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Foothill Yellow-Legged Frog Protection Plan

2006 Annual Report

Pit 1 Hydroelectric Project (FERC No. 2687)

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EXECUTIVE SUMMARY

The Foothill Yellow-Legged Frog Protection Plan (Plan) was developed in compliance with Article 420 of the Federal Energy Regulatory Commission license for Pacific Gas and Electric Company's Pit 1 Hydroelectric Project in Fall River Mills, California. The objective of the Plan is to determine if foothill yellow-legged frogs (FYLF) and other special-status amphibians are present in the Pit 1 Project vicinity, and if present, whether measures are necessary to protect them from potential impacts associated with changes in flow regime required by the current license. Fall River Pond, lower Fall River, and the mainstem Pit River from the Fall River confluence to Lake Britton are the Project waters most affected by the license-required changes to the flow regime. These Project waters, which form the Pit 1 FYLF Study Area, are the primary focus of surveys for foothill yellow-legged frogs and egg masses.

As in the previous two years of monitoring, foothill yellow-legged frog surveys in 2006 focused on the Pit and Fall rivers within the Pit 1 FYLF Study Area. In addition, we surveyed wetlands adjacent to the Pit and Fall rivers that had potentially suitable breeding habitat for Cascades, northern leopard, and Oregon spotted frogs. The Pit 1 Project vicinity falls within the historic range of the latter three special-status amphibians. No special-status amphibians were observed during the 2006 surveys. Pacific chorus frogs and non-native bullfrogs were observed during all years. Long-toed salamanders, which were found in both the Pit 1 FYLF Study Area and the Cinder Flats State Wildlife Area in 2004, were not observed in either 2005 or 2006.

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INTRODUCTION

The Federal Energy Regulatory Commission (FERC) issued Pacific Gas and Electric Company (PG&E) a new license for the Pit 1 Hydroelectric Project, FERC No. 2687 (Project) on 19 March 2003. The Project is located on the Pit River and its tributary, the Fall River, near Fall River Mills in Shasta County, northeastern California. In compliance with Article 420 of the license, PG&E developed and submitted to FERC, the Foothill Yellow-Legged Frog Protection Plan to “...determine if measures are necessary to protect foothills [*sic*] yellow-legged frogs from potential adverse impacts associated with the flow regimes in California Water Board Conditions 8, 11, and 13; and the reduction of maximum generator loading and unloading rates required by California Water Board Condition 12.” Article 420 is included in its entirety and Water Board Conditions 8, 11, and 13 are described fully in Appendix A. The license-required flow conditions are:

- 1) Continuous flow releases from the Pit 1 Forebay into the lower Fall River, and through to the Pit River, with minimum instantaneous flows (as measured at the Fall River Weir) that vary from 50 to 150 cubic feet per second (cfs) depending on the time of year (Condition 8).
- 2) Combined flow of the Pit River and the Pit 1 Powerhouse during normal operations must meet or exceed a daily average of 700 cfs as recorded at the U. S. Geological Survey’s (USGS) gage on the Pit River downstream of the Pit 1 Powerhouse (#11-3550.10) (Condition 11 as modified by Article 402).
- 3) Specified generator ramping rates (and associated changes in rate of flow) at the Pit 1 Powerhouse (Condition 12).
- 4) A flushing flow of 1250 cfs or the natural flow to the Pit 1 Forebay, whichever is less, released through Fall River Pond for two consecutive weekend days three times a year (Condition 13).

The license-required flows were implemented in spring of 2003, following the issuance of the license. FERC modified and approved the Foothill Yellow-Legged Frog Protection Plan (Plan) on 22 January 2004.

The foothill yellow-legged frog (*Rana boylei*) is one of four special-status frog species in the family Ranidae that has a reasonable potential to occur in the Project vicinity. The Plan requires

foothill yellow-legged frog egg mass surveys during the spring of the first five years of the license and general amphibian surveys during the spring of the first two years of the license. The primary objectives of the Plan are to: (1) determine the distribution of foothill yellow-legged frogs in Project waters; (2) determine the potential effects of the summer flushing flows on foothill yellow-legged frogs; (3) establish a baseline for future monitoring, if necessary; and (4) determine the distribution of other native amphibians in the water bodies affected by the Project during the first two years of the license.

Based on the Plan requirements, three foothill yellow-legged frog egg mass surveys were conducted in the Project-affected waters in year one, 2004. Because no foothill yellow-legged frogs, tadpoles, or egg masses were found during the first year, one egg mass/frog survey is required during the spring of years two through five of the license. If any foothill yellow-legged frog egg masses are found during any of these surveys, egg mass and tadpole surveys are required to continue every two weeks until tadpole metamorphosis.

Study Areas

The Pit 1 foothill yellow-legged frog study area (Pit 1 FYLF Study Area) includes 19.3 km of the Fall and Pit rivers from Pit 1 Forebay Dam downstream to Lake Britton. These are the Project waters most affected by the new flow conditions (Figure 1). The elevation of the Pit 1 FYLF Study Area ranges from 832 m (2730 ft) at the head of Lake Britton to 1006 m (3300 ft) at the head of Fall River Pond. This study area includes four river reaches: (1) Fall River Pond (i.e., Fall River between Pit 1 Forebay Dam and Fall River Weir); (2) lower Fall River between Fall River Weir and the Pit River; (3) Pit 1 Bypass Reach (i.e., the Pit River from Fall River to the Pit 1 Powerhouse); and (4) the Pit River from the Pit 1 Powerhouse to Lake Britton.

The general amphibian study area (General Study Area) encompasses the Pit 1 FYLF Study Area, as well as other waters in the vicinity of the Project. These include the Fall River drainage upstream of Fall River Pond (Figure 1) and nearby wetlands with potentially suitable breeding habitat for native ranid frogs. The General Study Area includes elevations up to 1012 m (3320 ft) at the headwaters of the Fall River drainage and 1021 m (3350 ft) at Cinder Flats State Wildlife Area.

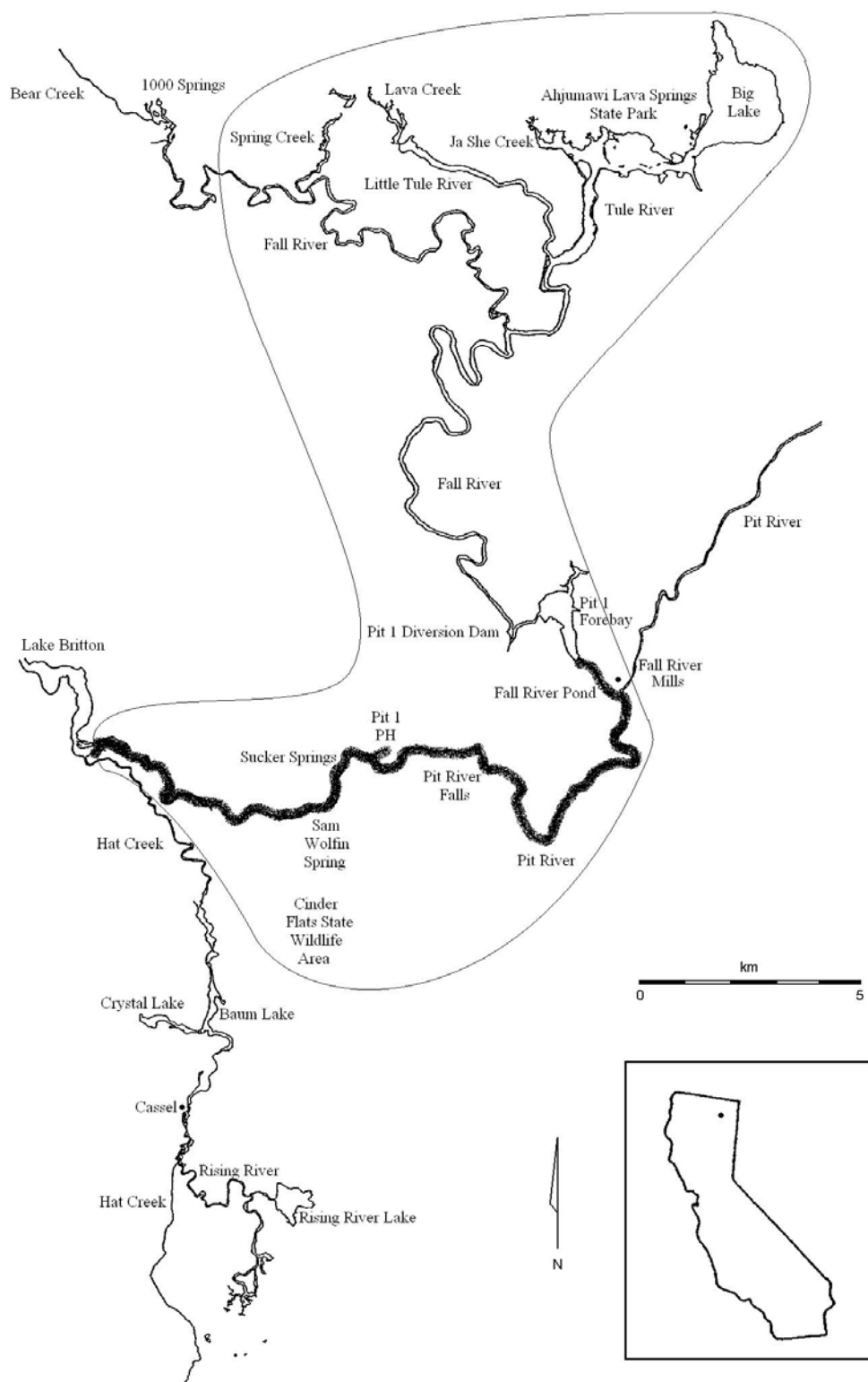


Figure 1 Location of the Foothill Yellow-Legged Frog Study Area (shaded reaches) and General Study Area (polygon) in the midreaches of the Pit River drainage.

In 2004, the survey efforts focused on the Pit 1 FYLF Study Area (i.e., downstream of Pit 1 Forebay), while efforts in 2005 added the Fall River drainage upstream of Fall River Pond. This 2006 annual report for the Foothill Yellow-Legged Frog Protection Plan provides findings from 2006 surveys in the Pit 1 FYLF Study Area and nearby wetlands, as well as a compilation of all monitoring efforts since 2004.

Special-Status Species

The foothill yellow-legged frog (*Rana boylei*), Cascades frog (*Rana cascadae*), northern leopard frog (*Rana pipiens*), and Oregon spotted frog (*Rana pretiosa*) are four special-status frog species that have a reasonable potential to occur within the General Study Area. The status of each of these species, brief habitat descriptions, and information on verified or possible occurrences for the species within the Pit River/Fall River region are included below.

The foothill yellow-legged frog is a federal species of concern, U.S. Forest Service sensitive species, and California species of special concern. Foothill yellow-legged frogs use pool tailouts, edgewater, and other microhabitats of mainstem rivers for breeding, deposition of egg masses, and tadpole rearing. Outside of the breeding season subadults and adults generally use tributaries and other cool microhabitats (Table 1; Fuller and Lind 1991, Kupferberg 1996, Lind et al. 1996, Yarnell 2000, PG&E 2001, 2002a, 2002b, Spring Rivers 2003, 2004). Foothill yellow-legged frogs are present in the Pit 4 Reach of the Pit River (Spring Rivers 2003), approximately 36 river kilometers downstream of the Pit 1 Powerhouse.

The Cascades frog is a federal species of concern, U.S. Forest Service sensitive species, and California species of special concern. Cascades frogs occur and reproduce in quiet sunny ponds, streams, or bogs, which are often fed by springs or snowmelt. They generally occur at elevations between 915 m (3000 ft) and 1829 m (6000 ft), but have been documented at elevations as low as 230 m (755 ft) (Table 1; Zweifel 1955, Nussbaum et al. 1983, Corkran and Thoms 1996). Although the California Department of Fish and Game's Natural Diversity Data Base (NDDDB) has no record of Cascades frogs in the Project vicinity, two Cascades frogs were identified in 1995 in non-riverine habitat near PG&E's Pit 1 Powerhouse (M. Ellis, Spring Rivers Ecological Sciences, personal observation). Three Cascades frogs were also identified from upper Rock

Creek, a tributary to the Pit 3 Reach of the Pit River downstream of Lake Britton (EA 1995). The Museum of Vertebrate Zoology also has two records (MVZ 56845, 56846) of Cascades frogs from the upper Bear Creek drainage, which is adjacent to the General Study Area (Figure 1).

Table 1 Habitat criteria for foothill yellow-legged frog, Cascades frog, Oregon spotted frog, and northern leopard frog.

| Species | Adult/Subadult Habitat | Breeding/Egg-mass & Tadpole Habitat |
|-----------------------------|--|---|
| Foothill yellow-legged frog | Tributary or shaded river microhabitat | Mainstem with cobble & small boulder substrate where active channel is broad and shallow with basking rocks for adults; within migration distance of a tributary or shaded microhabitat |
| Cascades frog | Quiet sunny ponds or streams with springs or snowmelt | Unshaded microhabitat in shallow, open water of stream pools, lake margins, and clear mountain ponds fed by springs or snowmelt |
| Northern leopard frog | Marshes, wet meadows, riparian areas, and moist open woods | Cattail and sedge marshes, weedy ponds, or other deeper water habitat with aquatic vegetation |
| Oregon spotted frog | Well-vegetated marshes, ponds, lake edges, and slow meadow streams | Unshaded microhabitat in very shallow water, often a flooded meadow beside a pond or stream |

The northern leopard frog is a U.S. Forest Service sensitive species and California species of special concern. Northern leopard frogs occur in or near quiet, permanent or semi-permanent water, and require aquatic habitat in which to overwinter and lay eggs (Table 1; Jennings and Hayes 1994, Corkran and Thoms 1996). Northern leopard frogs use cattail and sedge marshes, weedy ponds, or other water with aquatic vegetation for reproduction (Nussbaum et al. 1983, Corkran and Thoms 1996). In California, native populations were historically recorded from only Modoc and Lassen counties (Jennings and Hayes 1994) at elevations from approximately 1216 m (3990 ft) to 1503 m (4931 ft). A verified museum record of northern leopard frog exists from the upper Hat Creek drainage (Jennings and Hayes 1994). The most recent verified northern leopard frog sighting was in 1990 from Tule Lake National Wildlife Refuge, approximately 100 kilometers north of the Pit 1 Powerhouse.

The Oregon spotted frog is a federal candidate species, U.S. Forest Service sensitive species, and California species of special concern. Oregon spotted frogs live in marshes, ponds, lake edges, and slow meadow streams, usually where there is low emergent vegetation (Table 1; Licht 1986, Jennings and Hayes 1994, Corkran and Thoms 1996). They breed in very shallow, unshaded water, often in flooded meadows beside a pond or stream (Corkran and Thoms 1996, McAllister and Leonard 1997). Jennings and Hayes (1994) report only seven records of Oregon spotted frogs from five localities in three counties (i.e., Siskiyou, Shasta, and Modoc) in northeastern California. The five museum records of spotted frogs in California were all collected between 1898 and 1918. One of these records is a spotted frog collected in the Fall River at Fall River Mills in Shasta County on 29 August 1898 by Rutter and Chamberlain (U.S. National Museum 38806, verified by David Green, Ph.D. [personal communication, 15 February 2006] of McGill University, Montreal, Canada). The only NDDB record for Oregon spotted frogs is of two individuals on the South Fork Pit River in the Warner Mountains (Modoc County) in 1910 (Museum of Vertebrate Zoology 2098 and 2099). The last reported sighting of this species in California (Jennings and Hayes 1994) was beneath a woodpile at the Modoc National Forest Fire Station in Cedarville (Modoc County) on 24 September 1989. That sighting has been questioned by Gary Fellers, Ph.D. of the USGS Point Reyes Field Station (personal communication, 1 February 2006), because it was in a vacant lot with no suitable habitat. A tentative identification of an Oregon spotted frog (an approximately 6-cm [2.5-in.], dark brown frog with an opaque, orange-red ventral surface) was made at Sucker Springs Creek, a tributary to the Pit River within the FYLF Study Area below the Pit 1 Powerhouse (Figure 1), on 30 November 1999 (M. Ellis, Spring Rivers Ecological Sciences, personal observation).

METHODS

In accordance with the Plan, one multiple-day egg mass/frog survey was conducted in the Pit 1 FYLF Study Area in 2006, because no foothill yellow-legged frogs, tadpoles, or egg masses were found during the first or second monitoring years (2004 and 2005). Timing of the foothill yellow-legged frog survey was based on general weather conditions, Pit River discharge, and the approximately 12 °C water temperature threshold at which egg-mass deposition generally begins. The survey was done between 12 May and 14 June. A two-person team with one surveyor on either side of the channel surveyed the Pit 1 FYLF Study Area in an upstream direction. The

survey on Fall River Pond and the Pit River between Fall River-Cassel Road Bridge and Big Eddy was done from a canoe in a downstream direction. Nearby wetlands, ponds, and springs were surveyed on foot. During the survey, river margins, side channels, and inlets with potential habitat for foothill yellow-legged frogs and other amphibians were closely examined for egg masses, tadpoles, and adults.

As in 2004 and 2005, the survey followed the standard National Biological Service amphibian protocols, as well as, protocols and data collection methodologies developed by PG&E biologists specifically for foothill yellow-legged frogs (PG&E 2002a), Cascades frogs (PG&E 2003), and northern leopard frogs (PG&E 2003). All amphibian species encountered, as well as potentially suitable habitat for special-status amphibians, were recorded onto maps marked with river kilometers (RK); these kilometers were originally established in the 1980s for bald eagle surveys (BioSystems 1985). We recorded sightings for Fall River (RK 0.0–1.4) and the Pit River (RK 75.5–93.8) to the nearest tenth of a kilometer.

The Cinder Flats State Wildlife Area, which is part of the General Study Area, was surveyed on foot and by canoe, where appropriate, on 10 February and 11 May 2006. Locations of all amphibian sightings were recorded.

RESULTS

Mean daily water temperatures in the Pit River below the Pit 1 Powerhouse rose to and stayed above 12 °C (i.e., the threshold at which foothill yellow-legged frog breeding typically begins) at the end of April (Figure 2). Foothill yellow-legged frog surveys in the Pit River could not, however, be initiated until discharge in the Pit River subsided to a level at which surveyors could safely access. Table 2 provides the locations, dates, times, and water temperatures for all 2006 FYLF and General Study Area surveys.

Pit 1 FYLF Study Area

No special-status amphibians were observed during the May/June 2006 survey in the Pit River, Fall River, or adjoining wetlands and springs of the Pit 1 FYLF Study Area). Pacific chorus frog (*Pseudacris regilla*) tadpoles were found in the ephemeral pool (RK 75.8) near the upstream end

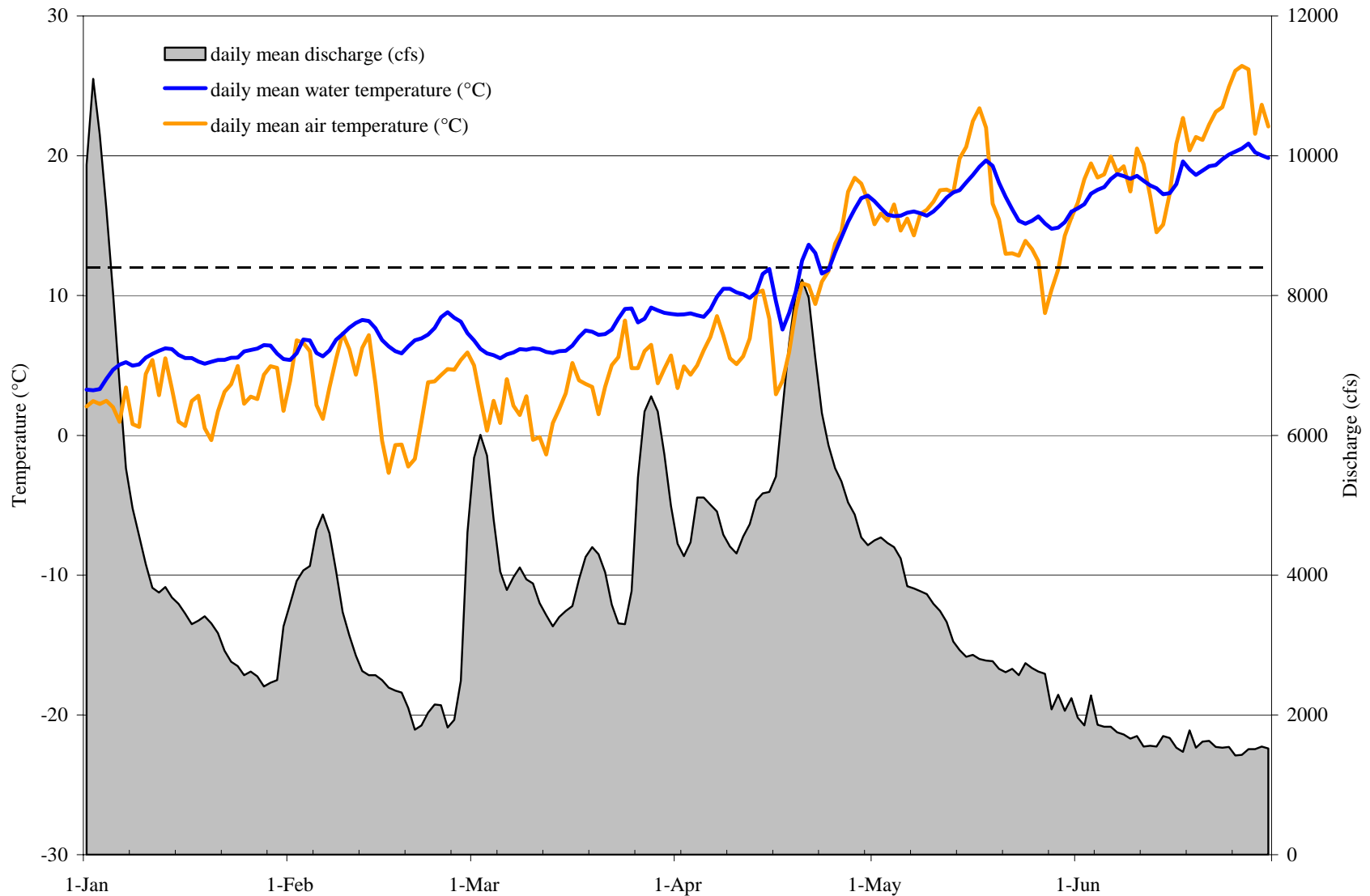


Figure 2 Daily mean discharge (cfs) at USGS gage #11-3550.10 and daily mean water and air temperatures (°C) for the Pit River below the Pit 1 Powerhouse in 2006. Dashed line indicates 12 °C.

Table 2 Locations, dates, times, and water temperatures for FYLF and General Study Area surveys.

| Location | Survey Date | Water Temp. (°C) ^a | Time of Data Collection ^b |
|--|-------------|----------------------------------|---|
| FYLF Study Area | | | |
| Sam Wolfin Spring | | | |
| Meadow | May 12 | 13.5–18.6 | 13:55 |
| Pond 1 | May 12 | 12.1 | |
| Pond 2 | May 12 | 11.8 | |
| At Pit River | May 12 | 17.8 | 14:40 |
| Pit River floodplain between the Hwy 299 bridges across Hat Creek and Pit River | | | |
| Pond at Hat Creek chalk bluff | May 18 | 21.1 | 10:00 |
| Meadow | May 18 | 16.0–21.3 | 10:30 |
| Spring against Hat Creek Bluff | May 18 | 15.9 | 11:30 |
| Pit 1 springs between tailrace and footbridge | May 18 | 14.1–16.0 | 12:00 |
| PG&E water supply spring, lower channel | May 18 | 16.7 | 15:10 |
| PG&E water supply spring, upper channel | May 18 | 16.6 | 15:15 |
| Blue Spring area | May 19 | | |
| Blue Spring | May 19 | 12.6 | 10:15 |
| Adjoining spring pools | May 19 | 17.0 | |
| Lower spring | May 19 | 13.7 | |
| Lower spring channel | May 19 | 14.8 | 11:00 |
| Sucker Springs Creek area | May 19 | 12.0–13.9 | 12:30–14:30 |
| Ephemeral pond near Pit 1 PH turnoff | February 3 | | |
| Ephemeral pond near Pit 1 PH turnoff | May 19 | 25.7 | 14:45 |
| Lake Britton to Highway 299 | May 22 | | |
| Highway 299 to Sam Wolfin | May 23 | | |
| Sam Wolfin to Pit 1 Powerhouse | May 24 | | |
| Fall River | May 25 | | |
| Footbridge to Pit River Falls | June 6 | | |
| Fall River Confluence to Big Eddy | June 8 | | |
| Pit River Falls to Big Eddy | June 13 | | |
| Pit 1 Powerhouse to the footbridge | June 14 | | |
| General Study Area | | | |
| Cinder Flats State Wildlife Area | | | |
| Pond 1 | February 10 | 7.0–8.5 | 11:30 |
| Pond 3 | February 10 | 10.0 | 14:00 |
| Pond 4 | February 10 | 9.0 | 14:30 |
| Cinder Flats State Wildlife Area | | | |
| Pond 1 | May 11 | 27.2 | 16:00 |
| Pond 2 | May 11 | | |
| Pond 3 | May 11 | 22.0–23.0 | 13:30 |
| Pond 4 | May 11 | 27.2 | |
| Pond 5 | May 11 | 25.2–28.1 | |

^aTemperature ranges indicate temperature readings at different locations of a wetland, pond, or creek.^bTime ranges indicate various temperature readings taken in this time period.

of Lake Britton where they had been found in 2004 and 2005 and in the ephemeral pool near Sam Wolfin Spring where they were found in 2004. They were also found in ephemeral pools on the north side of the Pit River (RK 76.1), which were dry during previous surveys, and in overflow channels in the Pit River floodplain between the Hwy 299 bridges across Hat Creek and Pit River (Figure 3). Adult Pacific chorus frogs were not observed in these locations in 2006. Incidental observations of non-native bullfrog (*Rana catesbeiana*) adults and tadpoles in the Pit 1 FYLF Study Area in 2006 were as numerous as in 2005, but less numerous than in 2004. Long-toed salamanders (*Ambystoma macrodactylum*) were not observed in the Pit 1 FYLF Study Area in 2006. Figure 3 shows the combined observations for 2004–2006.

General Study Area

We surveyed ponds 1, 3, and 4 of the Cinder Flats State Wildlife Area (Figure 4) during the first warm sunny days in early February 2006 (Table 2). No special-status amphibians were encountered. Adult Pacific chorus frogs were heard in ponds 3 and 4. On 11 May, all five ponds were surveyed. Adult Pacific chorus frogs were found in ponds 1, 2, 4, and 5.

Bullfrogs were not observed at Cinder Flats State Wildlife Area. Long-toed salamanders were not observed in any of the ponds in the Cinder Flats State Wildlife Area in 2006.

DISCUSSION

The Foothill Yellow-Legged Frog Protection Plan was designed to identify and assess the potential effects of the license-required flow regimes on foothill yellow-legged frogs and other special-status amphibians, if present. Three years of surveys in the Pit 1 FYLF Study Area have not produced evidence of a foothill yellow-legged frog population nor any other special-status amphibian species population in or near waters affected by the Pit 1 license-required flow regime. Although not a special-status species, long-toed salamanders were found in off-channel pools along the Pit River upstream of Lake Britton in 2004, but were not observed in the Pit 1 FYLF Study Area in either 2005 or 2006.

As discussed in previous annual reports, both breeding and refuge habitats for foothill yellow-legged frogs appear to be absent in the Pit 1 FYLF Study Area from Fall River Pond to the

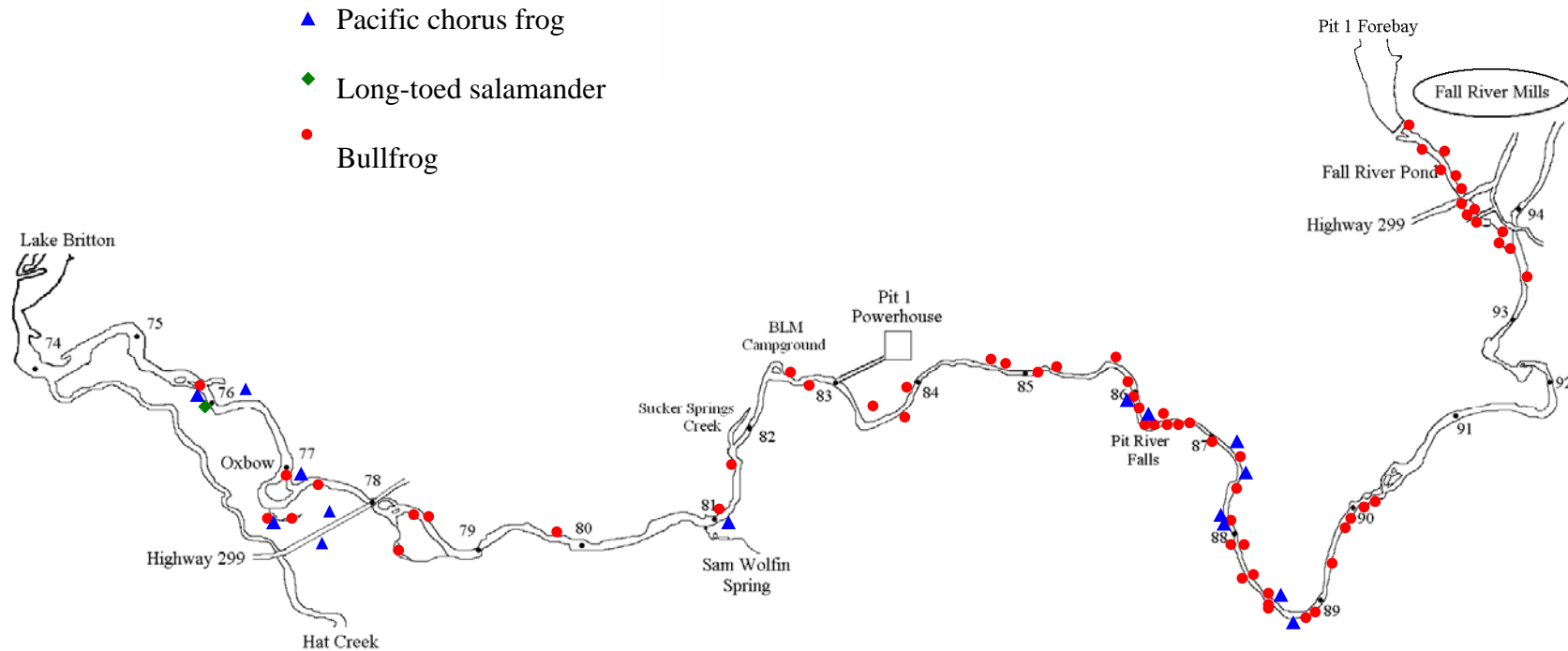


Figure 3 Amphibian observations in the Pit 1 FYLF Study Area from Fall River Pond to Lake Britton in 2004–2006.

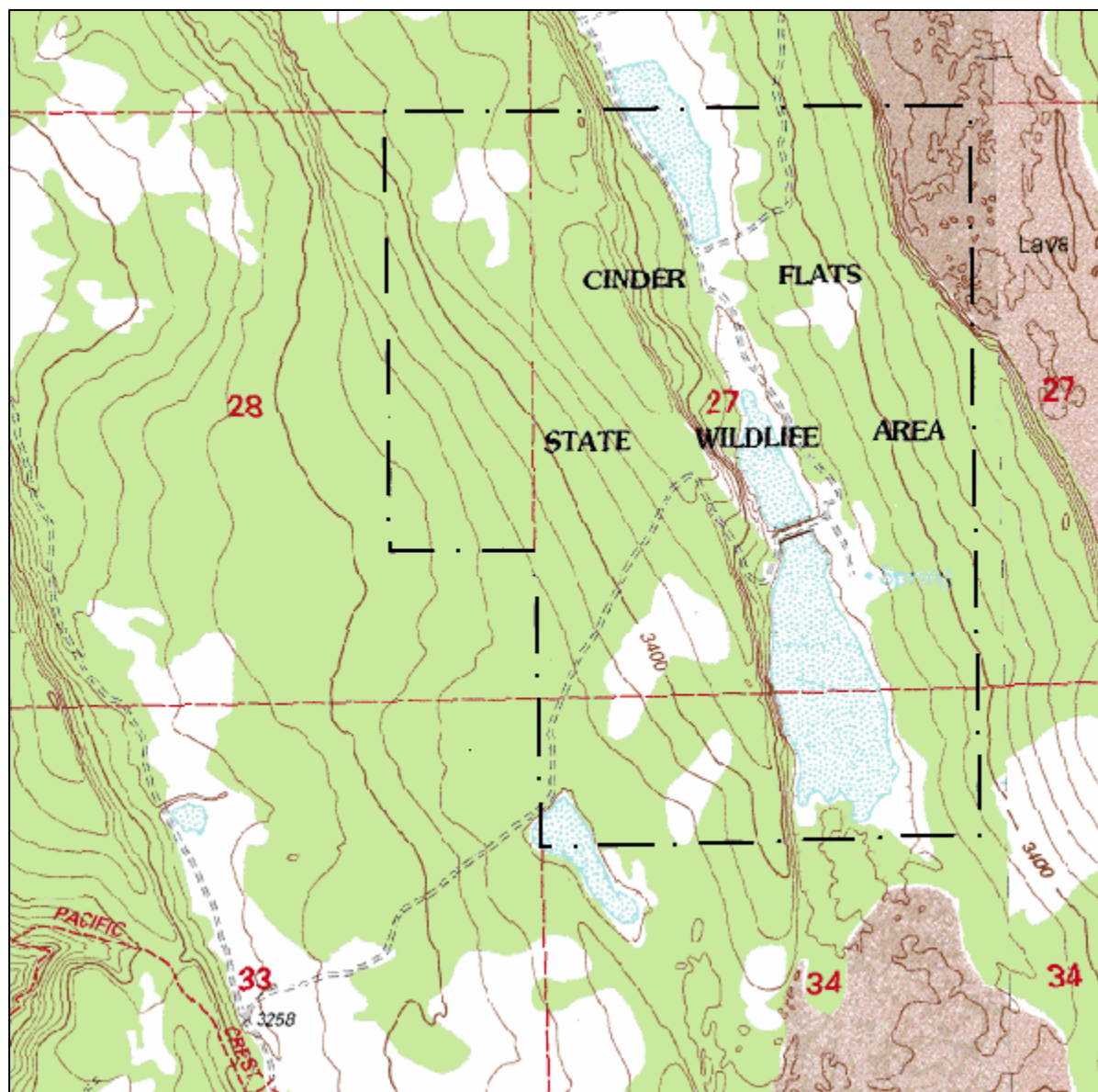


Figure 4 Wetlands surveyed within and in the vicinity of Cinder Flats State Wildlife Area (USGS topographic map base).

downstream end of the Pit 1 Canyon (RK 84.0) and appear to exist only in limited amounts between the canyon and Lake Britton (Spring Rivers 2005, 2006). Despite the current license-required minimum discharges and modified powerhouse loading and unloading (i.e., ramping) rates designed in part to increase flow stability, daily changes in discharge continue to create fluctuating water levels downstream of the Pit 1 Powerhouse during the course of a typical day.

These fluctuations render the already very limited potential habitat less suitable for foothill yellow-legged frogs (Spring Rivers 2005), even though flows are more stable under the new license.

Historically, foothill yellow-legged frogs may have inhabited the waters downstream of the Pit 1 Canyon, especially the area that is currently inundated by Lake Britton, immediately downstream of the Pit 1 FYLF Study Area. Prior to inundation by Lake Britton, this area likely contained a broad, alluvial channel with a bed of cobbles and small boulders and a connected floodplain (R2 Resource Consultants 2001). Additionally, this reach of the Pit River was fed by numerous perennial tributaries (including Hat, Burney, Clark, and Cayton creeks). This combination of features likely resulted in a higher concentration of high-quality breeding, rearing, and adult refuge habitat for foothill yellow-legged frogs than currently exists either in the Pit 1 FYLF Study Area or in the Pit 4 Reach, where foothill yellow-legged frogs are known to exist.

Both Cascades and Oregon spotted frogs are early season breeders that breed in shallow unshaded waters lacking predatory fish and bullfrogs (Zweifel 1955, Nussbaum et al. 1983, Corkran and Thoms 1996, McAllister and Leonard 1997). In 2004, the wet meadow at Sam Wolfin Spring was found and surveyed after the likely breeding period for Cascades and Oregon spotted frogs was over. Based on the conditions seen at that time, however, we speculated that this location could provide suitable breeding habitat earlier in the season for these two species (Spring Rivers 2005). Information from subsequent surveys, however, indicated that ideal breeding conditions for these frogs may not exist at any time in this meadow. Only small (~30 cm x 60 cm) and shallow (~3 cm) areas of open water (without emergent vegetation) were found even after heavy rains in April and May 2005 (Spring Rivers 2006). Depth and expanses of open water appeared to be unaffected by soil moisture conditions or increases in seasonal runoff. During surveys, we noticed that meadow substrate was very spongy and tended to sink somewhat wherever we stepped and then rebound after we took the next step. It may be that the central meadow surface floats and therefore depth and expanse of water remains unchanged despite changes in surrounding soil moisture or runoff rates. Surveys in 2004, 2005, and 2006 did not reveal signs of any ranid frogs.

The extensive wetlands (including open water) of the Cinder Flats State Wildlife Area, the common habitat association between Cascades frogs, Oregon spotted frogs, long-toed salamanders, and Pacific chorus frogs observed in other locations, suggest that this area may be the best remaining refuge in the Pit 1 vicinity for Cascades and Oregon spotted frogs. Similarly, the wooded corridor surrounding the wetlands, deep waters, abundant aquatic vegetation, and an absence of fish suggest that this area may also be the best remaining refuge for northern leopard frogs in the area. In addition, the absence of bullfrogs makes the habitat at Cinder Flats State Wildlife Area more favorable for native ranid frogs; non-native bullfrogs are reported to cause declines in native frog populations (Moyle 1973, Hayes and Jennings 1986, Jennings 1988, Kupferberg 1997). Long-toed salamanders, which were found in the Cinder Flats State Wildlife Area in 2004, were not observed in either 2005 or 2006. No ranid frogs, however, have been observed at the Cinder Flats State Wildlife Area during surveys in June and August 2004, March 2005, or February and May 2006.

The 2004, 2005, and 2006 surveys of the Pit 1 FYLF Study Area and the 2005 survey upstream of the Pit 1 FYLF Study Area did not confirm the presence of Cascades, northern leopard, or Oregon spotted frogs. The midreaches of the Pit River drainage, including the Fall River subdrainage, appear to have always been near the limits of the historical distributions of all four special-status ranid frog species, but likely contained more habitat historically than at present. The General Study Area now appears to contain only marginally sufficient breeding and rearing habitats (in terms of both habitat type and areal extent) for Cascades, northern leopard, and Oregon spotted frogs. In addition, bullfrogs currently inhabit most of the surveyed areas that provide potential habitat for Cascades, northern leopard, Oregon spotted, and even foothill yellow-legged frogs.

At least one survey in the Pit 1 FYLF Study Area will be conducted in 2007 and 2008 as stipulated in the Plan. These surveys will continue to include the mainstem Pit River, tributary streams, off-channel ponds and pools, and adjoining wetlands.

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**APPENDIX A—FERC LICENSE ARTICLES (INCLUDING CALIFORNIA WATER
BOARD CONDITIONS) PERTAINING TO FOOTHILL YELLOW-LEGGED FROGS**

Article 420. Within 6 months from license issuance, the licensee shall file, for Commission approval, a foothills yellow-legged frog protection plan. The plan shall determine if measures are necessary to protect foothills yellow-legged frogs from potential adverse impacts associated with the flow regimes in California Water Board Conditions 8, 11, and 13, (Appendix); and the reduction of maximum generator loading and unloading rates required by California Water Board Condition 12 (Appendix).

The plan shall include, at a minimum:

- (1) surveys for foothills yellow-legged frogs, at a minimum, along the Pit River from its confluence with the Fall River to Lake Britton;
- (2) the proposed areas to be surveyed with accompanying maps and the proposed survey methodology;
- (3) a schedule for implementing the plan, for consulting with the U.S. Fish and Wildlife Service (FWS) and the California Department of Fish and Game (Cal Fish and Game) and for filing monitoring reports with the consulted agencies and the Commission; and
- (4) a schedule for filing any proposed protection and management measures, or any proposed modifications to the project or project operations, necessary to protect foothills yellow-legged frogs or its critical habitat, for Commission approval. The licensee shall prepare the plan after consultation with the FWS and Cal Fish and Game. The licensee shall include with the plan documentation of agency consultation, copies of comments and recommendations on the completed plan after it has been prepared and provided to the agencies, and specific descriptions of how the agencies' comments are accommodated by the plan. The licensee shall allow a minimum of 30 days for the agencies to comment and to make recommendations before filing the plan for Commission approval. If the licensee does not adopt a recommendation, the filing shall include the licensee's reasons, based on site-specific information.

The Commission reserves the right to require changes to the plan. The plan shall not be implemented until the licensee is notified by the Commission that the plan is approved. Upon Commission approval, the licensee shall implement the plan, including any changes required by the Commission.

California Water Board Conditions

Condition 8 requires PG&E to make continuous flow releases from the Pit 1 Forebay into the lower Fall River thence the Pit River and maintain instantaneous flows (in cubic feet per second, i.e., cfs) downstream of the Fall River Pond as measured at the Fall River Weir. The minimum required flows vary depending on the time of year, as shown below:

| Dates | Required Flow (cfs) |
|-----------------------|---------------------|
| Nov 1 through Nov 15 | 75 |
| Nov 16 through May 15 | 50 |
| May 16 through May 31 | 75 |
| June 1 through Oct 31 | 150 |

Condition 11 requires that the combined flow of the Pit River and the Pit 1 Powerhouse during normal operations meet or exceed a daily average of 500 cfs as recorded at the U. S. Geological Service's (USGS) gage (#11-3550.10) on the Pit River below Pit #1 Powerhouse near Fall River Mills. Article 402 of the new license further increased the required total instantaneous flow in the Pit River, as measured at the same USGS gage, to 700 cfs.

Condition 12 requires that under normal operations the Pit 1 Powerhouse limit the generator-loading rate (i.e., up-ramping rate) to a maximum of 2 MW/min as a matter of public safety. This equates to a loading period of approximately 32 min. This condition also requires a generator-unloading rate (i.e., down-ramping) of approximately 0.5 MW/min to reduce the potential for stranding of aquatic organisms. This equates to an unloading period of approximately 120 min.

Condition 13 requires that PG&E release flushing flows through Fall River Pond for two consecutive weekend days three times a year for the purposes of controlling both growth of aquatic vegetation and mosquito production. Flushing flows are defined as 1,250 cfs or the natural flow to the Pit 1 Forebay, whichever is less. These flows will be released in: (1) May or June when warranted by vegetation growth in Fall River Pond, (2) July, and (3) at the end of August prior to the Labor Day weekend.