

#### 4.1 **Amphibians and Aquatic Reptiles Study Plan**

This study is designed to provide information relating to special status amphibian and aquatic reptile species in reservoirs and river reaches associated with Sacramento Municipal Utility District's (SMUD) Upper American River Project (UARP) and Pacific Gas and Electric Company's Chili Bar Project using accepted sampling protocols. The overall approach is to collect information regarding presence and habitat for these species in 2002, 2003, and 2004. It is expected that sampling will be modified (expanded, focused or eliminated) in 2004 based on the results of 2002 and 2003 data.

##### 4.1.1 Pertinent Issue Questions

This Amphibians and Aquatic Reptiles Study Plan addresses the following Aquatic/Water Issue Questions:

1. Does the Project affect special-status species? If so, where and how?
8. What is the composition, distribution, and population of aquatic resources in the Project-affected streams and reservoirs, including benthic macroinvertebrates?

Note that this study plan only addresses amphibians and aquatic reptiles: other aquatic special status species and resources are addressed in the Fish Survey Study Plan, and benthic macroinvertebrates are addressed in the Aquatic Bioassessment Study Plan.

##### 4.1.2 Background

Pages E3-6 through E3-11 of SMUD's Initial Information Package (SMUD 2001) list 18 amphibians and aquatic reptiles that have a potential to occur in the vicinity of the UARP and/or Chili Bar projects based on SMUD's review of existing information. Nine of these are special status species, four of which have a very low likelihood of being affected by the either project. These four are:

1. California tiger salamander breeds in vernal pools and seasonal/permanent ponds in annual grasslands and oak woodlands. These habitats are not likely to be affected by either project.
2. Western spadefoot toad is found primarily in open grassland or occasionally in valley-foothill hardwood forests with vernal pools or other temporary standing water such as pools in ephemeral drainages. These habitats do not occur in the vicinity of either project.
3. Northern leopard frog prefers aquatic habitat in and around marshes, wet meadows, and riparian areas with thick vegetation that the adults use for cover. While this type of habitat does occur in the vicinity of the projects, the Northern leopard frog's only verified sighting in the recent past is within a national wildlife refuge near the Oregon border (Jennings and Hayes 1993). An additional sighting of a Northern leopard frog near Riverton has been reported (Personal Communication with S. Lehr of CDFG on March 1, 2002), but the origin of the specimen is unknown.
4. Mt. Lyell salamander prefers seeps/springs habitat in massive rock areas. Although these habitat types may occur in the vicinity of the projects, these habitats are not likely to be affected by the activities of the projects. Furthermore, the species is usually patchily distributed and has no verified sighting in the area of the projects.

Therefore, this study focuses on the remaining five special status amphibians listed in Table 1 that have a potential to occur in the vicinity of the UARP and/or Chili Bar Project and to be affected by one or both of these projects. Note that the Study Methods section below does not pertain to California red-legged frog. Since this species is listed as Threatened under the federal Endangered Species Act (ESA), the Licensees will utilize the United States Fish and Wildlife Service's (USFWS) established site assessment and survey protocol for this species (USFWS 1997). Also note that the western pond turtle uses primarily terrestrial habitat for reproduction, uses riverine and pond habitat for feeding and basking, and does not tend to use large water bodies, such as reservoirs and lakes (Holland 1991). For those reasons and since surveys for the other special status species (particularly red-legged frog and foothill yellow-legged frog) will sample locations that likely encompass potential western pond turtle habitat if they occur in the study area, specific surveys for western pond turtle are not proposed unless Phase 1 and 2 studies described below reveal some specific reason to conduct such surveys. Lastly, note that the proposed helicopter and

field surveys will encompass habitats suitable for most special-status amphibians and aquatic reptiles, but that sightings of any amphibians or aquatic reptiles will be noted.

**Table 1. Special-status amphibian and aquatic reptile species with the potential to occur in the vicinity of Sacramento Municipal Utility District's Upper American River Project and/or Pacific Gas and Electric Company's Chili Bar Project, and to be affected by one or both projects.**

Common Name	Scientific Name	Status <sup>1</sup>
Yosemite toad	<i>Bufo canorus</i>	FC, CSC, CP, FSS
California red-legged frog	<i>Rana aurora draytonii</i>	FT, CSC, CP
Foothill yellow-legged frog	<i>R. boylei</i>	FSC, CSC, CP, FSS
Mountain yellow-legged frog	<i>R. muscosa</i>	FC, CSC, CP, FSS
Western pond turtle	<i>Clemmys marmorata</i>	FSC, FSS, CSC, CP

<sup>1</sup>Status:

FT	Federal threatened species	FC	Federal candidate for listing
FSC	Federal species of concern	FSS	Forest Service sensitive species
CSC	California species of concern	CP	California protected species

#### 4.1.3 Study Objectives

The objectives of this study are to: 1) document the distribution and suitability of habitat in the study area for the five special status amphibians and aquatic reptiles listed in Table 1; 2) document, to the extent possible, the geographic and temporal distribution and relative abundance of the special-status amphibians and aquatic reptiles in the study area; 3) identify potential impacts of the UARP and/or Chili Bar Project on these species and their habitats; and 4) develop measures to protect and/or enhance these species and their habitats.

#### 4.1.4 Study Area

The study area will include at a minimum the area within one mile of the normal high water line of all stream banks and reservoirs. Attempts will be made to secure permission to access any areas within the study area where the Licensees do not have legal access. The study area will include: 1) all Project reservoirs as described in the IIP as well as the Chili Bar Reservoir, and 2) the main stem of the all Project stream reaches as identified by the Aquatics TWG, including the reach downstream of Chili Bar Dam. For reservoirs and stream reaches, the study area may be extended farther upstream for perennial streams and selected ephemeral streams with permanent pools past one mile if suitable habitat for the special status species is accessible to the species from habitat in the main stem of the river. Tributaries that occur within the 1-mile zone will also be characterized. Other areas (such as at recreation sites to be identified by the Recreation TWG and Project roads to be identified through the Project Sources of Sediment Study) may be added to the study area. The study area will be stratified by known preferred habitat and elevation range for each of the special status species. Table 2 lists the preferred habitat for each of the five special status species, the elevation range of that species, and the study area band as described above.

**Table 2. Known aquatic habitat requirements and elevation range of special-status amphibians and aquatic reptiles with the potential to occur in the vicinity of Sacramento Municipal Utility District's Upper American River Project and/or Pacific Gas and Electric Company's Chili Bar Project, and to be affected by one or both of the projects.**

Species	Preferred Habitat	Elevation Range	Study Area
Western pond turtle	Streams/Ponds	Below 5,000 feet	Will be included within the area of other species as incidental observations
California red-legged frog	Wetlands, Wet Meadows, Ponds, Lakes, Pools, & Low Gradient, Slow-Moving Stream Reaches	Below 5,000 feet	1 mile
Foothill yellow-legged frog	Streams	Below 5,000 feet	1.25 mile
Mountain yellow-legged frog	Streams, Lakes, Pools, & Low Gradient, Slow-Moving Stream Reaches	Above 5,000 feet	1.25 mile
Yosemite toad	Wetlands & Wet Meadows	Above 6,000 feet	1.25 mile

#### 4.1.5 Information Needed From Other Studies

Information from other studies will assist in identifying the distribution, quality, and quantity of available habitat for amphibians and aquatic reptiles. The needed information will include: 1) stream flow, ramping rates and reservoir elevations from the Hydrology Study; 2) stream channel condition from the Channel Morphology Study; 3) water temperature from the Water Temperature Study; 4) distribution of native and non-native fish species from the Fish Survey Study; 5) general occurrence of invertebrate prey from the Aquatic Bioassessment Study; and 6) maps of aquatic, riparian, and terrestrial habitat/cover types from the Instream Flow Study, Riparian Vegetation Study, Wetland Study and various terrestrial studies; and 7) recreation areas that may be affected by the projects as identified by the Recreational TWG.

#### 4.1.6 Study Methods And Schedule

All necessary permits will be obtained for the handling of special status species during surveys.

As described above, the Licensees' study methods for California red-legged frog will follow established USFWS site assessment and survey protocols (USFWS 1997). The study methods described below pertain to Yosemite toad, foothill yellow-legged frog, mountain yellow-legged frog and western pond turtle.

##### *Phase 1 – Compile and Review Existing Information*

In this phase, the Licensees will conduct follow-up discussions with resource agencies (especially with USFS and CDFG which have conducted amphibian surveys in the higher elevations and have an Access database with GPS coordinates for each occurrence) and known experts. The Licensees will review any other information source for updates to information collected during preparation of the IIP and this study plan regarding amphibian and aquatic reptile species occurrences and habitat associations in the vicinity of the UARP and the reach downstream of Chili Bar Dam. Updated descriptions of species-specific habitat needs will be used to assist in subsequent study phases.

##### *Phase 2 – Identify Potential Habitat and Select Sampling Sites*

The Licensees will identify sites within the study area where potential habitat for Yosemite toad, foothill yellow-legged frog, mountain yellow-legged frog and western pond turtle may occur, using USGS maps, aerial photographs, and other available information. Aerial photographs of the area of the projects taken by the USFS in 1996 and 2000 at 1:15,840 scale will provide initial information. Existing helicopter video footage will also be used to provide information about the general aquatic habitats. Aerial photographs taken in 1947 will also be used. During this phase, all potential habitat sites will be given an alphanumeric designation and denoted on USGS topographic maps.

The Licensees will then conduct field reconnaissance (utilizing helicopter and on-the-ground methods) to locate and document potential habitat locations within the study area. Potential sites will be logged by GPS position, photographs will be taken of each site from various angles, and a preliminary habitat assessment will be conducted. Pertinent habitat characteristics to be recorded will include habitat type, flow regime (perennial or ephemeral), primary habitat features such as aquatic and terrestrial vegetation (e.g., emergent, overhanging, and canopy), gradient, aquatic substrate, and stream channel characteristics. Habitat that appears to be of moderate-to-high quality for the target special status species will be selected for initial surveys. Based on this visit, the initial evaluation of the site habitat quality (moderate to high) will be confirmed or modified. If moderate to high quality habitat is not found within a stream reach, the Licensees will survey sites identified previously as the best low quality habitat.

After completing the preliminary habitat assessments, the data obtained on each potential habitat site will be reviewed and sites with similar habitat characteristics will be grouped together. For Yosemite toad, foothill yellow-legged frog and mountain yellow-legged frog in each stream reach (as identified by the Aquatics TWG including the reach downstream of Chili Bar Dam), initially one to three sites will be selected for visual encounter surveys (VES) starting with the sites that have the highest quality and easiest access and working down to those sites with lower quality habitat and difficult access. Suitable sites for amphibians associated with lentic habitats will also be selected in the appropriate elevation zones for targeted species. The final

determination of the number of sites in each reach will be made after the results of the reconnaissance are presented to the Aquatic TWG, as described below. Interested parties from the Aquatics TWG and Plenary Group will be invited to visit the sites in the field to concur with or modify the selected survey sites.

### *Phase 3 – Conduct Surveys*

VES surveys at the selected sites for Yosemite toad, foothill yellow-legged frog and mountain yellow-legged frog will be conducted following the survey methodologies and protocols listed below. VES surveys for western pond turtle will not be conducted unless determined necessary after Phase 1 and 2. During the surveys, incidental observations of other amphibians and aquatic reptiles will be recorded. Up to four VES will be conducted at each site. The first two surveys will be conducted to locate breeding and oviposition sites, the third survey will focus on tadpoles, and the final survey will target both juveniles and adults. If target species are not observed by the second or third site visit, and it appears likely that additional visits will not yield any additional information, the subsequent visits will be cancelled. VES surveys typically would involve two biologists surveying in tandem with one biologist scanning ahead with binoculars to look for amphibians, while the other surveyor trails behind searching for egg masses and/or tadpoles. In reservoirs, surveys are either conducted from the boat (electric motor to reduce disturbance) or on foot along the reservoir shoreline where suitable habitat occurs. When possible, surveys for more than one species will be combined to increase survey efficiency and reduce disturbance of amphibians and their habitats. The timing of the surveys will be determined using a combination of local environmental factors (i.e., weather; air and water temperature; peak flows/descending flows; snow pack/snow melt, and when possible, direct observations by operations staff of snowmelt conditions at upper elevations obtained during helicopter flights conducted as part of normal project operations; and any other available sources, as appropriate), as well as preliminary survey results from similar studies recently conducted in other Sierran river systems (i.e., Mokelumne, Tuolumne, Feather, and Stanislaus rivers).

During each site visit, VES data sheets will be completed. Transect lengths including upstream and downstream site boundaries, site lengths, site width, survey effort (time), search areas and patterns, flow, water temperature, and incidental observations will be recorded and denoted on GIS maps, photographs or topographic maps. When special status amphibians and aquatic reptiles are encountered during surveys, basic measurements of the individuals (e.g., length, mass) and microhabitat characteristics (e.g., air and water temperature, flow, water depth, substrate, location in the stream, associated vegetation or cover), and global positioning system (GPS) coordinates will be measured, estimated, or described and recorded, as indicated by published survey methodologies or protocols. After completing the initial VES, detailed site habitat assessments will be conducted. Specific habitat characteristics associated with the species to be recorded will include: 1) habitat types (e.g., lateral and point bars, boulder/sedge margins, isolated pools, islands, and braided river sections); 2) length and width of habitat, water depth and temperature; 3) average water velocities at site; 4) aquatic substrate types; 5) types and percentages of aquatic and terrestrial cover, aquatic and terrestrial vegetation, and riparian canopy; 6) presence and location of tributaries; 7) bank and stream gradients; 8) upland vegetation types; and 9) fish, amphibians, and reptiles observed. To document representative conditions at the site; one photograph will be taken from the top of the site looking downstream; one from the bottom of the site looking upstream; and photographs facing both upstream and downstream from the middle of the site. Additional photographs will be taken to document specific habitat features. The site assessment will not be repeated during subsequent surveys at the site unless significant changes in habitat occur (i.e., significant drop in water levels, or change in habitat quality or extent).

The following protocols will be employed or adapted for the special status species surveys:

Yosemite toad: USFS (2001) protocol from the Sierra Nevada Forest Plan Amendment ROD Survey requirements for adults and metamorphs: PG&E (2001)

California red-legged frog: USFWS (1997) for post-metamorphs in summer to fall.

Foothill yellow-legged frog: Lind (1997) for adults, egg masses, and larvae in spring to early summer, and Crump and Scott (1994) for post-metamorphs in mid-summer to early fall; PG&E (2001).

Mountain yellow-legged frog: Crump and Scott (1994) for streams, Thoms et al. (1997) for larvae, metamorphs, and post-metamorphs in late spring to summer and CDFG (2001) for ponds and lakes; PG&E (2001)

Western pond turtle: Species-specific surveys or protocols are not proposed for Western pond turtle, unless determined necessary after Phase 1 and 2 studies.

*Phase 4 – Analyze Data*

See Analysis Section below.

It is anticipated that Phases 1 and 2 (compiling and reviewing data and identification of habitats to be surveyed) will occur in spring 2002. A presentation will be made to the Aquatics TWG and Plenary Group in late summer/early fall 2002, and will include recommendations for survey locations and an invitation to interested parties to visit the sites in the field and comment on their selection. Phase 3 (field surveys) will be conducted from spring to fall 2003. A presentation will be made to the Aquatics TWG and Plenary Group in winter 2003, including any recommendations concerning modifying the study in 2004. Phase 4 (data analysis) will begin in 2003 and extend through 2004, depending on the scope of study in 2004.

4.1.7 Analysis

Data analysis will include evaluating patterns of observed distribution and abundance of the species surveyed in relation to habitat types and characteristics. Data analysis will also include reviewing information available from other study elements (listed above) on the distribution, quality, and quantity of amphibian and aquatic reptile habitats in the study area, and assessing the impacts of the Project (e.g., reviewing historical information compared to existing conditions). Lastly, the analysis will include developing and evaluating options for protecting and/or enhancing amphibian and aquatic reptile populations and habitats in the study area.

4.1.8 Study Output

A presentation of study progress will be made to the Aquatics TWG and the Plenary Group in late 2002, 2003, and 2004 to obtain feedback on site selection, studies in 2004, and data analysis, respectively. A written report including the issues addressed, objectives, description of study area and sampling locations (e.g., maps and photos), methods, results, discussion and conclusions will be prepared after field visits and analyses are complete. The report will be prepared in a format that can easily be incorporated into SMUD's draft environmental assessment that will be submitted to FERC with SMUD's application for a new license.

4.1.9 Preliminary Estimated Study Cost

A preliminary cost estimate will be prepared after the Plenary Group approves this study plan.

4.1.10 TWG Endorsement

On April 11, 2002 the following entities gave approval to the plan: USFWS, CDFG, BLM, PCWA, CSPA, SMUD, SWRCB, PG&E (pending review by PG&E technical staff) and USFS.

On May 1, 2002 the following participants gave Plenary Group approval to the plan: USFS, BLM, USFWS, Taxpayers of El Dorado County, Friends of El Dorado County, Camp Lotus, El Dorado County Water Agency, El Dorado County, Placer County Water Agency, California Department of Fish and Game, California State Water Resources Control Board, Pacific Gas and Electric and Friends of the River. None of the participants at the meeting said they could not "live with" this study plan.

4.1.11 Literature Cited

CDFG (California Department of Fish and Game). 2001. 2001 Fish and Amphibian Inventory Data Sheet Instructions. Version 1.0. Based on fish and amphibian survey protocols developed by R. Knapp. Sierra Nevada Aquatic Research Laboratory, University of California, Mammoth Lakes, California. 11 June.

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**AQUATICS TWG NOTE:**

1. *This study area will be revisited once SMUD and the USFS reach agreement regarding responsibility for and potential Project actions in "Defense and Threat" zones as defined in the Forest Service Plan Amendment EIS and Record of Decision*