Amphibian and Aquatic Reptile Monitoring Plan

Sacramento Municipal Utility District

Hydro License Implementation • February 2016

Upper American River Project

FERC Project No. 2101

Powering forward. Together.

SMUD®

Table of Contents

Tables, Figures, and Attachments

Acronyms and Abbreviations

CDFW	California Department of Fish and Wildlife
FERC	Federal Energy Regulatory Commission
FYLF	Foothill yellow-legged frog
PG&E	Pacific Gas and Electric Company
SFAR	South Fork American River
SMUD	Sacramento Municipal Utility District
SWRCB	State Water Resources Control Board
UARP	Upper American River Project
USFS	U.S. Forest Service
USFWS	U.S. Fish and Wildlife Service
UTM	Universal Transverse Mercator
WPT	Western pond turtle
VES	Visual encounter survey

1.0 Introduction and Background

This Amphibian and Aquatic Reptile Monitoring Plan (Plan) addresses monitoring requirements set forth in Conditions 8.C, 8.D, 9.A, 9.B, and 9.C of Appendix A, and Conditions 31 and 32 of Appendix B of the new License issuance order (FERC 2014) for the Upper American River Project (UARP; FERC Project 2101), owned and operated by the Sacramento Municipal Utility District (SMUD). Appendix A of the License incorporates the State Water Resources Control Board's (SWRCB) Water Quality Certification into SMUD's License, while Appendix B incorporates the U.S. Forest Service's (USFS) 4(e) conditions. The relevant License Conditions are included as Attachment 3 of this document.

The UARP lies within El Dorado and Sacramento counties, primarily within lands of the Eldorado National Forest (ENF). The UARP consists of three major storage reservoirs—Loon Lake, Union Valley, and Ice House (with a combined capacity of approximately 379,000 acre-feet), eight smaller regulating or diversion reservoirs, and eight powerhouses. The UARP has an authorized installed capacity of 637.3 megawatts (MW). The UARP also includes recreation facilities containing over 700 campsites, five boat ramps, hiking paths, and bicycle trails at the reservoirs.

SMUD will monitor for the presence of sensitive amphibians and aquatic reptiles, focused primarily on foothill yellow-legged frog (*Rana boylii*) (FYLF), over the term of the License. SMUD will also survey for western pond turtle (*Actinemys marmorata*) (WPT) during amphibian and reptile surveys. This Plan also includes stream water temperature monitoring at specified sites with known breeding or suitable breeding habitat for FYLF. Surveys focused on Sierra Nevada yellow-legged frog (*Rana sierrae*, formerly mountain yellow-legged frog [*Rana muscosa*]) will be described under a separate monitoring plan, as required under the License.

2.0 Monitoring Plan Objectives

The main objective of monitoring is to document FYLF and WPT presence and distribution over the term of the License, and to identify FYLF breeding and larval periods in the Project-affected reaches by periodically surveying reaches of known and potential FYLF presence during spring and summer. During the first survey year, surveys will determine the timing and success of the following life stages of known existing populations: egg laying, tadpole rearing, metamorphosis, and size/condition of metamorphs (newly metamorphosed individuals, also referred to as "young-of-year"). The size and condition of young-of-year will be documented in fall in an attempt to estimate the probability of overwintering success.

Determination of presence and distribution of sensitive amphibian species and identification of breeding and larval periods are important in evaluating potential impacts resulting from streamflow modifications. In particular, along with temperature monitoring and other aquatic species monitoring, FYLF monitoring will help inform whether short-

term fluctuations resulting from spill events below Slab Creek Reservoir Dam and/or Camino Reservoir Dam result in unacceptable environmental impacts. Identification of FYLF breeding and larval periods may also be used to monitor effects of spring recreational boating flows and potential October recreational boating flows in the South Fork American River (SFAR) below Slab Creek Reservoir.

FYLF monitoring is being conducted to help determine if populations of this species in Project-affected streams are increasing or decreasing for any life stage as a result of Project streamflow changes or fluctuations. Monitoring each 5-year period provides an opportunity to detect changes in amphibian populations, following sufficient response time to streamflow modifications. Trends in population size and/or changes in distribution over time will be monitored with consideration of Project-related changes in water temperature and habitat availability. Monitoring before (when feasible) and after spill events and during flow fluctuations will provide information on whether egg masses and/or larvae are being displaced or stranded.

In the future, U.S. Forest Service (USFS), U.S. Fish and Wildlife Service (USFWS), California Department of Fish and Wildlife (CDFW), and/or State Water Resources Control Board (SWRCB) (hereafter referred to as "the Resource Agencies") may revise and update this Plan during years when no monitoring surveys are scheduled in order to adapt to current accepted standards or request additional breeding site habitat data to assess the cause of unexpected or chronic reproductive failures that may be related to Project operations under the new License.

3.0 Monitoring Sites and Frequency

3.1 Monitoring Sites

FYLF monitoring will be conducted at sites of documented species presence (Camino Dam sites: CA-3 and SFA-4) as well as at sites with potential habitat within specified Project reaches[1] (Figure 3-1, Table 3-1).

[1] "Project reach" is a term to describe a segment of stream downstream of a dam (e.g., "Camino Dam Reach" is Silver Creek downstream of Camino Dam).

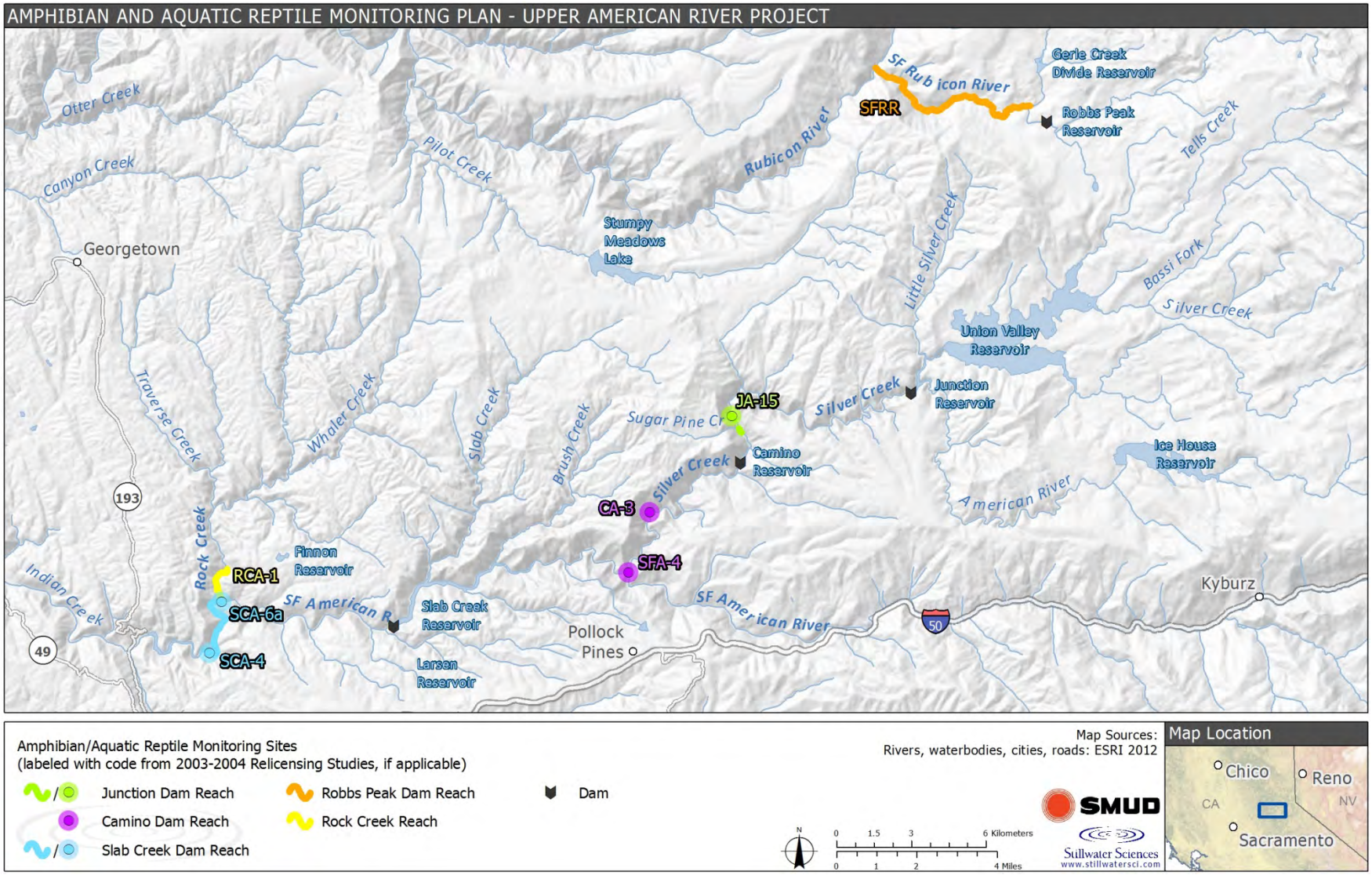

Figure 3-1. Amphibian and Aquatic Reptile Monitoring Sites for SMUD Upper American River Project.

Table 3-1. Amphibian/Aquatic Reptile Monitoring Site Descriptions.						
Project Reach	**Stream**	**Site Code**	**Site Length[a]**	**Site Description**	**FYLF Observed in 2003 or 2004?**	**Stream Margin Temperature Monitoring Required?**
Junction Dam	Silver Creek	JA-15	150 m / 0.09 mi[b]	**Silver Creek below Junction Reservoir Dam**: Associated with fish monitoring site JDF-2, and amphibian monitoring site JA-15.	No	No
Camino Dam	Silver Creek	CA-3	99[b] m / 0.06 mi	**Silver Creek below Camino Reservoir Dam**: Associated with amphibian monitoring sites CA-3 and SFA-4 (near confluence with SFAR).	Yes	Yes
		SFA-4	130[b] m / 0.08 mi			
Slab Creek Dam	SFAR	SCA-6a through SCA-4	3,470[c] m / 2.2 mi	**SFAR below Slab Creek Reservoir Dam**: Entire reach between and including amphibian monitoring sites SCA-6a and SCA-4.	No	Yes
Rock Creek	Rock Creek	RCA-1	1,650[c] m / 1.0 mi	**Rock Creek**: From the tributary's confluence with the SFAR to a point 1 mile upstream. This distance may be shortened if it is determined that there is a barrier to movement of FYLF.	No	No
Robbs Peak Dam	South Fork Rubicon River	SFRR	8,390[c] m / 5.2 mi	**SF Rubicon River below Gerle Creek:** from downstream of confluence with Gerle Creek to the confluence with the Rubicon River.	No	No

[a] Site lengths are reported in meters (m) and miles (mi).
[b] Site lengths from 2003–2004 amphibian and aquatic reptile relicensing studies (SMUD and PG&E 2005)
[c] Site lengths calculated in GIS (projection: NAD83 UTM Zone 10N)

FYLF were documented at two specific sites along the Camino Dam Reach during relicensing studies in 2003 and 2004 (SMUD and PG&E 2005) and will be included as monitoring sites in this Plan: (1) CA-3, on Silver Creek approximately 3.75 miles downstream of Camino Dam; and (2) SFA-4, on Silver Creek just upstream of the confluence with the SFAR.

Monitoring will be conducted in reaches that contain FYLF habitat but where relicensing Visual Encounter Surveys (VESs) did not document FYLF species presence: (1) Silver Creek below Junction Reservoir Dam (JA-15), where VESs were performed at three locations throughout the reach; (2) Slab Creek Reservoir Dam (SCA-6A through SCA-4); and (3) SF Rubicon River below Gerle Creek (Robbs Peak Dam Reach) (Figure 3-1, Table 3-1).

The Robbs Peak Dam Reach will be monitored during a one-time investigative survey as required by the SWRCB (Condition 8.C.A, Appendix A of the License). This survey will be conducted during the late-summer period; this survey period has the greatest probability of detecting FYLF since juveniles, and occasionally subadults and adults are often easily observed along river margins, and subadults and adults may also be

observed in tributary streams (PG&E 2002a). Although Placer County Water Agency (PCWA) did not detect FYLFs in the SF Rubicon River during Middle Fork American River relicensing studies, FYLFs were documented in the mainstem Rubicon River downstream of the confluence with the SF Rubicon River and below approximately 3,350 feet elevation (PCWA 2011).

Rock Creek is being included as a new monitoring site for Years 2-4 to provide information on whether FYLFs are using this major tributary of the reach below Slab Creek Dam. This will assist in determining whether FYLF movement is possible between the confluence with the SFAR and up to one mile along Rock Creek.

If FYLF are found in the Slab Creek Dam, Rock Creek, or Robbs Peak Dam reaches[2], discrete sub-reaches with fixed distances will be identified for repeatability and between-year comparisons of population fluctuations. Sub-reaches will include the locations where FYLF (if found) were initially documented, as well as the stretch of river upstream and downstream of these locations with moderately to highly suitable habitat. In this case, SMUD will consult with the Resource Agencies to establish the extent of these sub-reaches.

USFS staff documented three WPT in the UARP Project area in 2003, concurrent with 2003–2004 relicensing studies (SMUD and PG&E 2005). On the Slab Creek Dam Reach of the SF American River, USFS staff observed one juvenile WPT approximately 0.5 miles upstream of the White Rock Powerhouse and two juvenile WPT just downstream of the Rock Creek confluence (SMUD and PG&E 2005). These locations are included in the Slab Creek Dam Reach monitoring site as part of this Plan.

3.2 Monitoring Frequency

Each site will be monitored over the term of the License during specific years (Table 3-2), as well as surveys triggered by flow fluctuations and spill events (Table 3-3).

[2] Slab Creek Dam, Rock Creek, and Robbs Peak Dam reaches are each one mile or longer, and invariably will include stretches with varying levels of habitat suitability for target species.

Table 3-2. Monitoring Schedule for Each Amphibian/Aquatic Reptile Monitoring Site Over Term of License.																									
Site Description	**License Years 1 through 25**																								
	1	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**	**13**	**14**	**15**	**16**	**17**	**18**	**19**	**20**	**21**	**22**	**23**	**24**	**25**
Silver Creek below Junction Reservoir Dam		X	X		X					X					X					X					X
Silver Creek below Camino Reservoir Dam		X	X	X	X	X				X	X				X	X				X	X				X
SFAR below Slab Creek Reservoir Dam		X	X	X	X	X	X			X	X				X	X				X	X				X
Rock Creek		X	X	X																					
SF Rubicon River below Gerle Creek[1]		X																							
Site Description	**License Years 26 through 50**																								
	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41	42	43	44	45	46	47	48	49	50
Silver Creek below Junction Reservoir Dam					X					X					X					X					X
Silver Creek below Camino Reservoir Dam	X				X	X				X	X				X	X				X	X				X
SFAR below Slab Creek Reservoir Dam	X				X	X				X	X				X	X				X	X				X
Rock Creek																									
SF Rubicon River below Gerle Creek[1]																									

X = Amphibian and aquatic reptile monitoring years

[1] = requirements for subsequent monitoring will depend on results of first year of monitoring

Table 3-3. Flow and Spill Monitoring of Amphibian and Aquatic Reptile Monitoring Sites.		
Site Description	**As soon as possible after decline of spill flows?**	**During flow fluctuation per SWRCB Condition 8.D?**
Silver Creek below Junction Reservoir Dam	No	No
Silver Creek below Camino Reservoir Dam	Yes	Yes
SFAR below Slab Creek Reservoir Dam	Yes	No
Rock Creek	No	No
SF Rubicon River below Gerle Creek	No	No

4.0 Methods: VES

VESs will be performed in all safely accessible and permissible areas within each site, following protocols outlined in the Draft Visual Encounter Survey Protocol for *Rana boylii* in Lotic Environments (Yarnell et al. 2014), as well as protocols similar to those outlined in Heyer et al. (1994), Lind (1997), and Pacific Gas and Electric Company (PG&E) (2002a, b). Qualifications of surveyors shall be reviewed and meet approval of the Resource Agencies prior to commencing work. In addition to FYLF, all other amphibian and reptile species observed during the surveys will be recorded, as well as any observed potential predators (e.g., smallmouth bass, crayfish, and bullfrogs). Specific survey methodology for each species is addressed below, as are methods for adaptive management monitoring.

As required in the License, qualifications of surveyors will be reviewed and meet approval by the Resource Agencies prior to commencing FYLF and WPT surveys. Surveyors should have a background in diagnostic features and habitat associations of WPT.

4.1 Foothill Yellow-legged Frog

During each scheduled monitoring year, at least four focused VESs will be conducted: at least two egg mass surveys during the breeding period (late spring to early summer), one tadpole survey during the tadpole development period (mid-summer, approximately one month after egg masses are observed), and one survey for newly metamorphosed (young-of-year) FYLF in the fall (around September).

In the Sierras, breeding is initiated as early as late April through early July (generally mid-May), depending on the seasonal precipitation patterns and water year type (Yarnell et al. 2014). The timing of focused egg mass VESs will be critical during the first several years for: (1) developing the temperature threshold triggers for this system and, (2) timing of the subsequent life history stage surveys. To understand FYLF egg-laying (oviposition) timing (date) and the influence of water temperature, it is necessary to have multiple years of egg mass survey data with two or more surveys during the oviposition season. These multiple years need to include different water year types, since frogs can delay breeding and oviposition in wetter water years. More than two egg mass surveys during the oviposition season during initial survey years will help avoid missing the egg-laying window as a result of yearly variation in flows and water temperature. The Camino Dam reach of Silver Creek amphibian survey site(s) will initially be used as a sentinel site(s) to help determine the onset of the breeding season. After each year of survey, data will be reviewed to determine if breeding is occurring in UARP amphibian survey sites at a lower elevation than Silver Creek. If breeding is found to occur at lower elevation UARP amphibian survey sites, the location of the sentinel site(s) may be adjusted. Additionally, the temperature associated with the

initiation of egg mass surveys will also be reviewed to determine if it should be adjusted accordingly. Any proposed changes to sentinel survey site locations or water temperature triggers for subsequent years shall be approved by the Resource Agencies.

The beginning of egg mass surveys for the initial survey year will be based on the following two steps:

Step 1: When there is a mean daily temperature of 10°C for a three-day running average at any of the FYLF monitoring sites, as recorded by existing telemetered gaging stations, or after April 15th, whichever comes last. This is contingent on the ability to perform surveys safely and effectively.

Step 2: Once the above temperature trigger or date threshold is reached, the sentinel or reference site(s) (see above) should be checked for breeding activity.

When possible, a pair of surveyors will initiate the VES at the downstream end of the site and survey upstream. When wading in near-shore habitat, surveyors will use a carefully gauged zig-zag pattern to search the shallows in one pass. Use of a viewing box in shallow, wadeable areas to help detect egg masses and tadpoles is helpful but not mandatory. Polarized glasses help reduce glare during surveys. Observations of all FYLF life stages will be recorded during each survey. Data from the surveys will be recorded on field forms (Attachment 1) from Yarnell et al. 2014.

Data collection will include species information specific to each life stage (e.g., sex, Gosner [1960] stage, tadpole number and size, etc.), macrohabitat and microhabitat characteristics where the individual was detected (e.g., air and water temperature, flow, water depth, substrate, location in the stream, dominant vegetation), and universal transverse mercator (UTM) coordinates. Identified frog life stages and associated habitat will be photographed and photo numbers will be documented. Start and end times will be recorded, as well as the actual time spent exclusively searching for FYLF.

4.1.1 Egg Mass Surveys

During egg mass surveys, the team will include one snorkeler to survey areas where safe and feasible (e.g., in deeper water [0.5-3 m deep] in and adjacent to suitable breeding habitat). Surveyors will carefully use their hands to feel in areas where they cannot see, including under bedrock, under boulder ledges, and in deep pockets beneath large cobble in low-velocity areas.

At sites where FYLF egg masses are observed, data collection will include: Gosner stage, total depth of water at egg mass location, mid-column velocity, attachment substrate, dominant riparian type, geomorphic unit, nearest bank, and water temperature. Water velocity will be average local mid-column flow velocity of the

microhabitat immediately adjacent to the oviposition location. Any evidence of scouring, stranding, predation, or changes in use at existing breeding sites will be noted.

4.1.2 Larval Surveys

In shallow water habitats, hand dip nets may be used to carefully seine the channel bottom to collect tadpoles while minimizing habitat disturbance. At locations where FYLF tadpoles are documented, the number of tadpoles, Gosner stage, and nearest bank will be recorded. Data collected at each tadpole group location also includes total water depth, dominant substrate, and estimated average total length of tadpoles. Water velocity measurements will be made near the center of the tadpole group at a mid-column velocity to represent the average flow velocity at the location of the tadpoles.

4.1.3 Post-metamorphic Surveys

Survey for post-metamorphic individuals will focus on the surface of the ground, on rocks, or at the water's edge. Data collected for each post-metamorphic individual captured will include sex[3] and snout-to-vent length. An individual will be classified as adult if it possesses secondary sexual characteristics (such as enlarged nuptial pads in males) or is equal to or greater than 37 mm snout-to-vent length (Storer 1925, Zweifel 1955). An individual will be classified as a young-of-year based on size (which can measure from 22 to 27 mm snout-to-vent length, but typically from 22 to 24 mm [Nussbaum et al. 1983, Zeiner et al. 1988, PG&E 2002a]) and possible evidence of tail absorption; in addition, young-of-year are present in fall only. Habitat data collected as part of the post-metamorphic frog surveys will include perch substrate, dominant riparian type, and geomorphic unit. Surveys focused on young-of-year will occur in late September; size and condition of encountered young-of-year will be recorded.

Chin photographs may be used for comparison with future FYLF captures, allowing potential identification of individual frogs and potential tracking of movement by individual frogs. Chin patterns are hypothesized to be unique to each frog and persist throughout the life of the frog.

4.2 Western Pond Turtle

WPT surveys will be conducted concurrently with the mid-summer FYLF survey (Section 4.1.2 above), where one additional dedicated surveyor will independently look for WPT (for the survey on the SF American River this will increase to two surveyors due to the larger system).

[3] For size classes of juvenile and younger, when determination of sex is not feasible, sex will be recorded as "unknown."

The surveyor(s) will walk in an upstream direction, first using binoculars to scan ahead and search from a distance to identify potential basking locations, such as sunlit rocks, logs, exposed banks, floating vegetation, and for WPT at the surface of the water. The surveyor(s) will document skeletal remains and evidence of WPT nests, such as the scrapes produced by females when digging nest-holes, signs of nests opened by predators, and remnants of hatched eggshells. Evidence of habitat use (e.g., claw scrapes, scat), and basking sites used (e.g., boulder, log), will be recorded on field maps. In general, WPT are most likely to be observed during snorkeling associated with deep pools and backwaters. Personnel across studies will be trained in how best to observe and capture WPT while snorkeling pools with large and small woody debris and other complex underwater refugia.

If WPT are observed, the field crew will record the observation(s) along with associated data. Key attributes of the site (e.g., vegetation, habitat type, and the presence and nature of basking sites) will be characterized and recorded on a field form modified from Holland (1994) (Attachment 2), along with GPS coordinates (where possible) and corresponding photographs.

If a WPT is observed by snorkelers, the field crew will make a reasonable effort to capture the turtle without injuring or unduly stressing the animal. If captured, the field crew will measure the turtle. Captured WPTs will be categorized by sex (if determinable), and photograph in dorsal (carapace) and ventral (plastron) view alongside a ruler for later measurements and estimating age (counting actual rings).

The surveyors will also identify and map suitable WPT habitat within each survey reach during the initial survey. Suitable habitat will be based on qualitative characteristics such as vegetation, stream substrate, relative stream depth and velocity and presence of suitable basking areas. Surveyors will collect GPS data and take representative photographs for each reach.

4.3 California Red-Legged Frog

If California red-legged frogs (*Rana draytonii*) are encountered during surveys, UTM coordinates will be recorded. SMUD will consult with the Resource Agencies (including USFWS) and submit a proposal for approval to either: (1) continue the measures undertaken for FYLF; or (2) propose additional monitoring efforts that may be required to ensure that UARP minimizes impacts to California red-legged frogs. No California red-legged frogs were observed during relicensing studies conducted in 2003 and 2004, and no California red-legged frogs have historically been documented in reaches or reservoirs associated with the project (SMUD and PG&E 2005).

5.0 Methods: Adaptive Management for FYLF

Several License conditions outline requirements to: (1) monitor FYLF following spill events at Camino and Slab Creek reservoirs, (2) monitor FYLF during flow fluctuations from Camino Dam, and (3) monitor water temperature as an indicator of FYLF breeding initiation.

5.1 Monitoring Following Spill Events at Camino and Slab Creek Reservoirs

SMUD will monitor for effects of spill flows on amphibians, aquatic reptiles, and fish following spill events at Slab Creek Dam or Camino Dam as required under SWRCB Conditions 8.C and 9.C, and USFS 4(e) Conditions 31 and 32.

For spill events at Slab Creek Dam, the FYLF monitoring site SCA-6a at SFAR below Slab Creek Reservoir Dam (below the Rock Creek confluence) will be monitored for effects to FYLF as soon as possible after the decline of spill flows that occur after water temperatures rise above a daily mean of 12°C for a seven-day running average at Water Temperature Monitoring Site 8.I.18. This Water Temperature Monitoring Site is located approximately ½ -mile upstream of White Rock Powerhouse. For spill events at Camino Dam, the FYLF monitoring site at Silver Creek below Camino Dam (VES sites CA-3 and SFA-4) will be monitored for effects to FYLF as soon as possible after the decline of spill flows that occur after water temperatures rise above a daily mean of 12°C for a seven-day running average at Water Temperature Monitoring Site 8.I.14. This Water Temperature Monitoring Site is located on Silver Creek immediately upstream of the SF American River. Monitoring for effects to FYLF will include looking for evidence of damage, displacement, or scouring of egg mass or larvae, as well as evidence of egg mass or larval stranding/desiccation. When feasible, pre-spill surveys will be conducted to help determine the potential effects of the spill on egg masses or tadpoles. For example, weather forecasts will be monitored for large precipitation or snowmelt events that may result in a spill. Camino Dam has gates (as opposed to a spillway) that allow for a controlled spill, which may also aid in planning for a pre-spill survey.

Water temperature measurements are designed to be a proxy for when FYLF breeding and tadpole rearing seasons have begun (see Section 5.3 below).

5.2 Monitoring During Flow Fluctuations from Camino Reservoir Dam

As required under SWRCB Condition 8.D and USFS 4(e) Condition 31, VESs for FYLF will be conducted in Silver Creek below Camino Reservoir Dam at any time during June through September when the following criteria are triggered:

- the streamflows are 100 cfs or less; and
- the flows fluctuate more than 40 cfs over one week's time.

Water velocities and discharge will be recorded. To the extent possible, the Resource Agencies will be notified by SMUD if such fluctuations are going to occur at Camino Reservoir Dam. If the initial egg mass VESs have not yet been conducted or are not scheduled for that year, egg mass VESs will be initiated as quickly as possible in order to document possible effects. If not feasible, then egg mass VESs will be conducted as soon as feasible after the spill. Monitoring for effects to FYLF will include looking for evidence of damage, displacement, or scouring of egg mass or larvae, as well as evidence of egg mass or larval stranding/desiccation.

Controlled flow fluctuations are only anticipated to occur during wet water year types when SMUD exceeds minimum streamflow thresholds, as part of the "block of water" for this reach, described in SWRCB Condition 1 (Appendix A), and USFS 4(e) Condition 27 (Appendix B) of the License.

The surveys can be discontinued if the Resource Agencies are able to determine that the flow fluctuations can occur without resulting in egg mass or tadpole damage, displacement, or stranding.

5.3 Water Temperature as Indicator of Breeding Initiation

Water temperatures that initiate FYLF breeding are suspected to be site-specific within individual river systems (Kupferberg, personal comm., 2006, as cited in the License). Therefore, water temperatures suitable for FYLF breeding on one river may not initiate FYLF breeding in another river system. As such, SWRCB Conditions 9.A and 9.B, and USFS Condition 32 of the License provide provisions allowing the Deputy Director, in consultation with Resource Agencies, to modify the FYLF breeding water temperature indicator of 12°C (mean daily temperature for a seven-day running average). Any modifications to the FYLF breeding water temperature indicator would be based on the results of the aquatic species and water temperature monitoring (as described in SWRCB Conditions 8.C (Amphibian and Reptile Monitoring) and 8.I (Water Temperature) in the License.

Water temperature monitoring in known or suitable breeding sites will provide information about the relationship of flow and water temperature in FYLF breeding areas and allow the establishment of the mean water temperature that triggers FYLF breeding within these rivers. SWRCB Condition 8.C requires temperature monitoring, in the reaches below Camino Reservoir Dam (known breeding site) and below Slab Creek Reservoir Dam (suitable breeding site) during years 2 through 6 of the new License. Thermographs will be deployed in the stream margins (edgewater) in locations that are likely to remain watered throughout the summer and fall to avoid exposing the sensors to the air, typically at least 0.10–0.15 m below the surface of the water. A minimum of six recorders will be deployed to ensure an adequate sample size.

Temperature monitoring in stream margin habitats will be conducted concurrently with stream thalweg water temperature monitoring performed under SMUD's Water Temperature Monitoring Plan. Protocols will be adapted to establish data relationships between edgewater temperatures and thalweg temperatures. Subsequently, the thalweg temperatures will be used to initiate egg-mass VESs based on reach-specific temperature thresholds identified from results of this initial 5-year investigation.

6.0 Reporting

Each calendar year, by April 1, SMUD shall schedule and facilitate an Annual Review of Ecological Conditions meeting with the USFS, CDFW, USFWS, SWRCB and the Consultation Group (Settlement Agreement Section 4.12) to review and discuss the results of implementing this plan.

SMUD shall file with FERC by June 30 of each year an annual report fully describing the monitoring efforts of the previous calendar year. The Resource Agencies shall have at least 30 days to review and comment on the draft report prior to filing with FERC. SMUD shall provide copies of the annual report to the Resource Agencies.

7.0 Plan Revisions

If SMUD, USFS, CDFW, or SWRCB collaboratively determine that revisions should be made to the plan, SMUD will make any revisions to the Plan in coordination and consultation with the listed resource agencies. Any revisions to the plan must be approved by USFS, CDFW, and SWRCB. Any revisions shall be filed with FERC for approval prior to implementing.

8.0 Literature Cited

FERC (Federal Energy Regulatory Commission). 2014. Federal Energy Regulatory Commission Order 148 FERC ¶ 62,070 Issuing New License for the Sacramento Municipal Utility District Upper American River Hydroelectric Project No. 2101. Issued July 23, 2014

Gosner, K.L. 1960. A simplified table for staging anuran embryos and larvae with notes on identification. Herpetologica 16:183–190.

Heyer, W.R., M.A. Donnelly, R.W. McDiarmid, L.-A.C. Hayek, and M.S. Foster. 1994. Measuring and monitoring biological diversity: Standard methods for amphibians. Smithsonian Institution Press, Washington, D.C.

Holland, D.C. 1994. The western pond turtle: habitat and history. Final Report DOE/BP-62137-1. Bonneville Power Administration, Portland, Oregon.

Lind, A. 1997. Survey protocol for foothill yellow-legged frogs (Rana boylii) in streams. U.S. Forest Service, Pacific Southwest Research Station, Arcata, California.

Nussbaum, R. A., E.D. Brodie, Jr., and R. M. Storm. 1983. Amphibians and Reptiles of the Pacific Northwest. University of Idaho Press, Moscow, Idaho.

PCWA. 2011. AQ 12 – Special-Status Amphibian and Aquatic Reptile Technical Study Report (2007). Available in PCWA's Application for New License – Supporting Document B.

PG&E (Pacific Gas and Electric Company). 2002a. A standardized approach for habitat assessment and visual encounter surveys for foothill yellow-legged frog (*Rana boylii*). Unpublished. By Craig P. Seltenrich, Senior Aquatic Biologist and
Alicia C. Pool, Aquatic Biologist, PG&E, San Ramon, California. May.

PG&E. 2002b. Survey protocols, standard operating procedures, and data sheets for amphibian surveys and habitat assessments. Unpublished. PG&E, San Ramon, California.

SMUD (Sacramento Municipal Utility District) and PG&E. 2005. Sacramento Municipal Utility District Upper American River Project (FERC Project No. 2101) and Pacific Gas and Electric Company Chili Bar Project (FERC Project No. 2155) Amphibian and Aquatic Reptiles Technical Report. Prepared for SMUD and PG&E by Devine Tarbell & Associates, Inc. and Stillwater Sciences. April, Version 3.

Storer, T.I. 1925. A synopsis of the amphibians of California. University of California Publications in Zoology 27:1–342.

Yarnell, S.M., R.A. Peek, A.J. Lind. 2014. Draft: Visual Encounter Survey Protocol for *Rana boylii* in Lotic Environments.

Zeiner, D. C., W. F. Laudenslayer, Jr., and K. E. Meyer. 1988. California's wildlife. Volume I: amphibians and reptiles. May 2, 1988. California Department of Fish and Game. Sacramento, CA.

Zweifel, R.G. 1955. Ecology, distribution, and systematics of frogs of the Rana boylei group. University of California Publications in Zoology 54:207–292.

Attachment 1
Foothill Yellow-legged Frog Survey Field Form

FYLF Survey Datasheet

Date:	Surveyors:	Start Time:	End Time:	Survey Time:	Air (C°):	%Right Bank:	Weather (circle one):
River/Site:		(Start GPS):	(End GPS):		Water (C°):	%Left Bank:	Overcast / Drizzle / Rain / Clear / Windy
Approx. Site Length:		Datum:	(Metric or US)	Accy:	Invasives?		Photo #s:

UTM E	UTM N	Lifestage/ Sex[1]	# Obs	Gosner Stage	Length (mm)[2]	Total Depth (m)[3]	Mid-Col Velocity (m/s)[3]	EM/ Perch Sub[4]	Dominant Riparian Type[5]	Geom Unit[6]	Nearest Bank[7]	Photo Numbers	Notes

[1]Lifestage/Sex- (L)arvae, (E)gg mass, (Y)oung-of-year, (J)uvenile, (AM) adult male, (AF)female (AU)nknown

[2]Length in mm- SVL-Snout vent for A, J, Y; Total Length for Tadpoles

[3]Eggs/Tads: Total depth at obs. location. Velocity avg for 30 sec (m/s) at location

[4]Egg mass Attachment or Perch Substrate-SLT, SND, GRV, COB, BLD, BDX (Bedrock), WOOD, VEG

[5]Dominant Riparian Type-(1) Grav/Cobb Bar, (2) Willow, (3) Willow-Alder, (4) Alder, (5) Mature Riparian/Forest, (6) Bedrock

[6]Geomorphic Unit - RIF, BAR, POOL, STEP, RUN, RAP, BDX

[7]Bank nearest obs (looking downstream): (RB) Right Bank, (LB) Left Bank, (MC) Center Chan

Attachment 2
Holland (1994) Western Pond Turtle Survey Field Form

Western Pond Turtle Survey Form

Page____

Site Reference # OR_____ County _____ Date of Survey _____

Time of Survey_____ Conditions at Time of Survey _____

Photo Reference #s - Roll _____ Photo #'s & Orientation _____

Site Location (DeLorme Map Reference)_____ T ____ R____ S____

Exact Site Location (Road/other) _____

Ownership/Contact (if Known) _____

Estimated Dimensions at Survey Site _____

Water Turbidity _____ Current (Est.)_____ Substrate Type _____

Vegetation: Woody Dominants _____
Non-woody Elements- _____
Aquatics (Emergents and Floating) _____

Habitat Disturbance Reference Sheet #_____ Grazed (?) _____

Bullfrogs (Adults, subadults, larvae) _____ | _____ | _____
Introduced Fishes (bass/sunfish/carp/mosquitofish) _____ | _____ | _____ | _____
Other species observed & numbers _____

Total # Turtles Observed: *Clemmys* _____ *Chrysemys*_____ Other (specify)_____

Clemmys: Males n = _____ # & size(s) _____ 110-130_____ 130-150 _____150-170 _____ 170+ _____
Females n = ____ # & size(s) _____ 110-130_____ 130-150_____ 150-170_____170+ _____
Juveniles n = ___ # & size(s) _____30-50_____ 50-70 _____ 70-90 _____ 90-100

Animals marked at site: _____

Basking Site(s) Description _____

Other Notes:_____

Attachment 3 – Relevant License Conditions

FERC License Appendix A, SWRCB 401 Water Quality Certification

CONDITION 8. MONITORING PROGRAM

8.C. Amphibian and Reptile Monitoring

Foothill Yellow-legged Frog

Within one year of license issuance, and in consultation with USFS, CDFW, USFWS, and the State Water Board, the Licensee shall develop an amphibian and reptile habitat evaluation and species presence monitoring plan with a primary focus on FYL frogs. The Licensee shall submit the plan to the Deputy Director for review and approval after agency consultation. The Licensee shall provide the Deputy Director with any comments provided by the agencies during the consultation process. The Licensee shall provide the Deputy Director with at least 90 days to review and approve the plan prior to submittal to the Commission, if applicable. The Deputy Director may require modifications as part of the approval. The Licensee shall file the Deputy Director's approval, together with any required plan modifications, with the Commission.

Methods: The Licensee shall conduct protocol surveys for sensitive species, with an emphasis on FYL frogs, using the procedures of PG&E[21] or the most current standard (as determined jointly by CDFW, USFWS and USFS) in a sub-sample of appropriate habitat types to document species presence and distribution. The Licensee shall identify amphibian breeding and larval periods in UARP-affected reaches by periodically surveying reaches of known presence during spring/summer. The Licensee shall also, if encountered, record each incidence of western pond turtles and California red-legged frogs during the amphibian and reptile surveys.

The first year of surveys shall be to determine the timing and success of the following life stages of existing known populations: egg laying, tadpole rearing, metamorphosis, and size/condition of metamorphs in late September to estimate probability of overwintering success.

For Years 2-6, the monitoring shall also include the placement of thermographs in stream margin habitats associated with known or suitable breeding sites in the reach below Camino Reservoir Dam and the reach below Slab Creek Reservoir Dam. A minimum of six recorders shall be deployed to ensure that an adequate sample size is attained. After monitoring during Year 2, the Deputy Director, after consultation with USFS, USFWS, and CDFW, may approve a subset of survey sites or a less intensive program, based on review of the first year's data. In the future, USFS, USFWS, CDFW, and/or the Deputy Director may request additional breeding site habitat data to assess the cause of unexpected or chronic reproductive failures that may be related to UARP operations.

[21] 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). Pacific Gas and Electric Company.

Foothill Yellow-legged Frog Monitoring Sites:

8.C.1. Silver Creek below Junction Reservoir Dam (site associated with site JDF2).
8.C.2. Silver Creek below Camino Reservoir Dam (C-A3 and SFA-A4).
8.C.3. SF American River below Slab Creek Reservoir (entire reach between and including SCA-6a and SCA-4).
8.C.4. Rock Creek, a tributary located upstream of the White Rock Powerhouse from the confluence with the SF American River to a point one mile upstream. This distance may be shortened if it is determined that there is a barrier to movement of FYL frogs.
8.C.5. SF Rubicon River from downstream of confluence with Gerle Creek to the confluence with the Rubicon River.

Timing:
1. Silver Creek below Junction Reservoir Dam: Years 2, 3, 5, 10, 15 and thereafter every five years for the term of the license and any extensions.
2. Spill flows in SF American River below Slab Creek Reservoir Dam and Silver Creek below Camino Reservoir Dam: as soon as possible after the decline of the spill.
3. Silver Creek below Camino Reservoir Dam: Years 2, 3, 4, 5, 6, 10, 11, 15, 16, and thereafter for two consecutive years every five years for the term of the
license and any extensions.
4. SF American River below Slab Creek Reservoir Dam: Years 2, 3, 4, 5, 6, 7, 10, 11, 15, 16, and thereafter for two consecutive years every five years for the term of the license and any extensions.
5. Rock Creek: Years 2, 3, and 4.
6. SF Rubicon River: Year 2; requirements for subsequent monitoring will depend on results of first year of monitoring.

Spill flows at Slab Creek Dam that occur after water temperatures rise above 12°C mean daily temperature for a seven-day running average[22] at Water Temperature Monitoring Site 8.I.18 (½ - mile upstream of White Rock Powerhouse) shall be monitored for effects to aquatic species (amphibians, fish, and aquatic reptiles) as soon as possible after the decline of the spill at FYL Frog Monitoring Site 8.C.3 in the SF American River below Rock Creek.

Spill flows at Camino Dam that occur after water temperatures rise above 12°C mean daily temperature for a seven-day running average at the Water Temperature Monitoring Site 8.I.14 (Silver Creek immediately upstream of the SF American River) shall be monitored for effects to aquatic species (amphibians, fish and aquatic reptiles) as soon as possible after the decline of the spill at FYL Frog Monitoring Site 8.C.2 in the reach below Camino Reservoir Dam.

[22] The temperature trigger may be modified as defined in Condition 9.A – Cancellation of Pulse and Recreational Streamflows in South Fork Silver Creek.

If California red-legged frogs are encountered during the amphibian surveys described above, the Licensee shall consult with the State Water Board, USFS, USFWS and CDFW

and submit a proposal to the Deputy Director for approval to either: (1) continue the measures undertaken for the FYL frogs; or (2) propose additional conservation measures that may be required to ensure that UARP impacts to California red-legged frogs are minimized. The Licensee's proposal must be approved by the Deputy Director prior to implementation. The Licensee shall provide the Deputy Director with at least 90 days to review and approve the proposal prior to submittal to the Commission, if applicable. The Deputy Director may require modifications of the proposal as part of the approval. The Licensee shall file the Deputy Director's approval, together with any required proposal modifications, with the Commission.

Mountain Yellow-legged Frog

Within two years of license issuance, the Licensee shall develop a Mountain Yellow-legged Frog monitoring plan in consultation with USFS, CDFW, USFWS, and the State Water Board. The Licensee shall provide the Deputy Director with any comments provided by the agencies during the consultation process. The Licensee shall submit the plan to the Deputy Director for review and approval after agency consultation. The Licensee shall provide the Deputy Director with at least
90 days to review and approve the plan prior to submittal to the Commission, if applicable. The
Deputy Director may require modifications as part of the approval. The Licensee shall file the Deputy Director's approval, together with any required plan modifications, with the Commission.

Method: The Licensee shall conduct protocol surveys for sensitive species using the procedures of CDFW (2001)[23] in a subsample of appropriate habitat types to document species presence and distribution. Surveys shall focus on presence of the larval stage at sites by periodically surveying reaches of known presence during spring/summer. If CDFW or USFS collects data associated with Rubicon Reservoir, Rockbound Lake, and Buck Island Reservoir, that information can be used to satisfy this requirement after the Deputy Director, in consultation with USFS, CDFW and USFWS, reviews the results and approves the use of these data.

Mountain Yellow-legged Frog Monitoring Sites:

8.C.6. Rubicon Reservoir
8.C.7. Rockbound Lake
8.C.8. Buck Island Reservoir

Timing: Years 5, 10, 15 and thereafter every 10 years for the term of the license and any extensions.

[23] CDFW (formerly California Department of Fish and Game) 2001. Fish and Amphibian Inventory Data Sheet Instructions. California Department of Fish & Game Fish/Amphibian Survey Protocols - Version 1.1, July 17, 2001.

8.D. Foothill Yellow-legged Frog Flow Fluctuations (Also refer to 8.C above, related to spill flows.)

Within one year of license issuance, the Licensee shall develop an amphibian flow fluctuation monitoring plan in consultation with USFS, CDFW, USFWS, and the State Water Board. The Licensee shall provide the Deputy Director with any comments provided by the agencies during the consultation process. The Licensee shall submit the plan to the Deputy Director for review and approval after agency consultation. The Licensee shall provide the Deputy Director with at least 90 days to review and approve the plan prior to submittal to the Commission, if applicable. The Deputy Director may require modifications as part of the approval. The Licensee shall file the Deputy Director's approval, together with any required plan modifications, with the Commission.

Method: The Licensee shall conduct visual surveys for FYL frog. Water velocities and streamflow shall be recorded.

Location: Silver Creek below Camino Reservoir Dam

Timing: Any time from June through September when: (1) the streamflows are 100 cfs or less; and (2) the flows fluctuate more than 40 cfs over one week's time. The Licensee shall provide advance notification to USFS, the State Water Board, USFWS, and CDFW if such fluctuations are going to occur and shall conduct visual surveys as referenced above prior to and after the fluctuations.

The visual surveys can be discontinued if USFS, USFWS, CDFW, and the Deputy Director determine that the flow fluctuations can occur without resulting in egg mass or tadpole displacement.

CONDITION 9. ADAPTIVE MANAGEMENT CONDITIONS

9.A. Cancellation of Pulse and Recreational Streamflows in South Fork Silver Creek

If FYL frogs are found on SF Silver Creek and water temperatures at SFSC 1 (SF Silver Creek immediately upstream of Junction Reservoir) rises above 12°C mean daily temperature for a seven-day running average (refer to Condition 8.I – Water Temperature), the Licensee shall cancel the pulse and recreational flow events in SF Silver Creek unless the Deputy Director, in consultation with USFS and CDFW, determines that such events are compatible with protection of FYL frogs and other biological resources. The Licensee shall provide notice to the Commission, USFS, State Water Board, USFWS and CDFW within 10 days of determining that the temperature trigger has been met, causing cancellation of the pulse and recreational flow events.

If the Deputy Director, in consultation with USFS, USFWS and CDFW, determines that the water temperature that is an indicator of FYL frog breeding initiation (12°C mean daily temperature for a seven-day running average) should be increased or decreased based on aquatic species and water temperature monitoring (as described in Conditions 8.C. – Amphibian and Reptile Monitoring), the Deputy Director may increase or decrease the water temperature indicator identified in Conditions 8.C. (Amphibian and Reptile Monitoring), 9.A. (Cancellation of Pulse and Recreational Streamflows in SF Silver Creek), and 9.B. Cancellation of Recreational Streamflows in SF American River). The Licensee shall provide Notice to the Commission if the Deputy Director, in consultation with USFS, USFWS and CDFW approves a modification to the water temperature trigger.

The State Water Board will not allow the pulse flows to continue nor will it change the water temperature indicator as contemplated under this subsection if the wildlife agencies advise that doing so would constitute a take of a listed species.

9.B. Cancellation of Recreational Streamflows in South Fork American River

If water temperatures rise above 12°C mean daily temperature for a seven-day running average
(refer to Condition 8.I. – Water Temperature) at SFAR 6 (in the SF American River approximately ½-mile upstream of White Rock Powerhouse water temperature monitoring location 8.I.18), the Licensee shall cancel the recreational flow events in the SF American River below Slab Creek Reservoir Dam unless the Deputy Director, in consultation with USFS, USFWS and CDFW, determines that such events are compatible with protection of FYL frogs and other biological resources. The Licensee shall provide notice to the Commission, USFS, State Water Board, USFWS and CDFW within 10 days of determining that the above temperature trigger has been met, causing cancellation of the recreational flow events.

If the Deputy Director, in consultation with USFS, USFWS and CDFW, determines that the water temperature that is an indicator of FYL frog breeding initiation (12°C mean daily temperature for a seven-day running average) should be increased or decreased based on aquatic species and water temperature monitoring (as described in Conditions 8.C. – Amphibian and Reptile Monitoring), the Deputy Director may increase or decrease the water temperature indicator identified in Conditions 8.C. (Amphibian and Reptile Monitoring), 9.A. (Cancellation of Pulse and Recreational Streamflows in SF Silver Creek), and 9.B. (Cancellation of Recreational Streamflows in SF American River). The Licensee shall provide Notice to the Commission if the State Water Board approves a modification to the water temperature trigger.

The State Water Board will not allow the recreational flow events to continue as contemplated under this subsection if the wildlife agencies advise that doing so would constitute a take of a listed species.

9.C. Untimely Spill Events below Slab Creek and Camino Reservoir Dams

The Licensee shall make every reasonable effort to avoid spilling at Slab Creek Reservoir Dam and Camino Reservoir Dam once FYL frog breeding is deemed to have been initiated based on a water temperature trigger that is determined through the Monitoring Program described in Condition 8 (Monitoring Program). If a spill does occur, the Licensee shall make every reasonable effort to manage the spill to minimize flow fluctuations in the SF American River. If the Deputy Director determines that spills below Slab Creek Reservoir Dam and/or Camino Reservoir Dam are resulting in unacceptable environmental impacts based on aquatic species and temperature monitoring described in Conditions 8.B., 8.C., and 8.I. (Aquatic Macroinvertebrates, Amphibian and Reptile Monitoring, and Water Temperature, respectively), appropriate adaptive management measures shall be developed in consultation with USFS, CDFW, USFWS, and State Water Board staff and approved by the Deputy Director. The Licensee shall provide the Deputy Director with any comments provided by the agencies during the consultation process. The Deputy Director may require modifications as part of the approval. The Licensee shall file the Deputy Director's approval, together with any required plan modifications, with the Commission. The Licensee shall implement the appropriate adaptive management measures upon approval of the Deputy Director and any other necessary regulatory approvals.

Condition No. 31 - Monitoring Program

Foothill Yellow-legged Frog

Within 1 year of license issuance, the licensee shall develop an amphibian and reptile habitat evaluation and species presence monitoring plan in consultation with FS, *CDFG, FWS, and SWRCB*. The licensee shall provide FS, *CDFG, FWS, and SWRCB* a 90-day review and approval period for the monitoring plan prior to implementation. The licensee shall implement the plan upon approval.

Methods: Conduct protocol surveys for sensitive species using the procedures of Pacific Gas and Electric Company (2002) or the most current standard in a sub-sample of appropriate habitat types to document species presence and distribution. Identify amphibian breeding and larval periods in Project-affected reaches by periodically surveying reaches of known presence during spring/summer. Qualifications of surveyors shall be reviewed and meet approval of FS, *FWS, and CDFG* prior to commencing work. The licensee shall also survey for WPT during amphibian and reptile surveys.

The first year of surveys shall be to determine the timing and success of the following life stages of existing known populations: egg laying, tadpole rearing, metamorphosis, and size/condition of metamorphs in late September to estimate probability of overwintering success. The monitoring shall also include the placement of micro hydrothermographs for years 2 - 6 in the stream margin habitats associated with known or suitable breeding sites in the reach below Camino Reservoir Dam and the reach below Slab Creek Reservoir Dam. A minimum of six recorders shall be deployed to ensure that an adequate sample size is attained. For subsequent years, FS, *FWS, CDFG, and SWRCB* may approve a subset of survey sites or a less intensive program, based on review of the first year's data. In the future, FS, *FWS, CDFG, and SWRCB* may request additional breeding site habitat data to assess the cause of unexpected or chronic reproductive failures that may be related to Project operations. Licensee shall also survey for western pond turtles during FYLF surveys.

Foothill yellow-legged frog Monitoring Sites:

a. Silver Creek below Junction Reservoir Dam (site associated with site JDF2).

b. Silver Creek below Camino Reservoir Dam (C-A3 and SFA-A4).

c. SFAR below Slab Creek Reservoir (entire reach between and including SCA-6a and SCA-4).

d. *Rock Creek, a tributary located upstream of the White Rock Powerhouse from the confluence with the SFAR to a point 1 mile upstream. This distance may be shortened if it is determined that there is a barrier to movement of FYLF.*

Spill flows that occur after water temperatures rise above 12°C mean daily temperature for a 7-day running average (refer to Condition No. 32, number 9) at SFAR 6 *shall be monitored in the reach below Rock Creek* and CA-3 in the reach below Camino Reservoir Dam for effects to aquatic species (amphibians, fish, and aquatic reptiles) as soon as possible after the decline of the spill.

Frequency: (1) Silver Creek below Junction Reservoir Dam: Years 2, 3, 5, 10, 15 and thereafter for every 5 years for the term of the license; (2) SFAR below Slab Creek Reservoir Dam and Silver Creek below Camino Reservoir Dam, spill flows as soon as possible after the decline of this spill; (3) Silver Creek below Camino Reservoir Dam: Years 2, 3, 4, 5, 6, 10, 11, 15, 16 and thereafter for 2 consecutive years during every 5 years for the term of the license; and (4) SFAR below Slab Creek Reservoir Dam: Years 2, 3, 4, 5, 6, 7,10, 11, 15, 16 and thereafter for 2 consecutive years during every 5 years for the term of the license; *and Rock Creek: Years 2, 3, 4.*

Rationale: Determination of presence and distribution of sensitive amphibian species and identification of breeding and larval periods are important in evaluating potential impacts resulting from streamflow modifications (particularly short-term fluctuations and the proposed October recreational boating flows in the SFAR below Slab Creek Reservoir). FYLF monitoring shall determine if any threshold is reached from Project streamflow changes or fluctuations where this species is being affected in any life stage. Monitoring each 5-year period provides an index of changes in amphibian populations, following sufficient response time to streamflow modifications.

Monitoring SFAR below Slab Creek Reservoir Dam and Silver Creek below Camino Reservoir Dam spill flows will assist in determining if there are effects to aquatic species (amphibians, fish, and aquatic reptiles) from untimely spills. Monitoring in the stream margin habitats associated with known or suitable breeding sites in the reach below Camino Reservoir Dam and the reach below Slab Creek Reservoir Dam (years 2 - 6) will establish the mean water temperature trigger for FYLF breeding for these rivers. Suitable water temperatures to initiate FYLF breeding are suspected to be site-specific to the river system (Kupferberg, personal comm. 2006), thus water temperatures suitable for breeding on one river cannot be extrapolated to another. Monitoring on Rock Creek will provide information on whether FYLFs are using this main primary tributary of the reach below Slab Creek Dam, which will assist in determining whether FYLF movement is possible between Rock Creek (1mile distance) to the SFAR.

Amphibians (Foothill Yellow-Legged Frog Flow Fluctuations) (Also refer to number 3, above, related to spill flows.)

Within 1 year of license issuance, the licensee shall develop an amphibian flow fluctuation monitoring plan in consultation with FS, *CDFG, FWS, and SWRCB.* The licensee shall provide FS, *CDFG, FWS, and SWRCB* a 90-day review and approval period for the monitoring plan prior to implementation. The licensee shall implement the plan upon approval.

Method: Conduct visual surveys for FYLF in Silver Creek below Camino Reservoir Dam at any time June through September when (1) the streamflows are 100 cfs or less and (2) the flows fluctuate more than 40 cfs or more over 1 week's time. Water velocities and discharge shall be recorded. To the extent possible, the licensee shall provide advance notification to FS, *SWRCB, FWS, and CDFG* if such fluctuations are going to occur and shall conduct visual surveys as described above prior to and after the fluctuations.

Frequency: See above. The surveys can be discontinued if FS, *SWRCB, FWS, and CDFG* determine that the flow fluctuations can occur without resulting in egg mass or tadpole displacement.

Rationale: Determine if flow fluctuations are displacing egg masses or tadpoles.

Condition No. 32 - Adaptive Management Program

Cancellation of Pulse and Recreational Streamflows in South Fork Silver Creek Due to Water Temperature

If foothill yellow-legged frogs (FYLF) are found on South Fork Silver Creek, and water temperatures at SFSC 1 rise above 12°C mean daily temperature for a 7-day running average (refer to Condition No. 32, number 9) at USGS gage 11441500, the licensee shall cancel the pulse and recreational flow events in South Fork Silver Creek unless FS, *SWRCB, and CDFG* determine that such events are compatible with protection of FYLF and other biological resources. The licensee shall provide Notice to *FERC*, FS, *SWRCB, and CDFG* within 10 days of determining that the above temperature trigger has been met, causing cancellation of the pulse and recreational flow events. *The licensee shall provide Notice to FERC* if FS, *SWRCB, and CDFG* approve a modification to the water temperature trigger.

Cancellation of Recreational Streamflows in SFAR Due to Water Temperature

If water temperatures below Slab Creek Reservoir Dam rise above 12°C mean daily temperature for a 7-day running average (refer to Condition No. 32, number 9) at SFAR 6, the licensee shall cancel the recreational flow events in SFAR below Slab Creek Reservoir Dam unless FS, *SWRCB, FWS, and CDFG* determine that such events are compatible with protection of FYLF and other biological resources. The licensee shall provide Notice to *FERC*, FS, *SWRCB, FWS, and CDFG* within 10 days of determining that the above temperature trigger has been met, causing cancellation of the recreational flow events. *The licensee shall provide Notice to FERC* if FS, *SWRCB, FWS, and CDFG* approve a modification to the water temperature trigger.

Untimely Spill Events Below Slab Creek Reservoir Dam and Camino Reservoir Dam

The licensee shall make a good faith effort to avoid spilling at Slab Creek Reservoir Dam and Camino Reservoir Dam once FYLF breeding has been initiated based on a water temperature trigger that is determined through the monitoring program. If a spill does occur, the licensee shall make a good faith effort to manage the spill to minimize flow fluctuations in the SFAR. If FS, *SWRCB, FWS, and CDFG* determine that spills below Slab Creek Reservoir Dam and/or Camino Reservoir Dam are resulting in unacceptable environmental impacts based on aquatic species and temperature monitoring described in Condition No. 31, appropriate mitigation measures that are approved by FS, *CDFG, FWS, and SWRCB* shall be developed. The licensee shall implement the appropriate adaptive management measures upon approval of FS*, CDFG, FWS, and SWRCB*.

Water Temperature for Foothill Yellow-Legged Frogs

If FS, SWRCB, FWS, and CDFG determine that the water temperature that is an indicator of breeding initiation (12°C mean daily temperature for a 7-day running average) should be increased or decreased based on aquatic species and water temperature monitoring (as described in Sec.5 (3)), FS, SWRCB, FWS, and CDFG may increase or decrease the water temperature indicator. Suitable water temperatures to initiate foothill yellow-legged frog breeding are suspected to be site-specific to the river system (Kupferberg, personal comm. 2006), thus water temperatures suitable for breeding on one river cannot be extrapolated to another.

155 FERC ¶ 62,128

UNITED STATES OF AMERICA
FEDERAL ENERGY REGULATORY COMMISSION

Sacramento Municipal Utility District Project No. 2101-126

ORDER MODIFYING AND APPROVING AMPHIBIAN AND AQUATIC REPTILE MONITORING PLAN

(May 19, 2016)

1. On April 11, 2016, Sacramento Municipal Utility District, licensee for the Upper American River Project (project) No. 2101, filed an Amphibian and Aquatic Reptile Monitoring Plan (plan), pursuant to Section 401 Water Quality Certification conditions 8.C, 8.D, and 9.C and 4(e) conditions 31.3, 31.4, 32.3 and 32.9 of the Order Issuing New License for the project (2014 order).[1] The project is located on the Rubicon River, Silver Creek, and South Fork American River in El Dorado and Sacramento counties, California. The project occupies lands within the El Dorado National Forest administered by the U. S. Department of Agriculture's Forest Service (Forest Service) and lands administered by the U.S. Department of Interior's Bureau of Land Management.

Background

2. On July 23, 2014, the Commission issued a new license for the project. The Water Quality Certification conditions 8.C, 8.D, and 9.C and 4(e) conditions 31.3, 31.4, 32.3 and 32.9 of the license required the licensee to develop, in consultation with California Water Resources Control Board, California Department of Fish and Game, U.S. Fish and Wildlife Service, and the Forest Service (resource agencies), multiple plans and protocols to address the needs of amphibians and aquatic reptiles of conservation concern. Due to overlapping monitoring requirements and plan development schedules, and with resource agency concurrence, the licensee consolidated the plans and protocols into one Amphibian and Aquatic Reptile Monitoring Plan. This order modifies and approves that plan.

[1] *Sacramento Municipal Utility District*, 148 FERC ¶ 62,070 (2014).

Licensee's Plan

3. The plan emphasizes the monitoring of the foothill yellow-legged frog (FYL frog). The plan identifies seven different monitoring sites within five reaches for FYL frog and two sites for western pond turtle (WP turtle). Monitoring would be accomplished by conducting visual encounter surveys (surveys) at all sites initially, then during different years throughout the term of the license. Qualifications of surveyors must be reviewed and meet approval of the resource agencies prior to commencing work. In addition to FYL frog, all other amphibian and reptile species observed during the surveys would be recorded, as well as any observed potential predators (e.g., smallmouth bass, crayfish, and bullfrogs) to FYL frog.

4. There would be four focused surveys for FYL frog during each monitoring year. The surveys would include: two egg mass surveys during the breeding period (late spring to early summer); one tadpole survey during the tadpole development period (mid-summer, approximately one month after egg masses are observed); and one survey for newly metamorphosed young-of-year in the fall (around September).

5. Initial FYL frog egg mass surveys would be triggered when there is a mean daily temperature of 10°C for a three-day running average at any of the monitoring sites, as recorded by existing telemetered gaging stations, or after April 15th, whichever comes last. At sites where egg masses are observed, data collection will include: Gosner stage, total depth of water at egg mass location, mid-column velocity, attachment substrate, dominant riparian type, geomorphic unit, nearest bank, and water temperature. Water velocity would be average local mid-column flow velocity of the microhabitat immediately adjacent to the oviposition location. Any evidence of scouring, stranding, predation, or changes in use at existing breeding sites would be noted.

6. FYL frog tadpoles would be sampled in shallow water habitats, using hand dip nets to carefully seine the channel bottom while minimizing habitat disturbance. At locations where tadpoles are documented, the number of tadpoles, Gosner stage, and nearest bank would be recorded. Data collected at each tadpole group location also includes total water depth, dominant substrate, and estimated average total length of tadpoles. Water velocity measurements would be made near the center of the tadpole group at a mid-column velocity to represent the average flow velocity at the location of the tadpoles.

7. FYL frog post-metamorphic individuals would be surveyed by focusing on the surface of the ground, on rocks, or at the water's edge. Data collected for each post-metamorphic individual captured would include sex and snout-to-vent length. Habitat data collected as part of the post-metamorphic frog surveys would include perch substrate, dominant riparian type, and geomorphic unit. Surveys focused on young-of-year would occur in late September; size and condition of encountered young-of-year will be recorded.

8. WP turtle surveys would be conducted concurrently with FYL frog tadpole surveys. Surveyors would search for WP turtle by visually scanning and snorkeling within appropriate habitat. All evidence of occurrence or habitat use of WP turtle would be recorded. Surveyors would record morphological measurements of any WP turtles captured. All suitable WP turtle habitat observed during the surveys would be identified, photographed, and mapped.

9. California red-legged frogs (CRL frogs) were neither observed during relicensing studies nor have they been documented in the project area historically. If CRL frogs are observed during FYL frogs surveys the licensee would consult with the resource agencies to determine the appropriate action going forward.

10. Effects of spill events on FYL frog would be monitored at Camino and Slab Creek reservoirs under specified water temperature thresholds. Monitoring for effects to FYL frog would include looking for evidence of damage, displacement, or scouring of egg mass or larvae, as well as evidence of egg mass or larval stranding/desiccation. When feasible, pre-spill surveys would be conducted to help determine the potential effects of the spill on egg masses or tadpoles.

11. Effects of flow fluctuations on FYL frog would be monitored below Camino Reservoir Dam under specified streamflow thresholds. Monitoring for effects to FYL frog would include looking for evidence of damage, displacement, or scouring of egg mass or larvae, as well as evidence of egg mass or larval stranding/desiccation.

12. Water temperatures would be monitored below Camino Reservoir Dam (a known breeding site) and below Slab Creek Reservoir Dam (suitable breeding site) during years 2 through 6 of the new license. The temperature of the margins and thalweg would be monitored to support the establishment of the mean water temperature that triggers FYL frog breeding within these rivers.

13. The licensee would meet with the resource agencies annually by April 1 to review and discuss the results of implementing the plan. The licensee would file draft annual reports with the resource agencies for review and comment 30 days before filing a final report with Commission by June 30. Any plan revisions deemed necessary through collaboration of the licensee and resource agencies must be approved by the resource agencies prior to filing with the Commission for final approval.

Agency Consultation

14. The 2014 order issuing new license stipulates the licensee must provide documentation of approval by the resource agencies for all plans filed with the Commission. Attachments filed with the plan indicate the licensee submitted the final plan to the resource agencies on February 12, 2016. Approval from California Water

Resources Control Board, California Department of Fish and Game, U.S. Fish and Wildlife Service, and the Forest Service was acquired by April 6, 2016.

Discussion and Conclusions

15. The plan's protocols for surveying FYL frog and WP turtle will effectively catalogue important data for both species within the project area. Data will be collected for multiple variables associated with all life stages of FYL frog. Detailed morphology and habitat measurements will be collected for WP turtle.

16. The licensee's plan to consult with the agencies in the event that CRL frogs are observed during the above surveys is prudent. The CRL frog currently is federally-listed as threatened. In the final Environmental Impact Statement issued March 14, 2008, Commission staff found that relicensing the project would not likely have an adverse effect on CRL frog. This finding was largely based on the lack of historical occurrence and limited suitable habitat for CRL frog within the project boundary. If the CRL frog is observed during amphibian surveys however, the plan describes the licensee's intent to continue established monitoring protocols or add new monitoring protocols to minimize impacts.

17. The plan does not, however, say when the licensee would notify the Commission should CRL frog be observed. This order requires the licensee to notify the Commission of any CRL frog observations within 10 days.

18. The plan outlines sound methodology to monitor the presence of, and determine any project impacts to, FYL frogs, WP turtles, and CRL frogs. The plan should therefore be approved.

The Director orders:

(A) Sacramento Municipal Utility District's Amphibian and Aquatic Reptile Monitoring Plan filed April 11, 2016, pursuant to Section 401 Water Quality Certification conditions 8.C, 8.D, and 9.C and 4(e) conditions 31.3, 31.4, 32.3 and 32.9 of the license for the Upper American River Project No. 2101, as modified by paragraph (B), is approved.

(B) If California red-legged frogs are observed during foothill yellow-legged frog or western pond turtle surveys, the licensee must notify the U.S. Fish and Wildlife Service, U.S. Forest Service and the Secretary of the Commission within 10 days of any observation.

(C) This order constitutes final agency action. Any party may file a request for rehearing of this order within 30 days from the date of its issuance, as provided in section 313(a) of the Federal Power Act, 16 U.S.C. § 825*l* (2012), and the Commission's regulations at 18 C.F.R. § 385.713 (2015). The filing of a request for rehearing does not operate as a stay of the effective date of this order, or of any other date specified in this order. The licensee's failure to file a request for rehearing shall constitute acceptance of this order.

Steve Hocking
Chief, Environmental and Project Review
Division of Hydropower Administration
and Compliance

Document Content(s)