FLOW FLUCTUATION MONITORING
FOOTHILL YELLOW-LEGGED FROG (*Rana boylii*)

EL DORADO COUNTY, CALIFORNIA
EL DORADO HYDROELECTRIC PROJECT (FERC NO. 184)
SOUTH FORK AMERICAN RIVER

Prepared for:

2890 MOSQUITO ROAD
PLACERVILLE, CALIFORNIA 95667

Prepared by:

2601 MISSION STREET, SUITE 600
SAN FRANCISCO, CALIFORNIA 94110

September 2022

TABLE OF CONTENTS

LIST OF FIGURES:

LIST OF TABLES:

APPENDICES:

Foothill Yellow-Legged Frog (*Rana boylii*) Flow Fluctuation Monitoring
El Dorado Hydroelectric Project (FERC No. 184)

1.0 INTRODUCTION

1.1 Monitoring Requirements

El Dorado Irrigation District (District) owns and operates the El Dorado Hydroelectric Project (Project) on the South Fork American River (SFAR) in El Dorado County, California, The Project is licensed by the Federal Energy Regulatory Commission (FERC; Project No. 184). Foothill yellow-legged frog (FYLF; *Rana boylii*) is a special-status amphibian species known to occur in Project waters. As required by the Project 184 License,[1] the District, in coordination with the U.S. Forest Service (FS), the California State Water Resources Control Board (SWRCB), and the Ecological Resources Committee, developed the Project 184 Foothill Yellow-Legged Frog Monitoring Plan (Plan; EID 2007) to monitor potential effects of Project operations on FYLF populations in the area.

In addition to routine population monitoring, the Plan requires FYLF surveys be conducted at SFAR sites following any flow fluctuation, defined in the Project 184 License when "June through September at any time the SFAR flow is 100 cfs or less and the diversion into the El Dorado Canal causes the flow in the SFAR below Kyburz Diversion Dam to change 50 cfs or more in one day."

One such flow fluctuation occurred on August 15, 2022, when the District had to dewater the El Dorado Canal in response to a leak in an elevated precast concrete section of the canal near Kyburz. District staff detected the leak at 7:30 a.m. and immediately ceased diversions into the canal in order to assess the situation. At 7:30 a.m. flows in the SFAR below Kyburz were approximately 20 cfs. At 9:00 a.m., with diversions to the canal shut off, flows in the SFAR below Kyburz increased to approximately 123 cfs.

Prior to its discovery, leakage at the site was being conveyed by a culvert drain located underneath the elevated section of canal into an ephemeral drainage that flows to the SFAR. No evidence of active erosion was observed at the outlet of the culvert drain; however, because the drainage is located in an area recently burned by the Caldor Fire, water from the leak transported ash and other organic material to the SFAR, which resulted in a temporary period of elevated turbidity levels in the SFAR. The leak was repaired on August 15 and resumed diversions into the canal on August 16.

The District immediately contracted with Kleinfelder to perform FYLF surveys.

[1] *FS Section 4(e) Conditions 37 and 38; SWRBC 401 Water Quality Certification Condition 13; Project 184 Settlement Agreement Sections 7 and 8.*

2.0 METHODS

2.1 Visual Encounter Surveys

Flow fluctuation monitoring consisted of visual encounter surveys (VES) conducted at three[2] sites on the SFAR: site 105R located near the El Dorado Powerhouse and sites 213R and 220R located in the Riverton area (Figure 2-1). Surveys were followed "*A Standardized Approach for Habitat Assessments and Visual Encounter Surveys for the Foothill Yellow-Legged Frog (Rana boylii)*" (Seltenrich and Pool 2002). All VES monitoring was conducted by a team of two Kleinfelder biologists on August 18, 2022.

Survey data were recorded onto VES data sheets for each subsite surveyed. Separate data sheets were completed for tadpoles and for juveniles/adults. Juvenile and subadult frogs were defined as frogs from previous years' cohorts, ranging approximately 30–40 mm snout-urostyle length (SUL), but not considered of adult size. Adults were defined as frogs greater than or equal to 40 mm SUL.

Data parameters collected for tadpoles included: tadpole group location within site; number of tadpoles in each group; distance from the shore; velocity; total length; substrate; percent algae and detritus; and, water depth. The data parameters collected for juvenile and adult FYLF included: number of frogs observed; frog location within the site; sex; age; SUL; habitat type; activity; percent cover of vegetation; percent shade; and, substrate.

3.0 RESULTS

3.1 Visual Encounter Survey Results

VES results are summarized in Table 3-1. Site photographs are located in Appendix A.

3.1.1 Site 105R – SFAR at El Dorado Powerhouse

Site 105R is located near El Dorado Powerhouse at approximately 575 m (1,880 ft) elevation. This site includes four subsites (105a, 105b, 105c, and 105d) and is approximately 221 m in total length (Photos 1 and 2, Appendix A). YOY fish (cyprinids and suckers) were observed along with signal crayfish. No FYLF life stages were observed at this site. Within Site 105R, there was no evidence of recent increased flows, siltation, or other noticeable effects of the August 15 flow fluctuation.

[2]*Sites 120R and 124R, located in remote portions of the SFAR canyon, were not surveyed due to extremely high forecasted temperatures and other safety concerns. Following a helicopter rescue required during recent site 120/124 surveys, the District has determined that it is not safe to send crews into the remote portions of the SFAR canyon. Hence the substitution of the more easily accessible site 105 which provides adequate information regarding potential effects of flow fluctuations in this section of the SFAR.*

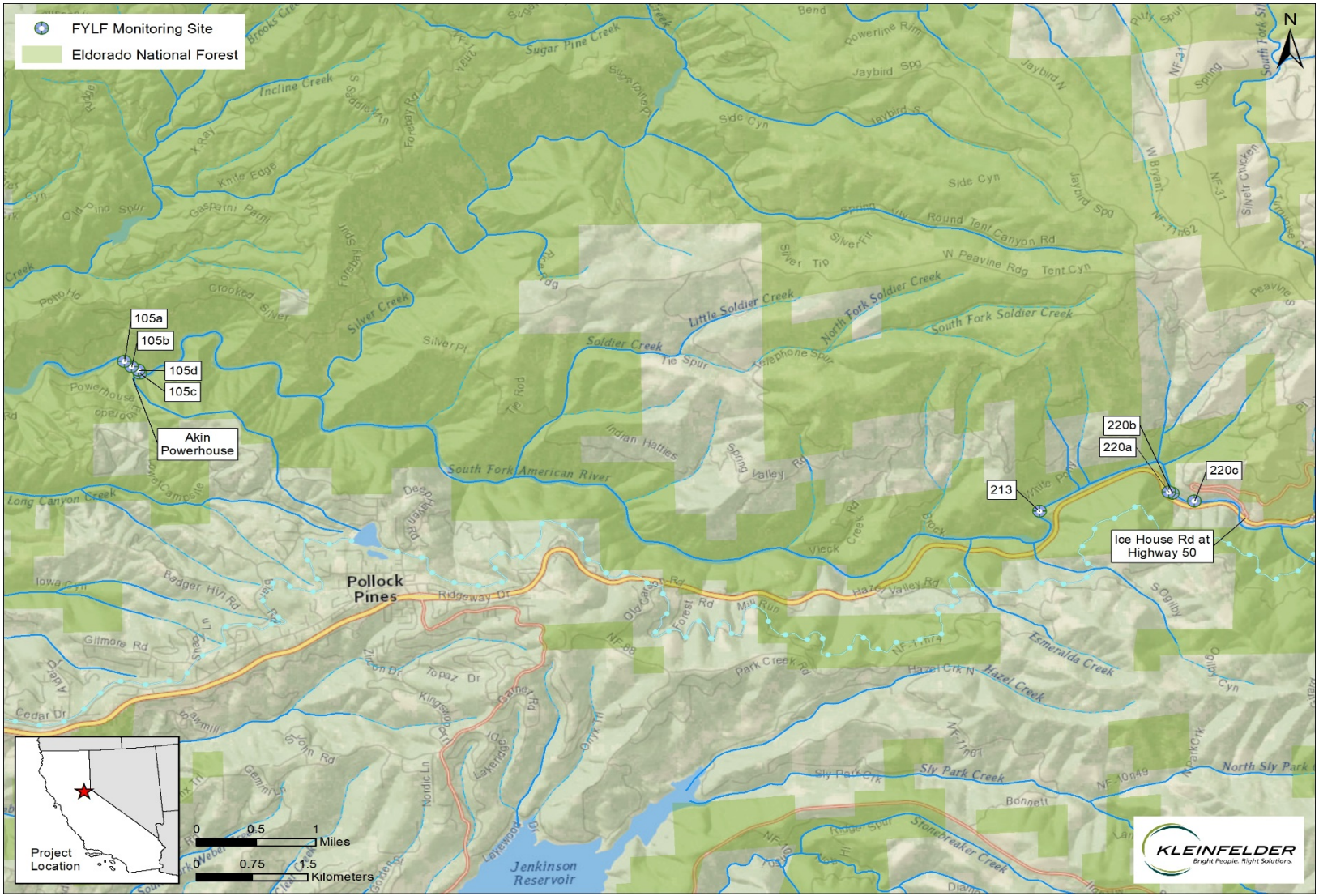

Figure 2-1. August 2022 flow fluctuation monitoring sites and spillway locations.

Table 3-1. Survey results for August 2022 flow fluctuation monitoring (all surveys conducted on 8/18/22).

SITE#	Start Time	End Time	Actual VES Time (min)	Start Air Temp.(°C)	End Air Temp. (°C)	Water Temp. (edge) (°C)	Water Temp. (main)(°C)	# Egg Masses	# Tadpoles	# Juvenile/ YOY Frogs	#Adult Frogs
105R	1150	1220	30	35.5	35.5	23.5	21.5	0	0	0	0
213R	1420	1440	20	33.5	33.5	24.5	24.5	0	0	0	0
220R	1305	1345	40	31.5	31.5	23.5	24.0	0	0	0	0

3.1.2 Site 213R – SFAR above Ogilby Creek confluence

Site 213R is located on the left bank of the SFAR about 0.6 km (1,970 ft) upstream of the confluence with Ogilby Creek, at an elevation of 930 m (3,050 ft) (Photos 3 and 4, Appendix A). The site is 105 m long and consists of a low-gradient cobble/gravel point bar. YOY fish (cyprinids and suckers) were observed along with signal crayfish. No FYLF life stages were observed at this site. Within Site 213R, there was no evidence of recent increased flows, siltation, or other noticeable effects of the August 15 flow fluctuation.

3.1.3 Site 220R – SFAR at Maple Grove

Site 220R is located near Maple Grove Campground at an elevation of 965 m (3,160 ft) (Photo 5 and 6, Appendix A). Three subsites are established within the site: 220a, 220b, and 220c. The total site length is 286 m. YOY fish (cyprinids and suckers) were observed along with signal crayfish. No FYLF life stages were observed at this site. Within Site 220R, there was some evidence of recent increased flows with the high-flow water mark evident approximately 1.5 meters wider in edge water areas (Photos 7 and 8, Appendix A). No other noticeable effects of the August 15 flow fluctuation were observed.

4.0 LITERATURE CITED

El Dorado Irrigation District (EID). 2007. Project 184 Foothill yellow legged frog monitoring plan. May, 2007. 6 pp. plus appendices.

Seltenrich, C.P. and A.C. Pool. 2002. A Standardized Approach for Habitat Assessments and Visual Encounter Surveys for the Foothill Yellow-Legged Frog (*Rana boylii*). May 2002. Pacific Gas and Electric Company, Technical and Ecological Services, unpublished report.

Appendix A:

Site Photographs

Photo 1. Bottom of site 105R looking upstream (8/18/22)

Photo 2. Top of site 105R looking downstream (8/18/22)

Photo 3. Bottom of site 213R looking upstream (8/18/22)

Photo 4. Top of site 213R looking downstream (8/18/22)

Photo 5. Bottom of site 220R looking upstream (8/18/22)

Photo 6. Top of site 220R looking downstream (8/18/22)

Photo 7. Middle of site 220R with recent high-flow water mark evident (8/18/22)

Photo 8. Middle of site 220R recent high-flow water mark evident (8/18/22)