of Project effects within the license application.

2.0 STUDY GOALS AND OBJECTIVES

The objectives of the study, as outlined in the BIO-1 Study Plan (SCE, 2022), are to:

- Assess habitat suitability for all foothill yellow-legged frog (*Rana boylei*) life stages (i.e., egg masses, larvae, subadults, and adults) in the study area; and
- Ascertain whether any life stage of foothill yellow-legged frog is extant in the study area.

3.0 STUDY AREA AND STUDY SITES

The study area includes lands and waters within the FERC Project Boundary in addition to areas adjacent to, or in the proximity of, the FERC Project Boundary along the North Fork Kern River (NFKR) and Salmon, Corral, and Cannel Creeks.

Survey sites include the following areas and locations, extending up to 400 meters at each location.

- NFKR between the KR3 Powerhouse and the Brush Creek Confluence:
 - Brush Creek Confluence at Brush Creek Campground (river mile [RM] 20.4)
 - Fairview Campground (RM 16.2)
 - Salmon Creek confluence (RM 13.2)
 - Headquarters Campground (RM 5.0)
 - Downstream of the KR3 Powerhouse (RM 2.9)
- Tributaries to the Kern River:
 - Salmon Creek (one site at NFKR confluence and one site upstream of the diversion)
 - Corral Creek (one site at NFKR confluence and one site upstream of the diversion)
 - Cannell Creek (one site at NFKR confluence and one site upstream of the siphon)

A map of specific survey sites is provided in Figure 3-1.



Figure 3-1. Kern River No. 3 Hydroelectric Project Map of Foothill Yellow-legged Frog Survey Sites, 2023–2024.

4.0 METHODS

Study implementation followed the methods described in SCE's Revised Study Plan Package (SCE, 2022), as amended by FERC in its Study Plan Determination (FERC, 2022), with the exceptions noted below.

4.1. VARIANCES FROM STUDY PLAN

Surveys were delayed from May to late June because high stream flows prevented surveyors from safely accessing the NFKR and its tributaries. The delay also allowed surveyors to time the surveys with the expected breeding and egg mass oviposition periods, which are flow and temperature dependent. During the June 2023 field survey, no NFKR or Salmon Creek sites were surveyed because high flows created unsafe wading conditions. Similarly, during the September 2023 field survey, the reach downstream of the KR3 Powerhouse was not surveyed because high flows created unsafe wading conditions; the same site was only partially surveyed in June 2024, where safely accessible.

These variances are not expected to affect the results of the study. If present, foothill yellow-legged frog breeding would have also been delayed due to the high flows, delaying the timeline for egg mass oviposition and constraining the timeline available for metamorphosis. Biologists also consulted with the U.S. Fish and Wildlife Service and the Forest Service regarding survey timing prior to the surveys (see Section 6, *Study Specific Consultation*, below). An additional survey was conducted in June 2024 to capture sites that were missed in 2023 due to the high flows.

4.2. PHASE I: IDENTIFICATION OF SUITABLE HABITAT AND SELECTION OF SURVEY SITES

Survey sites were selected using results from a desktop analysis and information gathered during a reconnaissance field visit. Prior to the reconnaissance visit, biologists reviewed available data sources such as online databases including California Natural Diversity Database, iNaturalist, and Global Biodiversity Information; aerial satellite imagery; and drone video to aid in identifying areas of potential habitat for the foothill yellow-legged frog. On August 29 to 30, 2022, biologists conducted a reconnaissance field visit with a Forest Service representative to identify suitable foothill yellow-legged frog habitat and select study sites that would provide reasonable coverage of representative highly or moderately suitable habitat. Suitability was characterized based on the following categories.

- High: areas containing suitable habitat for all life stages, especially breeding. These stream segments would provide protection for egg mass deposition and larval maturation (e.g., wide channel areas with edgewater and backwater areas sheltered from flow, banks with shallow slopes).
- Moderate: areas containing suitable habitat for most life stages, although areas may lack potential habitat for one or more life stages (e.g., some habitat may be exposed to the main flow or may include moderately steep or incised banks).

- Low: areas containing little or no suitable habitat for breeding or larval development and minimal refugia for post-metamorphic life stages (i.e., young-of-year, juveniles, and adults). Habitat may function as a dispersal corridor or overwintering habitat.
- Not suitable: areas containing no potentially suitable habitat for any life stage.

4.3. PHASE II: CONDUCT FIELD SURVEYS

4.3.1. VISUAL ENCOUNTER SURVEYS

Two biologists working in tandem conducted Visual Encounter Surveys. Surveyors waded into shallow-water habitats or walked along the shoreline of shallow-water habitats scanning ahead and searching stream banks, back-channel areas, and instream habitats for egg masses, larvae, and post-metamorphic frog life stages (juveniles and adults) on both sides of the river, where possible.

All other amphibian and aquatic reptile species observed during the surveys were recorded. Each species' detection was recorded by life stage along with associated habitat data. Surveyors also noted any incidental observations of non-native invasive aquatic species (e.g., bullfrog, crayfish, Asian clams, and invasive fishes) and other key species of interest (e.g., special-status freshwater mussels, bald eagle, osprey, and great blue heron).

4.3.2. ENVIRONMENTAL DNA SAMPLING

Environmental DNA (eDNA) samples were collected at all Visual Encounter Survey sites (Figure 3-1) in 2023. Surveyors collected four 500-milliliter water samples at 100-meter increments for a total of 2 liters of water collected and filtered at each site. The eDNA samples were collected from the water's surface in high-quality foothill yellow-legged frog habitats/micro-habitats (e.g., backwaters, rocky slow-moving streams). To prevent downstream contamination, surveyors wore disposable nitrile gloves, collected all samples from downstream to upstream, and, where possible, avoided entering the riverine system.

Surveyors used 0.45-micron Cellulose Nitrile filters paper and a polypropylene vacuum flask with a rubber stopper fixed peristaltic pump to filter all eDNA water samples. After filtration, the filter paper was stored in desiccant beads in a fridge or cooler prior to DNA extraction. All personnel wore disposable nitrile gloves during sample filtration and changed gloves prior to handling the filter membrane. To create a field blank (i.e., control sample), surveyors filtered 1 liter of distilled water at the end of each day following collection.

eDNA samples were extracted and analyzed by a recognized laboratory that conducts eDNA analysis. Laboratory personnel followed best practices for eDNA extraction and created and analyzed an extraction and quantitative polymerase chain reaction (qPCR) negative¹ with every extraction batch and qPCR plate. All eDNA samples were analyzed

¹ A negative control is used to detect any potential DNA contamination introduced during analysis.

with an internal positive control to ensure samples are not inhibited and that a negative result signifies DNA was not detected (not a failed qPCR reaction). Laboratory personnel analyzed the samples for foothill yellow-legged frogs using previously published assays that have been peer reviewed as well as tested *in situ* and *in vivo* (Bedwell and Goldberg 2020).

5.0 DATA SUMMARY

5.1. PHASE I: IDENTIFICATION OF SUITABLE HABITAT AND SELECTION OF SURVEY SITES

Because the reconnaissance visit was conducted during extreme drought conditions, study sites were reassessed for habitat suitability during the first field survey. Table 5.2-1 includes habitat rankings and descriptions for study sites surveyed during the 2023 and 2024 field efforts.

5.2. PHASE II: CONDUCT FIELD SURVEYS

Surveyors did not observe foothill yellow-legged frogs during the June 2023, September 2023, or June 2024 field surveys. Table 5.2-1 includes habitat rankings and descriptions for study sites surveyed during the 2023 and 2024 field efforts.

During the September 2023 surveys, biologists collected eDNA samples at all monitoring sites. No foothill yellow-legged frog DNA was detected in any of the eDNA samples. During laboratory analysis, none of the samples showed signs of inhibition and all the negative control samples (including extraction negative and qPCR negative) tested negative. Surveyors observed non-native crayfish.

Table 5.2-1. Foothill Yellow-legged Frog Visual Encounter Survey and Habitat Characterization Results

Site	Foothill Yellow-legged Frog Observed	Overall Habitat Quality	High-quality Breeding Habitat Present	Moderate-quality Breeding Habitat Present	Average Riparian Canopy Cover	Reach Description and Habitat Notes	Fish Observed	Other Species Observed
Brush Creek Confluence at Brush Creek Campground (RM 20.4)	No	Moderate	0%	1–20%	51–75%	Very shady reach with a few areas of moderate-quality breeding habitat and unembedded boulders present in shallow slow-moving water. Some of the main channel pools had good basking habitat. Overhanging bank present throughout.	No	None
Fairview Campground (RM 16.2)	No	Moderate	0%	21–40%	1–25%	Reach was mostly long glides/pool habitat with some riffles. Limited breeding habitat available along the top of bars at pool tails and some side channels with unembedded boulders.	Yes	Sierran treefrog (<i>Pseudacris sierra</i>)
Salmon Creek confluence (RM 13.2)	No	Moderate	0%	1–20%	0–25%	Low- to moderate-quality habitat in the mainstem with some basking habitat for adults. Side-channel habitat present, consisting of low flow over unembedded boulders that offer some breeding habitat.	Yes	Sierra garter snake (<i>Thamnophis couchii</i>)
Headquarters Campground (RM 5.0)	No	Moderate	1–20%	21–40%	0–25%	Reach consisted of run-riffle complexes with high flows; good basking habitat throughout. Some high-quality breeding habitat in backwater pools and along the top of cobble bars.	Yes	Sierran treefrog
Downstream of the Kern River No. 3 Powerhouse (RM 2.9)	No	Low	0%	1–20%	0–25%	A deep, fast run reach with steep-sided bank that quickly reaches depths greater than 1 meter. Very limited shoreline basking habitat.	Yes	None
Corral Creek upstream of Diversion Dam	No	Low to Moderate	0%	0%	51–75%	Overgrown vegetation and high canopy cover. Mid-channel and side-channel habitat with limited or poor breeding locations. Some basking sites on bedrock and several undercut banks present. Potentially good overwintering habitat depending on flow conditions.	No	<ul style="list-style-type: none"> • Sierran treefrog • Southern alligator lizard (<i>Elgaria multicarinata</i>) • Blainville's horned lizard (<i>Phrynosoma blainvilli</i>)
Corral Creek at NFKR Confluence	No	Moderate	0%	1–20%	51–75%	Few sunny areas with numerous basking rocks. Some areas of open canopy basking sites and undercut banks. Few moderate breeding pools present. Potentially good overwintering habitat depending on flow conditions.	Yes	None
Cannell Creek upstream of the siphon	No	High	21–40%	21–40%	1–25%	Numerous backwater pools and channels with areas of high-quality breeding habitat. Small unembedded boulders present for ovipositing. Basking habitat present, especially upstream of the siphon.	No	<ul style="list-style-type: none"> • Sierran treefrog • Northwestern pond turtle (<i>Actinemys marmorata</i>)
Cannell Creek at NFKR Confluence	No	High	41–60%	41–60%	1–25%	Areas of high-quality breeding habitat with slow-moving water and small-sized unembedded boulders. Open canopy with hanging vegetation/undercut banks that provides protection and good basking habitat. High-quality breeding habitat with some undercut banks and several mid-channel pools present.	Yes	Sierran treefrog
Salmon Creek upstream of Diversion Dam	No	Low	0%	0%	51–75%	Poor habitat. Very shaded with limited basking and breeding areas. Undercut banks present. Some deep pools and a few long waterfalls.	No	None
Salmon Creek at NFKR Confluence	No	Moderate	0%	1–20%	51–75%	Swift moving tributary with some basking habitat and overhanging and undercut banks. High canopy cover and little suitable breeding habitat present.	Yes	Sierra garter snake

NFKR = North Fork Kern River; RM = river mile

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Photo Credit: J. Woodall, Stillwater Sciences

Figure 5.2-1. Incidental Herpetofauna Observed During Field Surveys: Southern Alligator Lizard (*Elgaria multicarinata*) (top) and Northwestern Pond Turtle (*Actinemys marmorata*) (bottom).

6.0 STUDY SPECIFIC CONSULTATION

Biologists consulted with the U.S. Fish and Wildlife Service and the Forest Service regarding survey timing, study design, and study site selection.

7.0 OUTSTANDING STUDY PLAN ELEMENTS

There are no outstanding study plan elements.

8.0 REFERENCES

Bedwell, M. E., and Goldberg, C. S. 2020. *Spatial and temporal patterns of environmental DNA detection to inform sampling protocols in lentic and lotic systems*. *Ecology and evolution*, 10(3), 1602–1612.

FERC (Federal Energy Regulatory Commission). 2022. *Study Plan Determination for the Kern River No. 3 Hydroelectric Project*. 20221012-3024. October 12.

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