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)

AMPHIBIANS AND AQUATIC REPTILES TECHNICAL REPORT

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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[1]
Yosemite toad	*Bufo canorus*	FC, CSC, CP, FSS
California red-legged frog	*Rana aurora draytonii*	FT, CSC, CP
Foothill yellow-legged frog	*R. boylii*	FSC, CSC, CP, FSS
Mountain yellow-legged frog	*R. muscosa*	FC, CSC, CP, FSS
Western pond turtle	*Clemmys marmorata*	FSC, FSS, CSC, CP

[1]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.

Crump, M.L. and N.J. Scott, Jr. 1994. Visual encounter surveys. Pages 84-92 *in* W.R. Heyer, MA Donnelly, R.W. McDiarmid, L.C. Hayek, and M.S. Foster, eds. Measuring and Monitoring Biological Diversity: Standard Methods for Amphibians.

Holland, D.C. 1991. A synopsis and status of the Western Pond Turtle (*Clemmys marmorata*) in 1991. Prepared for the USFWS National Ecology Research Center, San Simeon, California.

Jennings, M.R. and M.P. Hayes. 1993. Amphibian and reptile species of special concern in California. Final report submitted to the California Department of Fish and Game, Inland Fisheries Division, Rancho Cordova, under Contract (8023). 336 pp.

Jennings, M.R. 1996. Status of amphibians. Sierra Nevada ecosystem project: Final report to Congress, Vol. II: Assessments and scientific basis for management options, Chapter 31, pp. 924-944. University of California, Centers for Water and Wildland Resources, Davis, California.

Lind, A. 1997. Survey protocol for foothill yellow-legged frogs (*Rana boylii*) in streams. USDA Forest Service, Pacific Southwest Research Station, Arcata, California. 21 March.

PG&E (Pacific Gas and Electric Company). 2001. Survey Protocols, Standard Operating Procedures (SOP)s and Data Sheets for Amphibian Surveys and Habitat Assessments.

SMUD (Sacramento Municipal Utility District). 2001. Initial Information Package for Relicensing of the Upper American River Project (FERC Project No. 2101). Sacramento, CA.

Thoms, C., C.C. Corkran, and D.H. Olson. 1997. Basic amphibian survey for inventory and monitoring in lentic habitats. Pages 35-46 *in* Sampling Amphibians in Lentic Habitats, D.H. Olson, W.P. Leonard, and R.B. Bury, eds. Society for Northwestern Vertebrate Biology, Northwest Fauna Number 4.

USFS (U.S. Forest Service). 2001. Yosemite Toad. Proposed Study Plan for Sierra Nevada Forest Plan Amendment ROD Survey Requirements.

USFWS (U.S. Fish and Wildlife Service). 1997. Guidance on site assessment and field surveys for California red-legged frogs (*Rana aurora draytonii*).

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*

AMPHIBIANS AND AQUATIC REPTILES TECHNICAL REPORT

SUMMARY

This technical report describes the distribution and abundance of special-status amphibian and aquatic reptile species and suitable habitat in reservoirs associated with the Upper American River Project (UARP) and the Chili Bar Project, streams affected by the these reservoirs, and water bodies (tributaries, ponds, etc.) within one mile of the study reaches and reservoirs, including the Reach Downstream of Chili Bar. The target amphibian and aquatic reptile species evaluated during this study were mountain yellow-legged frog, foothill yellow-legged frog, California red-legged frog, and western pond turtle.

The study results presented here reflect a data collection effort in 2002, 2003, and 2004, including three phases of study. Phase I included review of existing information. Observations of all four target-species have been recorded in the vicinity of the study area, although only western pond turtle and foothill yellow-legged frog have been documented in the study reaches or reservoirs. Mountain yellow-legged frog and California red-legged frog have been observed within ten miles of the study area.

Phase II evaluated potentially suitable habitat during the first year of field study. Moderate and/or high quality habitat was identified in 12 of the 13 reaches surveyed, including the Reach Downstream of Chili Bar. Only the Gerle Creek Dam Reach had no moderate or high quality habitat for any of the target species. Loon Lake Dam Reach and Ice House Dam Reach contained some of the highest quality habitat for mountain yellow-legged frog within the study area, and Slab Creek Dam Reach contained moderate to high quality habitat for foothill yellow-legged frog. Habitat of moderate or high quality in the other reaches was patchy. Very little high quality habitat was observed on the mainstem South Fork American River in the Reach Downstream Chili Bar.

Preliminary habitat assessments were completed in 2002 for 51 potentially suitable sites in the UARP area and 21 potentially suitable sites in the Reach Downstream of Chili Bar in order to select sites for visual encounter surveys (VES) in 2003. After consultation with the Aquatic TWG, 55 sites were identified for VES in 2003 for Phase III of the study: 41 sites in the UARP and 14 sites in the Reach Downstream of Chili Bar. Upon further consultation with the Aquatic TWG in spring 2004, and after analyzing the results of surveys conducted in 2003, ten additional sites in the UARP and seven additional sites in the Reach Downstream of Chili Bar were surveyed for habitat quality and presence of target amphibian species in July 2004.

No mountain yellow-legged frogs or California red-legged frogs were documented during the VES. Foothill yellow-legged frogs were found at four sites in the UARP study area: two in the Camino Dam Reach and two in the South Fork American River Reach. Evidence of successful reproduction was found at all four sites. Foothill yellow-legged frogs were not found in the Reach Downstream of Chili Bar but were observed in a tributary to the SFAR near Coloma. Western pond turtles were found in the Reach Downstream of Chili Bar at one mainstem location and one tributary location.

With the approval of the Aquatic TWG and Plenary Group, an Amphibian Habitat Test Flow Study was completed for the Camino Dam Reach. The results of this study are presented in a separate *Amphibian Habitat Test Flow Technical Report.*

1.0 INTRODUCTION

This technical report is one in a series of reports prepared by Devine Tarbell and Associates, Inc., (DTA) and Stillwater Sciences for the Sacramento Municipal Utility District (SMUD) and

Pacific Gas and Electric Company (PG&E) to support the relicensings of SMUD's Upper American River Project (UARP) and PG&E's Chili Bar Project. SMUD and PG&E intend to append this technical report to their respective applications to the Federal Energy Regulatory Commission (FERC) for new licenses. The report addresses the distribution and abundance of amphibians and aquatic reptiles in reaches associated with the projects and includes the following sections:

- **BACKGROUND** – A summary the applicable study plan approved by the UARP Relicensing Plenary Group; a brief description of the issue questions addressed, in part, by the study plan; the objectives of the study plan; the study area; and agency information requests. In addition, requests by resource agencies for additions to this technical report are described in this section.
- **METHODS** – A description of the methods used in the study, including a listing of study sites.
- **RESULTS** – A description of the most important data results. Raw data, where copious, are provided by request in a separate compact disc (CD) for additional data analysis and review by interested parties.
- **ANALYSIS** – A brief analysis of the results, where appropriate.
- **LITERATURE CITED** – A listing of all literature cited in the report.

This technical report does not include a detailed description of the UARP Alternative Licensing Process (ALP) or the UARP, which can be found in the following sections of SMUD's application for a new license: The UARP Relicensing Process, Exhibit A (Project Description), Exhibit B (Project Operations), and Exhibit C (Construction). Nor does this technical report include a detailed discussion of PG&E's relicensing process for the Chili Bar Project.

Also, this technical report does not include a discussion regarding the effects of the projects on amphibians and aquatic reptiles or their habitat, nor does the report include a discussion of appropriate protection, mitigation, and enhancement (PM&E) measures. An impacts discussion regarding the UARP is included in SMUD's applicant-prepared preliminary draft environmental assessment (PDEA) document, which is part of SMUD's application for a new license for the UARP. Similarly, an impacts discussion regarding the Chili Bar Project will be included in PG&E's Chili Bar Project license application. Development of PM&E measures will occur in settlement discussions in 2004, and will be reported in the UARP application PDEA and the Chili Bar Project license application.

2.0 BACKGROUND

The UARP Aquatic Technical Working Group (TWG) developed two study plans that pertain specifically to amphibians and aquatic reptiles: 1) the Amphibians and Aquatic Reptiles Study Plan; and 2) the Amphibian Habitat Test Flow Study Plan. This report addresses the Amphibians and Aquatic Reptiles Study. The Amphibian Habitat Test Flow Study is addressed in the *Amphibian Habitat Test Flow Technical Report.*

2.1 Amphibian and Aquatic Reptiles Study Plan

On May 1, 2002, the UARP Relicensing Plenary Group approved an Amphibians and Aquatic Reptiles Study Plan that was developed and approved by the Aquatic TWG on April 11, 2002. The study plan was designed to address, in part, the following issue questions developed by the Plenary Group:

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

Specifically, the objectives of the study plan were to:

- Document the distribution and suitability of habitat in the study area for five special status amphibians and aquatic reptiles: mountain yellow-legged frog (*Rana muscosa*), foothill yellow-legged frog (*R. boylii*), California red-legged frog (*R. aurora draytonii*), and western pond turtle (*Clemmys marmorata*). Note that Yosemite toad (*Bufo canorus*) was initially included in the study but subsequently deleted from formal VES during a meeting with a subset of Aquatic TWG members (including Jann Williams of the Forest Service and Stafford Lehr of CDFG) on March 21, 2003 because the study area is beyond the documented range of Yosemite toad;
- 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;
- Identify potential impacts of the UARP and/or Chili Bar Project on these species and their habitats; and
- Develop measures to protect and/or enhance these species and their habitats.

The study area included, at a minimum, the area within one mile of the normal high water line of: 1) all reservoirs; and 2) the mainstem of the all project stream reaches as identified by the Aquatic TWG.

The study plan stipulated that the study area may be extended farther upstream for (a) perennial streams and (b) 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 mainstem of the river.

2.2 Water Year Type

The information in this subsection is provided for informational purposes, as requested by agencies. The derivation of water year types is described in the *Water Quality Technical Report*. Table 2.2-1 presents water year types applied to months for the period when amphibian and

aquatic reptile field work was conducted: 2002, 2003, and 2004. Additional water year types for 2001 are provided for comparison.

Table 2.2-1. Water year types applied to individual months of years 2001-2004.*

Year	Jan	Feb	Mar	Apr	May	June	July	Aug	Sep	Oct	Nov	Dec
2001	AN	D	D	D	D	D	D	D	D	D	D	D
2002	D	BN	BN	BN	BN	BN	BN	BN	BN	BN	BN	BN
2003	BN	BN	BN	D	BN	BN	BN	BN	BN	BN	BN	BN
2004	BN	BN	BN	BN	BN	BN	BN	BN	BN	-	-	-

*AN=Above normal water year, D=Dry water year, BN=Below normal water year.

2.3 Agency Requested Information

In a letter dated December 17, 2003 to the Licensees, the agencies requested that the Licensees provide the following information with regard to amphibians and aquatic reptiles:

- A minimum of two years of data and review to determine if three years of data is needed;
- Site maps including GPS coordinates;
- Species by sample location;
- Age class distribution by site; and
- Habitat characterization.

Note that this report does not address whether there is a need for another year of study; this determination will be made by the Aquatic TWG.

3.0 METHODS

The methods used were in conformance with the Amphibians and Aquatic Reptiles Study Plan. The fieldwork was completed in 2002 through 2004. The study was divided into four phases:

- Phase I involved collecting species-specific information on habitat criteria and review of existing information on species occurrence;
- Phase II involved collecting habitat data and selecting VES sites;
- Phase III involved collecting VES field data; and
- Phase IV involved analyzing the results of the first three phases.

Each phase is described below.

3.1 Phase I - Compile and Review Existing Information

Existing information compiled in the UARP Initial Information Package (IIP) was reviewed to assess the project area and to identify information gaps (SMUD 2001). Because much of the data collected for the IIP was one to two years out of date, follow-up discussions were conducted with resource agencies, including the U.S. Forest Service (USFS; Jann Williams); California Department of Fish and Game (CDFG; Stafford Lehr); biologists from Pacific Gas and Electric

Company, Technical Ecological Services (Alicia Pool); ECORP Consulting (Craig Seltenrich); and other recognized amphibian experts (Amy Lind, Roland Knapp, Sarah Kupferberg, and Vance Vredenberg) about habitat suitability and range, survey timing, and species life history. Published reports of habitat associations of target species were reviewed and the Forest Service Access database of amphibian sightings from past surveys in the vicinity of the projects was queried. GPS coordinates obtained from this database were mapped and habitat characteristics were obtained from the surveying biologist when possible. CDFG's California Natural Diversity Database (CNDDB) was also queried for sightings of target species.

3.2 Phase II - Identify Potential Habitat and Select Sampling Sites

3.2.1 Identification of Potential Habitat

Locations were identified within the study area where potential habitat for mountain yellow-legged frog (MYLF), foothill yellow-legged frog (FYLF), and California red-legged frog (CRLF) might occur, using USGS maps, aerial photographs, and other available information (e.g., known locations of target species, observations of field crews targeting other resources, and USFS and CDFG wildlife biologist observations). Tributaries and water bodies that occurred within the 1-mile zone of a study reach or facility were considered. A total of 13 reaches were analyzed. Reaches were grouped into elevational categories based on known distributional range of the target species (Table 3.2-1).

Of the 13 reaches, seven were categorized as "upper elevation" reaches, five were categorized as "lower elevation" reaches, and the Reach Downstream of Chili Bar was treated separately. MYLF are generally found at elevations of approximately 4,500 feet to over 12,000 feet. FYLF are generally found at sea level to elevations up to 6,000 feet (Stebbins 1985, 2003), but 5,000 feet is generally considered the current upper elevation limit for the species in the Sierra Nevada (Seltenrich and Pool 2002). CRLF can be found at elevations from sea level to 5,000 feet (Jennings and Hayes 1985), although historically CRLF were found at higher elevations (Stebbins 1985). Western pond turtles are found from sea level to about 6,000 feet.

Table 3.2-1. Special-status amphibian and aquatic reptile species with the potential to occur in the study area that may be impacted by activities of the projects.

Common Name	Scientific Name	Status[1]	Elevation Range
Mountain yellow-legged frog	*Rana muscosa*	FC, CSC, CP, FSS	Above 4,500 feet
Foothill yellow-legged frog	*Rana boylii*	FSC, CSC, CP, FSS	Below 6,000 feet
California red-legged frog	*Rana aurora draytonii*	FT, CSC, CP	Below 5,000 feet
Western pond turtle	*Clemmys marmorata*	FSC, FSS, CSC, CP	Below 6,000 feet

[1] 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

The survey sites ranged from an elevation of approximately 6,500 feet at Rubicon Reservoir to 522 feet at the confluence of Weber Creek and the South Fork American River. The split for lower and upper elevations was at approximately 5,000 feet, following the general elevational

boundary between MYLF and FYLF; sites within 4,500–6,000 feet elevation were considered potentially suitable for both species. For the UARP, sites above Union Valley Reservoir were considered upper elevation sites. Sites including and below Union Valley Reservoir and above Chili Bar Dam were considered lower elevation sites. The Reach Downstream of Chili Bar is discussed separately.

Aerial photographs of the study area taken by the USFS in 1996 and 2000 at a scale of 1:15,840 were reviewed to locate open areas, backwater, side channel, and pool habitats, and suitable vegetation conditions for potentially suitable amphibian and aquatic reptile habitat. Existing helicopter video footage was also used to provide information about the general aquatic habitats. For example, marsh-like and meadow habitats adjacent to water bodies in high elevations were targeted for upper elevation sites and potential MYLF habitat, and confluences of major tributaries within study reaches were targeted for potential FYLF habitat. Large, deep backwater pool areas with vegetation were targeted for CRLF and western pond turtle habitat. Although these types of habitats were targeted for further study, identified locations were not limited to these types of habitats. During this phase, all potential habitat sites were given an alphanumeric designation and denoted on U.S. Geological Survey (USGS) topographic maps.

Because FYLF adults are known to use tributaries during the summer and winter, and because CRLF often occur in tributaries rather than in large mainstem rivers, a coarse-level gradient analysis was conducted for major tributary drainages within the study area at 5,000 feet elevation or lower. FYLF typically prefer low to moderate gradient streams (0 to 4 percent), although adults may inhabit streams with higher gradients (Seltenrich and Pool 2002). CRLF adults are also typically associated with low gradient streams (Hayes and Jennings 1988). Tributaries that demonstrated gradients less than 10 percent through a coarse topographic mapping calculation were considered higher priority, and were further evaluated during on-the-ground and helicopter reconnaissance.

3.2.2 Selection of VES Sites

Field reconnaissance was conducted (utilizing helicopter and on-the-ground methods) to locate and assess potential sites within the study area. Based on those visits, the initial evaluation of site habitat quality from aerial photographs and videography was confirmed or modified.

3.2.2.1 Sites Within the UARP

Helicopter flyover photos and video footage of the study area were used to confirm or reject potential sites located in difficult to access and high elevation sites. Ground visits during low flow (six days in duration) were conducted to finalize selection of potentially suitable habitats, ascertain accessibility, and "ground-truth" observations made from photographs, maps, and the helicopter flight. Preliminary habitat assessments were conducted at 51 potential study sites in 2002. This included reservoir margins, study reaches, tributaries to study reaches (up to one mile), and off-channel water bodies (including ponds, stock ponds, etc.) within one mile of the study reach. In addition to taking numerous photographs and logging the position on a topographic map, the following habitat attributes were summarized for each site:

- habitat type (main channel stream/side channel/tributary/ backwater, etc.);
- flow regime (perennial/ephemeral);
- vegetation (aquatic/terrestrial/upslope);
- gradient (bank/channel);
- channel substrate (bedrock/boulder/cobble/gravel/sand);
- stream channel complexity/characteristics; and
- suitability for target species.

Each of the potential study sites were classified into high, moderate, and low suitability categories for each of the target species based on the preliminary habitat assessments and considering quality of habitat, reach length, diversity of habitat types per reach, and accessibility. If moderate to high quality habitat was not found within a stream reach, sites identified previously as the best low-quality habitat were surveyed. The rationale and factors used for this classification are summarized in Appendix A. After reviewing these observations and consulting with the Aquatic TWG, a total of 41 sites in the UARP were selected for VES in spring and summer 2003 (see Appendix B). Of these, MYLF was the target species at 28 sites, FYLF was the target species at nine sites, MYLF and CRLF were the target species at one site, MYLF and FYLF were both target species at two sites (the sites were located right at the elevational boundary between the two species, and the two species can co-exist), and all three species had the potential to occur at one site. Four off-channel ponds were identified in the Slab Creek Dam Reach on private property. Access was not secured to these ponds and surveys were not conducted there.

Results of the 2003 surveys were presented to the Aquatic TWG in a draft report discussed at an Amphibian Technical Subgroup meeting on March 11, 2004. Based on these discussions, ten additional sites in the UARP were selected for habitat evaluation and presence/absence surveys in 2004. Surveys were conducted in July, to increase the chance of encountering adult and juvenile FYLF in addition to evaluating habitat for both FYLF and CRLF. No habitat suitable for CRLF was found in these additional surveys, so no protocol-level surveys for CRLF were conducted in 2004. Surveys conducted in 2004 focused on the Junction Dam Reach and a tributary draining into Junction Reservoir, as well as the lower two miles of Slab Creek Dam Reach and the lower half of the SF American Reach, based on data gaps as determined by the Aquatic TWG and SMUD.

3.2.2.2 Sites Within the Reach Downstream of Chili Bar

Because much of the Reach Downstream of Chili Bar is private property, ground access was difficult, and preliminary habitat assessments were conducted from helicopter, with frequent stops or close-up views of the terrain when necessary and possible. This included the mainstem, tributaries to the mainstem (up to one mile), and off-channel water bodies (including ponds, stock ponds, etc.) within one mile of the reach. Preliminary habitat assessments were conducted at 21 potential study sites during low flow (approximately 200 cfs). Similar to the UARP reconnaissance, photographs were taken and GPS positions were recorded at each site, as well as data on the habitat attributes listed above. Ground visits (1.5 days in duration) were conducted for closer observations in selected areas and to ascertain accessibility for each site.

As with the UARP study area, each of the potential study sites were classified into high, moderate, and low suitability categories for each of the target species based on the preliminary habitat assessments and considering quality of habitat, position along the reach, diversity of habitat types within the reach, and accessibility. If moderate to high quality habitat was not found within a stream reach, sites identified previously as the best low-quality habitat were surveyed. Several off-channel ponds were identified in the Reach Downstream of Chili Bar on private property. Access was secured to one set of ponds and surveys were conducted there. After reviewing observations from the reconnaissance and consulting with the Aquatic TWG, a total of three sites were selected for CRLF surveys, nine sites for FYLF surveys, and two sites for combined CRLF and FYLF surveys. Mainstem sites were reassessed during the first VES under high flow conditions (1,200 cfs) to ensure that suitable habitat was available. If suitable habitat was not available at high flows (i.e., no new areas became inundated), and/or suitable habitats at low flows became inundated to the point of being unsuitable (i.e., high flows increased the depth and velocity of suitable habitats assessed under low flow conditions), then the site was not revisited for VES.

Results of the 2003 amphibian surveys were summarized in a draft report in early 2004. The findings were subsequently presented to the Aquatic TWG at an Amphibian Technical Subgroup meeting on March 11, 2004. Based on discussions at this meeting, seven tributaries in the Reach Downstream of Chili Bar were selected for habitat assessments and VES in 2004. These large tributaries were not surveyed in 2003 and were identified as data gaps by the Aquatic TWG and Licensees. Habitat assessments and VES for the target species were conducted in July to increase the chance of encountering individuals. No habitat suitable for CRLF was found during habitat assessments conducted at the seven additional tributaries. As a result, no protocol-level surveys were conducted for CRLF in 2004.

3.2.2.3 Aquatic TWG Confirmation of VES Sites

As outlined in the Amphibians and Aquatic Reptiles Study Plan, preliminary findings and recommended VES sites were presented to the Aquatic TWG on February 6, 2003 (Appendix A). Several additional sites were requested by the TWG at this meeting. A final list of sites to be visited were discussed and agreed upon at a follow-up meeting on March 21, 2003 with Stafford Lehr (CDFG) and Jann Williams (USFS). As described above, several additional sites were also added in 2004. A final list of all sites where VES were conducted (whether repeat site visits, as in 2003, or single visits, as in 2004) are listed in Table 3.2-2. Site maps and photographs are provided in Appendix B on CD-ROM.

Table 3.2-2. VES sites for the UARP area and the Reach Downstream of Chili Bar.

Site Code[1]	Project Reach	Stream	Site Description	Target Species[2]	Length (meters)	Width (meters)	UTM (NAD 27)[3]	
							Easting	Northing
UPPER AMERICAN RIVER PROJECT AREA - UPPER ELEVATION SITES								
RR	Rubicon Dam	-	Rubicon Reservoir margin	MYLF	4.6 km	10	0740317	4319103
RR-3		Rubicon River	Downstream of Rubicon Springs	MYLF	200	20	0739641	4321217
RR-4			Upstream of Rubicon Springs	MYLF	130	15	0739120	4321411
Fox		-	Fox Lake margin	MYLF	643	10	0740101	4319686
RBR	Rockbound Dam	-	Rockbound Reservoir margin	MYLF	4.8 km	10	0739466	4319546
RBP-1		-	Rockbound Pond 1	MYLF	128	5	0738426	4320151
RBP-2		-	Rockbound Pond 2	MYLF	128	5	0738490	4320042
RBP-3		-	Rockbound Pond 3	MYLF	209	5	0738381	4319945
RL-1		Highland Creek	Highland Creek downstream of Rockbound Dam	MYLF	434	5	0738549	4320317
BI-3	Buck Island Dam	Little Rubicon River	Downstream of Buck Island Dam	MYLF	106	10	0737433	4321202
BIR		-	Buck Island Reservoir margin	MYLF	3.4 km	10	0737929	4320366
LL-P9	Loon Lake Dam	-	Loon Lake Pond 9	MYLF	692	10	0733910	4319212
LL-P10		-	Loon Lake Pond 10	MYLF	354	10	0733655	4318114
LL-P11		-	Loon Lake Pond 11	MYLF	161	10	0733308	4317952
LL-P12		-	Loon Lake Pond 12	MYLF	274	10	0733088	4317969
LL-2		-	Loon Lake at Toad Cove	MYLF	120	60	0733640	4320958
LL-4A		Ellis Creek	Ellis Creek at confluence with Loon Lake	MYLF	80	10	0733343	4322109
LL-4B			Ellis Creek	MYLF	595	10	0733305	4322508
LL-8		Gerle Creek	Gerle Creek downstream of waterfall	MYLF	50	15	0729506	4321451
LL-10			Gerle Creek at Gerle Meadows	MYLF	116	20	0726493	4320936
LL-11A		Unnamed tributary	Loon Lake reservoir margin	MYLF	50	5	0733298	4321773
LL-11B			Small tributary to Loon Lake	MYLF	257	2	0733298	4321773
GC-6	Robbs Peak Dam	SF Rubicon River	SF Rubicon upstream of Gerle Creek confluence	MYLF	116	10	0725339	4314466
GC-8		SF Rubicon River	SF Rubicon downstream of Forest Service road 13N29	MYLF, CRLF	111	15	0725271	4314906
J-8	Ice House Dam	SF Silver	SF Silver downstream of Peavine Creek	MYLF	177	15	0728592	4299693

Table 3.2-2. VES sites for the UARP area and the Reach Downstream of Chili Bar.

Site Code[1]	Project Reach	Stream	Site Description	Target Species[2]	Length (meters)	Width (meters)	UTM (NAD 27)[3]	
							Easting	Northing
IH-1			SF Silver upstream of Junction Reservoir	MYLF	300	15	0721414	4303514
IH-3A			SF Silver at burn area	MYLF	297	8	0723655	4298389
IH-3B			SF Silver at burn area	MYLF	140	5	0723659	4298389
UPPER AMERICAN RIVER PROJECT – LOWER ELEVATION SITES								
UV-1	Union Valley Dam	Jones Fork Silver Creek	Jones Fork Silver Creek at Ice House Road	MYLF, FYLF, CRLF	100	10	0727614	4303219
UV-4A		Yellow Jacket Creek	Union Valley Reservoir margin	MYLF, FYLF,	40	2	0726461	4307605
UV-4B			Yellow Jacket Creek at Union Valley Reservoir	MYLF, FYLF	200	3	0726222	4307837
J-11	Junction Dam	Silver Creek	Silver Creek downstream of Junction Dam	FYLF	500	12	0720562	4303453
J-12		Silver Creek	Silver Creek 1 mile downstream of Junction Dam	FYLF	100	35	0719213	4302722
J-13		Grey Horse Creek	Grey Horse Creek upstream of Silver Creek confluence	FYLF	150	7	0718664	4302894
J-14		Unnamed tributary	Unnamed tributary to Silver Creek, approximately 1 mile downstream of Junction Dam	FYLF	60	2	0719637	4302718
J-15		Silver Creek	Silver Creek upstream of Camino Reservoir	FYLF	150	18	0713448	4302459
J-16		Little Silver Creek	Little Silver Creek, approximately 0.5 miles upstream of Junction Reservoir	FYLF	300	5	0720948	4305471
J-17		Little Silver Creek	Little Silver Creek at Junction Reservoir	FYLF	300	7	0720983	4304941
C-3	Camino Dam	Silver Creek	Silver Creek at Tunnel adit	FYLF	99	2	0710268	4298592
SFA-4			Silver Creek at confluence with SF American River	FYLF	130	20	0709356	4298674
SFA-3	SF American	SF American River	SF American River at El Dorado Powerhouse	FYLF	40	2	0706664	4296681
SFA-5		SF American River	SF American River at Camino Powerhouse	FYLF	70	4	0706467	4296723
BC-2	Brush Creek Dam	Brush Creek	Brush Creek downstream of dam	FYLF	39	6	0706302	4298476
SC-2A	Slab Creek Dam	SF American River	SF American River downstream of Slab Creek Dam	FYLF	62	15	0699561	4293956

Table 3.2-2. VES sites for the UARP area and the Reach Downstream of Chili Bar.

Site Code[1]	Project Reach	Stream	Site Description	Target Species[2]	Length (meters)	Width (meters)	UTM (NAD 27)[3]	
							Easting	Northing
SC-2B		Iowa Canyon Creek	Iowa Canyon Creek at confluence with SF American River	FYLF	225	8	0699516	4293916
SC-4		SF American River	SF American River at White Rock Powerhouse	FYLF	180	25	0692481	4292961
SC-6A		SF American River	SF American River at Rock Creek Confluence	FYLF	100	15	0692961	4295015
SC-6B		SF American River	SF American River at Rock Creek Confluence	FYLF	45	20	0692919	4295113
SC-7		SF American River	SF American River upstream of White Rock Powerhouse	FYLF	2000	10	0692442	4292954
SC-8		SF American River	SF American River 1 mile downstream of Rock Creek	FYLF	200	25	0692962	4294107
REACH DOWNSTREAM OF CHILI BAR								
CB-2	Reach Downstream of Chili Bar	Weber Creek	Weber Creek at SF American River	CRLF	1.2 km	20	0673562	4292196
CB-4.1		Stock Pond	Larger stock pond, A	CRLF	80	20	0680568	4296893
CB-4.2		Stock Pond	Smaller stock pond, B	CRLF	40	20	0680567	4297028
CB-5		SF American River	SF American River at hook gravel bar	FYLF	40	30	0676195	4297218
CB-7A		SF American River	SF American River at Hastings Creek	FYLF	15	3	0676931	4298611
CB-7B		Hastings Creek	Hastings Creek to H-49 Bridge	FYLF, CRLF	160	10	0676839	4298994
CB-8A		SF American River	SF American River at Greenwood Creek	FYLF	25	12	0678348	4299310
CB-8B		Greenwood Creek	Greenwood Creek to H-49 Bridge	FYLF, CRLF	250	10	0678368	4299608
CB-12	Reach Downstream of Chili Bar	SF American River	SF American River near Gorilla Rock	FYLF	32	15	0680539	4297612

Table 3.2-2. VES sites for the UARP area and the Reach Downstream of Chili Bar.

Site Code[1]	Project Reach	Stream	Site Description	Target Species[2]	Length (meters)	Width (meters)	UTM (NAD 27)[3]	
							Easting	Northing
CB-14		SF American River	SF American River at Camp Lotus	FYLF	210	15	0680610	4297477
CB-15		SF American River	SF American River at Scott Road	FYLF	197	15	0682588	4297977
CB-16A		SF American River	SF American River at confluence with Dutch Creek	FYLF	40	8	0683951	4296587
CB-16B		Dutch Creek	Dutch Creek	FYLF	100	15	0684091	4296637
CB-19/20		SF American River	SF American River at Flume site and unnamed creek	FYLF	60	1	0686830	4293606
CB-22A		SF American River	SF American River at Norton Ravine Creek	FYLF	100	5	0675129	4295650
CB-22B		Norton Ravine Creek	Norton Ravine Creek, upstream of SF American River confluence	FYLF	100	3	0674873	4296046
CB-23		Clark Creek	Clark Creek, upstream of Clark Mountain Road	FYLF	n/a[4]	n/a[4]	0678164	4297930
CB-24		Jacobs Creek	Jacobs Creek, at Bassi Road crossing	FYLF	1	3	0678735	4297289
CB-25		Shingle Creek	Shingle Creek, upstream of Lotus Road	FYLF	60	1	0681786	4296609
CB-26		Granite Canyon Creek	Granite Canyon Creek, to Granite Canyon Road	FYLF	40	2	0681149	4295513
CB-27		Indian Creek	Indian Creek, to approximately 1 mile upstream from SF American River	FYLF	1500[5]	3	0681802	4299645
CB-28		Big Canyon Creek	Big Canyon Creek, at confluence with SF American River	FYLF	n/a[6]	1	0689259	4292991

[1] Site codes do not correspond directly to the reach name (e.g., not all "J" numbers are in the Junction Dam Reach)

[2] MYLF=Mountain yellow-legged frog, FYLF=Foothill yellow-legged frog, CRLF=California red-legged frog

[3] UTM coordinates for stream sites are the upstream most point of survey, and for reservoirs/ponds are the starting point of the perimeter survey.

[4] Clark Creek was dry during survey, and thus no length or width measurements are provided.

[5] Because of restricted access to Indian Creek, the length of creek surveyed was not continuous.

[6] Due to heavy vegetation cover, Big Canyon Creek could not be accessed and surveyed; thus no length is provided.

3.3 Phase III - Conduct Visual Encounter Surveys (VES)

VES at the selected sites for MYLF and FYLF were conducted following the survey methodologies and protocols listed below. VES for CRLF followed USFWS (1997) protocols. VES surveys for western pond turtle were incorporated into surveys for FYLF and CRLF. During the surveys, incidental observations of other amphibians and aquatic reptiles were recorded.

During each site visit, standardized VES data sheets were completed. Blank datasheets are shown in Appendix C. After completing the initial VES, a detailed site habitat assessment was conducted at each study site, including a characterization of:

- upstream and downstream site boundary
- habitat type (e.g., lateral and point bars, boulder/sedge margins, isolated pools, islands, and braided river sections)
- length and width of habitat
- water depth
- temperature
- average water velocity
- aquatic substrate type
- type and percentage of aquatic and terrestrial cover, aquatic and terrestrial vegetation, and riparian canopy
- presence and location of tributaries
- bank and stream gradient
- upland vegetation type
- fish, other amphibians, and reptiles observed.

To document representative conditions at the site, one photograph was 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 were taken to document specific habitat features. Photographs were taken during each site visit to document changing flow and riparian shade conditions throughout the summer. The site habitat assessment was not repeated during subsequent surveys at the site unless significant changes in habitat occurred (e.g., significant drop in water levels, or change in habitat quality or extent). Photographs of VES sites are shown in Appendix B.

When special-status amphibians or aquatic reptiles were encountered during surveys, basic measurements of the individuals (e.g., length, sex, age) and microhabitat characteristics (e.g., air and water temperature, flow, water depth, substrate, location in the stream, associated vegetation or cover), and GPS coordinates were measured, estimated, or described and recorded.

Age class distribution and habitat association of amphibians and aquatic reptiles found during VES were tabulated and summarized. All data were entered into an Access database and original data were archived.

3.3.1 Mountain Yellow-Legged Frog

Because of the difficulty in finding MYLF egg masses (as indicated by CDFG, USFS, and species experts), and because MYLF typically overwinter for at least one season, MYLF surveys focused on tadpoles and adults. As a result, only mid-season surveys were conducted for this species. All sites were visited at least once, and higher quality habitats were visited a second time to confirm or refine findings of the first visit. The initial survey served two purposes: to designate moderate-to-high quality habitat along the lake and reservoir margins, and to complete VES around the entire shoreline. The second visit was used to revisit the segments of higher quality habitat for a second VES. All of the upper elevation sites were surveyed for MYLF to determine presence/absence and possible breeding areas. MYLF surveys were split into two types: stream surveys using the methods outlined in PG&E (2001), Crump and Scott (1994) and Thoms et al. (1997), and lake/reservoir surveys using the methods outlined in PG&E (2001) and CDFG (2001).

Stream surveys were conducted with two biologists working in tandem on each bank of the stream. Biologists would scan the stream up ahead to look for adults basking, and then slowly make their way upstream, looking for tadpoles and metamorphs along the way. For reservoirs and ponds, surveys were conducted on foot along the reservoir shoreline where suitable habitat occurred.

For all lakes and ponds surveyed, additional CDFG (2001) datasheets (recommended by Stafford Lehr of CDFG) were used. The datasheets provided a standardized approach to upper elevation lake and pond MYLF surveys. Supplementary data were collected on lake and pond inlets and outlets, littoral zone substrate, shoreline terrestrial substrate, and presence or absence of chytridiomycosis. Chytrid fungi can be common in the soil, and until recently had never been known to infect amphibians. During the past five years, however, declines and even extinctions of several amphibian species in Australia and Central America have been linked to outbreaks of a chytrid fungus (Berger et al. 1998). Even more recently, chytrid fungi have been found infecting amphibians in the Sierra Nevada, including MYLF. Some sections of the CDFG datasheet that were not relevant to the relicensing were not utilized and project-specific datasheets (containing habitat information outlined above) were completed in conjunction with the CDFG datasheets (Appendix C).

3.3.2 Foothill Yellow-Legged Frog

Up to four VES were conducted at each site targeting FYLF for sites visited in 2003. The first two surveys were conducted to locate breeding and oviposition sites. If egg masses were not observed during the initial site visit, a second site visit was made two to four weeks later. Two additional surveys, spaced approximately four to six weeks apart, were conducted for tadpoles, and then for post-metamorphic sub-adults, juveniles, and adults. As outlined in the study plan, if target species were not observed by the second or third site visit, subsequent visits were not made. In the Reach Downstream of Chili Bar, of the nine mainstem sites visited, several were visited only once or twice. Due to regular, significant flow fluctuations in this reach, sites of

moderate-to-high quality habitat that were identified at low flows were determined to be unsuitable at higher flows, and therefore were not re-visited.

As discussed above, surveys in 2004 were conducted mid-summer to increase the likelihood of encountering adults and/or tadpoles while evaluating the suitability of the habitat. Only one site visit was conducted at each of the additional sites identified for study in 2004.

VES for FYLF involved two biologists surveying in tandem. Each biologist scanned ahead to look for post-metamorphs, then surveyed for egg masses and/or tadpoles in the water. When possible, surveys began at the downstream end of the site and continued upstream, with each biologist along one bank until reaching the upstream end of the site. The protocols and datasheets outlined in Seltenrich and Pool (2002) were used for the surveys. Lind's (1997) protocol was incorporated into the study methods for adults, egg masses, and larvae in spring to early summer, and Crump and Scott's (1994) protocol was incorporated into study methods for post-metamorphs in mid-summer to early fall.

The timing of FYLF breeding surveys was determined using a combination of local environmental factors (e.g., weather, air and water temperature, peak flows/descending flows, and consultation with known experts), as well as preliminary survey results from similar studies recently conducted in other Sierran river systems (e.g., Mokelumne, Tuolumne, Feather, and Stanislaus rivers).

3.3.3 California Red-Legged Frog

USFWS (1997) protocols for CRLF surveys were used for post-metamorphs in summer through fall. VES were focused on searching for juveniles and adults only; no egg mass or tadpole surveys were conducted, as specified by the USFWS survey protocol. CRLF survey protocols required two day and two night surveys for each site. If applicable, day surveys for CRLF were combined with VES for MYLF or FYLF. During night surveys, a headlamp or flashlight was used to look for amphibian "eye-shine." If one crew member spotted an amphibian, the other crew member would approach and attempt to identify the individual to species. When possible, both biologists would walk in the stream or pond and each scan a respective riverbank.

3.3.4 Western Pond Turtle

As described in Section 3.3, no specific VES for western pond turtle were conducted. However, habitats associated with western pond turtle were encompassed in surveys for FYLF and CRLF.

4.0 RESULTS

4.1 Historical Information

Historical information in this section was derived from review of the USFS database for El Dorado NF and the CNDDB. The database queries were performed prior to conducting 2003 VES.

4.1.1 Mountain Yellow-Legged Frog

Multiple sightings of MYLF at upper elevation lakes in the Lake Aloha area of Desolation Wilderness were recorded by CDFG and USFS (USFS, unpublished data). They are found throughout the region, including the outlet stream of Highland Lake, Lake McConnell, and Lake Lois (approximately 8,300 feet) (USFS, unpublished data) (Figure 4.1-1). Several stream populations also occur in the vicinity of the study area, including on Bassi Fork Silver Creek, Rubicon River, and Lyons Creek (USFS, unpublished data). All these rivers and creeks occur at elevations over 7,000 feet. Several individuals have also been found on the Silver Fork American River south of Highway 50 near Kyburz (USFS, unpublished data); these data are summarized in Table 4.1-1. No MYLF have been historically recorded in reaches or reservoirs associated with the projects.

Table 4.1-1. Historical sightings of mountain yellow-legged frog in the UARP vicinity.

No. of Individuals Observed per Life History Stage	Year	Location Description[1]
Within 5 Miles of a Project Reach		
2 adults	1997	Approx. 0.25 mi east of McKinstry Lake
30 larvae, 13 adults	1997	Approx. 0.75 mi north of Highland Lake
1 adult	1997	0.7 mi north of Highland Lake
1 larvae, 3 adults	1995	Highland Lake
10 larvae	1993	Highland Lake
3 larvae, 1 adult	1993	Highland Lake
8 larvae	1993	0.2 mi NE of Highland Lake
11 larvae, 4 adults	2003	Lake Zitella
1 adult	1993	Lake Zitella
1 larvae	1995	McConnell Lake
1 adult	1993	0.20 mi SE of McConnell Lake
21 larvae	1995	0.2 mi SE of McConnell Lake
1 adult	1993	Approx. halfway between McConnell and Leland Lakes
1 adult	1993	Approx. halfway between McConnell and Leland Lakes
1 adult	1993	0.4 mi south of McConnell Lake
1 adult	1995	Lake Lois
2 adults	1993	Lake no. 9
22 adults	1993	Lake no. 9
228 larvae, 18 adults	2003	Lost Lake
16 larvae, 1 adult	1993	Lake Doris
16 larvae. 1 adult	1993	Lake Doris
12 larvae	1993	Lake Doris
35 larvae, 26 adults	1993	0.2 mi south of Lake Doris
1 adult	1993	Rubicon River, approx. 2.5 mi north of Clyde Lake
1 adult	1992	0.2 mi SE of Bassi Fork, approx. 5 mi upstream of Union Valley Reservoir
1 adult	1992	Bassi Fork of Silver Creek, approx. 3.4 mi upstream of Union Valley Reservoir

[1] Locations were obtained from the Forest Service database (USFS, unpublished data)

4.1.2 Foothill Yellow-Legged Frog

FYLF have been documented along the SF American River both upstream of the UARP and within the UARP reaches (SF American River Reach) (USFS, unpublished data; S. Hoover, ECORP Inc., pers. comm., 2003) (Figures 4.1-2a and 4.1-2b). Historical sightings along the mainstem SF American River extend as far upstream as Riverton, and downstream to Slab Creek Reservoir. Sightings are summarized in Table 4.1-2.

Table 4.1-2. Historical sightings of foothill yellow-legged frog in the UARP and Chili Bar Project vicinity.

No. of Individuals Observed per Life History Stage	Year	Location Description[1]
Within a Project Reach		
12 larvae	2003	SF American River, 0.1 miles upstream of confluence with Silver Creek
5 larvae	2003	SF American River, 0.1 mi upstream of confluence with Silver Creek
6 larvae, 2 adults, 1 juvenile	2002	Silver Creek, approx. 0.2 miles upstream of confluence with SF American River
100 larvae	2002	SF American River, approx. 0.6 mi downstream of Silver Creek confluence
4 juveniles	2002	SF American River, approx. 0.8 mi downstream of Silver Creek confluence
3 adults, 1 juvenile	2002	SF American River, approx. 2 mi downstream of Silver Creek confluence
1 juvenile	1994	SF American River, approx. 0.4 mi upstream of Slab Creek Reservoir
Within 5 Miles of a Project Reach		
10 adults, 6 juveniles	2002	SF American River, approx. 1.2 mi upstream of Silver Creek confluence
12 larvae, 3 adults, 1 juvenile	2002	Soldier Creek, approx. 0.3 mi upstream of SF American River confluence
1 adult	2002	Grays Canyon Creek, at SF American River confluence
2 larvae, 1 adult	2002	SF American River, at Grays Canyon Creek confluence
1 adult	1996	Soldier Creek, approx. 2.9 mi upstream of SF American River confluence

[1] Locations were obtained from the Forest Service database (USFS, unpublished data)

4.1.3 California Red-Legged Frog

CRLF have been found in the vicinity of the study area at lower elevations (USFS, unpublished data) (Figure 4.1-3). No CRLF have historically been documented in reaches or reservoirs associated with the projects. Table 4.1-3 summarizes occurrences within 20 miles of the study area.

Table 4.1-3. Historical sightings of California red-legged frog in the UARP and Chili Bar Project vicinity.		
No. of Individuals Observed per Life History Stage	**Year**	**Location Description[1]**
Within 5 Miles of a Project Reach		
3 egg masses, 1 larvae, and 6 adults	1997-2003	Spivey Pond, 1 mile southwest of Pollock Pines
1 adult		Traverse Creek
		Big Canyon Creek
1 adult	1975	S. Fork Weber Creek, 2.3 miles south of Camino
1 adult	1975	N. Fork Weber Creek, 1.3 miles south of Camino
2 adults	1996	N. Fork Weber Creek, 1 miles southeast of Camino
4 adults	1957	Weber Creek, 1.5 miles southwest of Placerville
3 adults	1935	just north of New Weber Ditch, <1 mile southeast of Placerville
Within 20 Miles of a Project Reach		
1 adult	2001	<1 mile from the Rubicon River, 9 miles east of Foresthill
1 adult	1996	Headwaters of Skunk Canyon, 4 miles northeast of Foresthill
6 adults	1974	Misery Creek, 3 miles northeast of Pioneer
3 adults	1942	Big Indian Creek in Enterprise

[1] Locations were obtained from the Forest Service database (USFS, unpublished data)

4.1.4 Western Pond Turtle

Western pond turtles have been observed in many of the same areas as CRLF (USFS, unpublished data). Although no western pond turtles have historically been recorded in the UARP reaches or reservoirs, they have been observed on NF Weber Creek near Camino, around Jenkinson Lake (south of Pollock Pines), Rock and Bear creeks (tributaries to SF American River in the Slab Creek Dam Reach), as well as Silver Fork American River (Figure 4.1-4). Historical sightings are summarized in Table 4.1-4.

Table 4.1-4. Historical sightings of western pond turtle in the UARP and Chili Bar Project vicinity.		
No. of Individuals Observed per Life History Stage	**Year**	**Location Description[1]**
Within a Project Reach		
1 adult	2003	SF American, approx. 1.7 mi upstream of Chili Bar Reservoir
1 adult	2003	SF American, 0.1 mi south of American River Powerhouse
Within 5 Miles of a Project Reach		
1 adult	1996	Rock Creek, 0.5 mi upstream from confluence with One Eye Creek
3 adults	1995	Harricks Revine, approx. 1.2 mi upstream from Rock Creek confluence
1 adult	1994	Bear Creek, approx. 2.3 mi upstream from Rock Creek confluence
1 adult	1997	NF Weber Creek, approx. 3.5 mi upstream of Weber Reservoir
1 adult	1995	NF Weber Creek, approx. 0.5 mi upstream from Weber Reservoir

[1] Locations were obtained from the Forest Service database (USFS, unpublished data)

4.2 Habitat Description and VES Results

4.2.1 Upper Elevation Sites

Seven of the 13 reaches were included in the upper elevation sites. The seven reaches include Rubicon Dam Reach, Rockbound Dam Reach, Buck Island Dam Reach, Loon Lake Dam Reach, Gerle Creek Dam Reach, Robbs Peak Dam Reach, and Ice House Dam Reach.

4.2.1.1 Habitat Description

Physical habitat characteristics for upper elevation sites are summarized in Table 4.2-1 and additional habitat data are provided in Appendix D for reference. Some sites were surveyed only once due to unsuitable habitat characteristics found during the first VES. For example, four ponds southwest of Loon Lake Reservoir were to be surveyed (LL-P9, LL-P10, LL-P11, LL-P12), but on an initial helicopter flyover, two of the four were noted as completely dry.

Table 4.2-1. Habitat characteristics of upper elevation VES sites in the UARP area.

Site code and description	Number of site visits	Original suitability rating [1]	Stream/pond and substrate characteristics	Vegetation characteristics	Other comments
RR: Rubicon Reservoir	2	N/A	Largely bedrock and boulder margin with a silt and bedrock substrate	Mostly grasses and LWD on shoreline	Large meadow/grass areas towards southern end of lake
RR-3: Rubicon River upstream of Rubicon Springs	2	High	River habitat was predominantly pool with some low gradient riffle and run/glide. Substrate was mostly sand with some smaller amounts of gravel as well as cobble and silt	Margin vegetation was present in the entire reach and was largely sedges and grasses. Small amounts of emergent and submergent vegetation were present but not dominant	Part of habitat segment 24, several small tributaries on right bank, small point and lateral bars. Crayfish, salmonids and cyprinids present. Moderate recreational effects due to the proximity of the Jeep trail
RR-4: Rubicon River downstream of Rubicon Springs	2	High	Mostly run/glide and pool, but also contained some low-gradient riffle. Substrate at the site was mostly gravel but also contained a fair percentage of sand with small amounts of silt and cobble	Margin vegetation was present in nearly the entire segment and was predominantly grasses and sedges	VES area includes part of habitat segment 66, side channels and wetlands adjacent to the segment appeared to receive ample use by beavers in the area. A well-maintained beaver dam found on the second visit to the site inundated much of the amphibian habitat. Effects of recreation were low despite the proximity of the Jeep trail
Fox: Fox Lake	1	N/A	Mainly bedrock and boulder substrate was nearly all silt	Abundant aquatic vegetation, high amount of algae, pond lilies	Shallow pond, several backwater pond areas adjacent to lake
RBR: Rockbound Reservoir	2	High	Mainly bedrock and boulder margin, substrate was primarily silt	Some aquatic vegetation (mostly algae) grasses and sedges	Large meadow area on southern end of lake at inlet
RBP-1: Pond 1 near Rockbound	1	N/A	Very shallow (<1 m) pond, all silt	Abundant aquatic vegetation, grasses and algae	Abundant aquatic macro-invertebrates
RBP-2: Pond 2 near Rockbound	1	N/A	Very shallow (<1 m) pond, all silt	Abundant aquatic vegetation, grasses and algae	Abundant aquatic macro-invertebrates
RBP-3: Pond 3 near Rockbound	1	N/A	Very shallow (<1 m) pond, all silt	Abundant aquatic vegetation, grasses and algae	Abundant aquatic macro-invertebrates, some pacific tree frog larvae observed

Table 4.2-1. Habitat characteristics of upper elevation VES sites in the UARP area.

Site code and description	Number of site visits	Original suitability rating [1]	Stream/pond and substrate characteristics	Vegetation characteristics	Other comments
RL-1: Highland Creek	1	High	Boulder, bedrock with some cobble, gravel and sand	Some riparian canopy, grasses and small shrubs	Highland Creek is very short (<0.25 miles long)
BIR: Buck Island Reservoir	2	High	A large amount of silt and bedrock, some boulder and cobble	A large amount of grass and forbs, ample aquatic vegetation (algae, grasses)	Margin is largely boulder/bedrock and silt substrate, moderate to high amount of aquatic vegetation
BI-3: Little Rubicon River downstream of dam	2	High	Bedrock pools and small amounts of run/glide and low-gradient riffle. Substrate was mostly sand and silt, with some gravel, cobble, boulder, and bedrock	Margin vegetation was present in nearly all of the reach and was predominantly grasses. Large amount of terrestrial cover (woody debris)	Effects of recreation were moderate due to nearby campgrounds and the Jeepers trail crossing the Little Rubicon just upstream of the site
LL-2: Loon Lake Reservoir at Toad Cove	2	High	Boulder and cobble, bedrock was present as well. Substrate was mostly silt and sand	Aquatic vegetation was abundant, mainly grasses/forbs and algae	Several ponds in area, all exhibited similar habitat characteristics
LL-4A: Loon Lake Reservoir	1	High	Reservoir margin predominantly silt and sand with boulder and bedrock along margins	The reservoir margin contained no vegetation and had a relatively high bank gradient	Habitat was not suitable for MYLF
LL-4B: Ellis Creek at Loon Lake Reservoir	1	High	Tributary substrate primarily silt and sand with some boulder and cobble through meadow complex at mouth. Water depth is relatively shallow. Bank gradient is high. Further upstream, channel narrows, substrate increases in particle size with more cobble and boulder	Some emergent vegetation through meadow complex and in channel, but little or no overhead cover at mouth. Further upstream some LWD deposits and overhanging vegetation	Tributary is much higher during spring/early summer period. Meadow was mostly dry and devoid of moisture during survey in September
LL-8: Gerle Creek below cascade	2	High	Predominantly bedrock pool with some low-gradient riffle present in the downstream end of the segment	Margin vegetation was present in half of the segment and was largely grasses. Large amounts of algae were present throughout the segment	Other significant habitat features included a split channel in the downstream end of the segment and a moderately steep bank gradient on the right bank

Table 4.2-1. Habitat characteristics of upper elevation VES sites in the UARP area.

Site code and description	Number of site visits	Original suitability rating [1]	Stream/pond and substrate characteristics	Vegetation characteristics	Other comments
LL-10: Gerle Creek at Gerle Meadow	2	High	Predominantly pool with a small amount of low-gradient riffle. Substrate was mainly sand with some boulder, bedrock, cobble, and silt. Embeddedness was high in this segment	Margin vegetation was mainly alder trees, which also created a large amount of the riparian canopy and overhanging vegetation	Some recreational use in this area; a campground and dirt roads are located nearby
LL-11A: Loon Lake Reservoir	1	N/A	Reservoir margin was largely silt with fair amounts of bedrock and boulder	The reservoir margin contained no vegetation and had a relatively high bank gradient	The water was deep (>1 m) within 1 m of the shore and did not provide adequate sheltered areas for amphibian activity
LL-11B: Un-named tributary to Loon Lake Reservoir	1	N/A	The creek was not flowing and consisted of pocket water throughout a large meadow/wetland area. The substrate was predominantly silt with small amounts of bedrock and boulder	Margin vegetation was present in the entire segment surveyed and was mainly different grasses	Heavy recreational use in the area was observed; the Jeep trail bisected Ellis Creek in several places
LL-P9: Loon Lake Reservoir Pond	1	N/A	Very shallow (<1m) ponds, substrate was all silt	Ample aquatic, submerged, and emergent vegetation, mostly all grasses/forbs, some algae	Pond was drying up quickly, adjacent ponds (LL-P10, LL-P11) were completely dry
LL-P10: Loon Lake Reservoir Pond	1	N/A	------	------	Pond was dry
LL-P11: Loon Lake Reservoir Pond	1	N/A	------	------	Pond was dry
LL-P12: Loon Lake Reservoir Pond	1	N/A	Very shallow (<1m) ponds, substrate was all silt, some boulder/bedrock in center of pond	Ample aquatic, submerged, and emergent vegetation, mostly all grasses/forbs, some algae	Pond was drying up quickly, adjacent ponds (LL-P10, LL-P11) were completely dry

Table 4.2-1. Habitat characteristics of upper elevation VES sites in the UARP area.

Site code and description	Number of site visits	Original suitability rating [1]	Stream/pond and substrate characteristics	Vegetation characteristics	Other comments
GC-6: SF Rubicon River	2	High	The river habitat was mainly pool with some run/glide and low-gradient riffle. Substrate was mostly silt, sand, and cobble	Margin vegetation in the entire reach and terrestrial cover present in nearly the entire reach, overhanging vegetation	Multiple split channels
GC-8: SF Rubicon River	5 *(3 Day, 2 Night)*	High	Mainly pool with some low-gradient riffle and a minimal amount of run/glide. Substrate was predominantly boulder with some silt, cobble, sand, gravel, and bedrock	Ample margin vegetation and a large amount of aquatic cover and terrestrial cover	Evidence of moderate recreational activity was observed (adjacent camping area and a nearby road)
J-8: SF Silver Creek	2	High	Mainly low-gradient riffle, but also contained run/glide and bedrock pool. Substrate was mostly cobble but contained equal amounts of silt and sand, and small amounts of boulder and bedrock	Margin vegetation was present in most of the reach and was primarily alder and willow trees. Smaller amounts of overhanging vegetation and riparian canopy	Water was particularly cold (max 10º C, min 5º C) at this site, less than 0.5 miles from dam
IH-1: SF Silver	3	High	Low-gradient riffle with some run/glide. Substrate was mostly boulder, bedrock and cobble	Large amounts of terrestrial cover and submerged algal cover were present throughout the site	There were several seeps nearby on the right bank and the banks were quite steep in this segment
IH-3A: SF Silver	3	High	Predominantly low-gradient riffle, with some amounts of run/glide and pool. Substrate was mainly bedrock, cobble, and gravel	Margin vegetation existed in nearly the entire segment and submerged vegetation was dominantly algae	Multiple cobble/boulder islands and side/split. This site was within the 1992 Cleveland Fire burn area, so most of the vegetation was relatively young and there was no riparian canopy
IH-3B: SF Silver	3	High	Mainly low-gradient riffle with a small amount of run/glide. Substrate was mainly cobble with some silt, sand, gravel, and boulder	Margin vegetation was present in the entire reach and consisted mainly of grasses	This site was within the 1992 Cleveland Fire burn area
UV-1: Jones Fork Silver Creek	5 *(3 Day, 2 Night)*	High	Mainly run/glide with some pool. The substrate was primarily sand with some small amounts of gravel	Margin vegetation in a majority of the reach and it consisted of mainly grasses	Several side/split channels, multiple lateral/point sand bars, and a small tributary that entered on the left bank near the top of the site

Table 4.2-1. Habitat characteristics of upper elevation VES sites in the UARP area.

Site code and description	Number of site visits	Original suitability rating [1]	Stream/pond and substrate characteristics	Vegetation characteristics	Other comments
UV-4A: Union Valley Reservoir	3	Moderate to High	Bedrock and boulder on lake margin, largely silt/sand substrate	Little or no margin vegetation present	Bank gradient was relatively steep
UV-4B: Yellow Jacket Creek	3	Moderate to High	Primarily high-gradient riffle with some pool due to small cascades throughout the segment. Substrate was boulder with some smaller amounts of cobble and gravel	Margin vegetation was largely grasses and root wads, riparian canopy and large amount of LWD	Industrial activities were high in this segment due to construction on nearby campgrounds. Tree removal and the diversion of the entire creek has resulted in significant habitat disturbance

[1]Suitability was determined for the target species (see Table 3.2-2) based on the preliminary habitat assessment and determination of suitability. N/A (not applicable) refers to those sites that were added after the initial habitat assessment was completed in 2002.

4.2.1.2 VES Results

Mountain Yellow-Legged Frog

Mountain yellow-legged frogs were not found at any upper elevation sites.

Reservoirs, Lakes, and Ponds: VES were focused on determining presence or absence of larvae, juveniles, and adults. Initial site visits took place in August 2003. A total of 11 reservoirs, lakes, or ponds were visited. Of these, two ponds were dry; the remaining ponds were only surveyed once. The entire perimeter of the three UARP reservoirs (Buck Island Reservoir, Rockbound Lake, and Rubicon Reservoir) was surveyed. Survey time for Buck Island Reservoir and Rubicon Reservoir was approximately four hours each for a two-person crew, while survey time for Rockbound Lake was eight hours for a two-person crew. High quality habitats during the perimeter survey were identified, and then re-surveyed later in the summer, including: five sites on Rubicon Reservoir, two sites on Rockbound Lake, and three sites on Buck Island Reservoir. Basking habitat, emergent vegetation, low-gradient bedrock and boulder margins, and shallow backwater areas provided suitable amphibian habitat. MYLF were not found at any of the sites visited.

Streams and Tributaries: At least one stream site was surveyed for MYLF on each of the upper elevation reaches. Sites with an "A" in the site code (e.g., Site LL-4A) indicated the survey location was along the reservoir margin or along a UARP reach at the confluence with a tributary, and a "B" site indicated the survey location was the tributary itself (Table 4.2-1). Most "B" sites were tributaries or inlets to one of the reservoirs or study reaches. For example, Site LL-4A was a site along the perimeter of Loon Lake Reservoir at the confluence of Ellis Creek, and Site LL-4B was a site on Ellis Creek upstream of Loon Lake Reservoir. Basking habitat, shallow backwater areas, emergent vegetation, undercut banks, and low gradient bank margins provided suitable amphibian habitat. MYLF were not found at any of the sites visited.

Many tributaries were dry at the confluence with a lake/reservoir by late August, and those that were not dry were relatively shallow. Some sites did have deep pool habitats and fish were present at most of these sites. The tributary connecting Rockbound Lake to Buck Island Reservoir (Highland Creek) was flowing at less than 1 cubic foot per second (cfs) and was nearly dry in August.

California Red-Legged Frog

CRLF surveys were conducted at two sites in the upper elevation area, Site GC-8 and Site UV-1. Two day and two night surveys were conducted at each site. Day surveys were incorporated into the FYLF/MYLF VES efforts. Emergent vegetation and shallow backwater areas were present at both sites. CRLF were not found at any of the sites surveyed.

Western Pond Turtle

Sites targeting CRLF included suitable habitat for western pond turtle. In addition, several sites targeting FYLF included habitats suitable for western pond turtle, such as Site IH-3. Although none of these sites had deep pools or associated ponds, the stream habitat contained side channel

or side water habitats with suitable vegetation for this species. No western pond turtle were observed at any of the upper elevation sites.

4.2.1.3 Incidental Observations

Non-target amphibian and aquatic reptile species were observed at many of the sites visited. Pacific tree/chorus frogs (*Hyla/Pseudacris regilla)*, various species of garter snake (*Thamnophis sirtalis, T. elegans, T. couchii, T. c. aquaticus)*, and Western toad (*Bufo boreas*) were observed at one or more of the VES sites (Table 4.2-2). The predominant herpetofauna found were adult garter snake species (20 total adult garter snakes were seen); garter snakes are natural predators of MYLF. Two western toads were documented during the VES; they were observed at Site LL-4B and Site LL-11. Numerous western toads were also documented at Site LL-4A in 2002 while conducting habitat evaluations. Although no bullfrogs were observed above the 5,000 feet elevation range in the UARP, they have been observed at elevations up to 9,000 feet.

Table 4.2-2. Incidental observations of aquatic herpetofauna at upper elevation sites in the UARP area.

Site	Species and number per life stage[1]					
	Tree/chorus frog		Garter snake (*Thamnophis* spp.)		Western toad	
	T	J/A	J	A	T	J/A
RR: Rubicon Reservoir	5	1	1	3	-	-
RR-3: Rubicon River	-	-	-	-	-	-
RR-4: Rubicon River	-	-	-	1	-	-
Fox Lake	-	5	-	-	-	-
RBR: Rockbound Reservoir	2	1	-	-	-	-
RBR-1: Rockbound Pond 1	-	-	-	-	-	-
RBR-2: Rockbound Pond 2	-	-	-	-	-	-
RBR-3: Rockbound Pond 3	5	-	-	-	-	-
BIR: Buck Island Reservoir	-	5	-	-	-	-
LL-2: Loon Lake Reservoir at Toad Cove	-	-	-	-	-	-
LL-4A: Loon Lake Reservoir	-	-	-	-	-	-
LL-4B: Ellis Creek at Loon Lake Reservoir	-	-	-	-	-	1
LL-8: Gerle Creek below cascade	-	-	-	-	-	-
LL-10: Gerle Creek at Gerle Meadow	-	-	-	-	-	-
LL-11: Unnamed tributary to Loon Lake Reservoir	-	-	-	1	-	1
LL-P9: Loon Lake Reservoir Pond	-	-	-	1	-	-
LL-P12: Loon Lake Reservoir Pond	-	-	-	1	-	-
GC-6: SF Rubicon River	-	2	-	2	-	-
GC-8: SF Rubicon River	-	-	-	-	-	-
J-8: SF Silver Creek	-	-	1	-	-	-
IH-1: SF Silver	-	-	2	4	-	-
IH-3A/B: SF Silver:	-	-	2	8	-	-

Table 4.2-2. Incidental observations of aquatic herpetofauna at upper elevation sites in the UARP area.

Site	Species and number per life stage[1]					
	Tree/chorus frog		Garter snake (*Thamnophis* spp.)		Western toad	
	T	J/A	J	A	T	J/A
UV-1: Jones Fork Silver Creek	-	-	-	-	-	-
UV-4A: Union Valley Reservoir	-	-	-	-	-	-
UV-4B: Yellow Jacket Creek	-	2	-	-	-	-

[1]Life stages abbreviated as: T = Tadpole J = Juvenile A = Adult

4.2.1.4 Results of Surveys by CDFG

In 2003, CDFG completed amphibian surveys of eight small ponds around the southwest side of Loon Lake, as well as creek surveys of portions of Gerle Creek near Gerle Meadow and of the Rocky Basin Creek drainage, including Francis Lake (J. Hanson, CDFG, pers. comm., 2003). No MYLF or FYLF were found.

4.2.2 Lower Elevation Sites

Five of the 13 reaches were included in the lower elevation sites. The five reaches included Union Valley/Junction Dam Reach, Camino Dam Reach, SF American River Reach, Brush Creek Dam Reach, and Slab Creek Dam Reach. FYLF were found in the Camino Dam Reach and in the SF American River Reach.

4.2.2.1 Habitat Description

Physical habitat characteristics for lower elevation streams and tributaries are summarized in Table 4.2-3. Additional habitat data are provided in Appendix D for reference.

Table 4.2-3. Habitat characteristics for lower elevation VES sites in the UARP area.

Site code and description	Site visits	Original suitability rating [1]	Stream and substrate characteristics	Vegetation characteristics	Other comments
J-11: Silver Creek downstream of Junction Dam	1	N/A	Habitat made up of low gradient riffle and small side pools, substrate comprised of bedrock, boulder, and cobble	Moderate amount of submerged and emergent vegetation, margin vegetation comprised of grass	Backwater areas along the mainstem provided most suitable habitat; water temperatures too low for breeding (<10°C in late spring)
J-12: Silver Creek 1 mile downstream of Junction Dam	1	N/A	Mostly low gradient riffle and pocket water, substrate comprised of bedrock, boulder, and cobble	Moderate amount of submerged and emergent vegetation, including sedges and grasses along margins	Connected backwaters provide suitable substrate and flow conditions, but water temperatures are too low for breeding (8°C in late spring)
J-13: Grey Horse Creek upstream of Silver Creek confluence	1	N/A	High gradient stream with bedrock cascade habitat	Very little submerged and emergent vegetation, some margin vegetation comprised mostly of forbs	Water temperatures and habitat conditions not suitable for breeding, but potentially suitable for adult overwintering habitat
J-14: Unnamed tributary to Silver Creek, approximately 1 mile downstream of Junction Dam	1	N/A	High gradient stream with bedrock cascade habitat	Very little submerged and emergent vegetation, some margin vegetation comprised mostly of grass	Low suitability for breeding habitat, potentially suitable for adult overwintering, but of relatively low quality
J-15: Silver Creek upstream of Camino Reservoir	1	N/A	Habitat comprised of cobble within a run/glide	Large amount of margin vegetation and submerged algae	High habitat complexity with shallow margin habitat; water temperatures and substrates suitable for breeding
J-16: Little Silver Creek, approximately 0.5 miles upstream of Junction Reservoir	1	N/A	Bedrock-dominated pool and riffle habitat	Moderate amounts of margin vegetation, and some emergent rhubarb	Moderate habitat complexity, with some small patches of suitable habitat for breeding
J-17: Little Silver Creek at Junction Reservoir	1	N/A	Sand and gravel bottom pools and riffles comprised of boulders and cobbles	Some emergent and submerged vegetation	High habitat complexity with seep and side channel; at mouth of reservoir and may experience water level changes
C-3: Silver Creek at Camino Adit	3	Moderate	Mostly pocketwater, bedrock pools and low-gradient riffle, substrate was mainly bedrock and some boulder	Large amount of submerged vegetation, some margin vegetation, mostly grasses and alder	Only the right bank was surveyed. Several seeps, side channels and backwater areas, boulder/sedge margin

Table 4.2-3. Habitat characteristics for lower elevation VES sites in the UARP area.

Site code and description	Site visits	Original suitability rating [1]	Stream and substrate characteristics	Vegetation characteristics	Other comments
SFA-3: SF American River at El Dorado Powerhouse	3	Moderate-High	Predominantly run/glide, some high gradient riffle and pocket water	Minimal margin vegetation and terrestrial cover	Point bar, seeps on both banks, small tributary, cobble island, directly downstream of EID's Akin Powerhouse
SFA-4: Silver Creek at SF American River confluence	5	N/A	Mostly high gradient riffle, some isolated pool and cascade. Substrate is mainly boulder, bedrock and cobble.	Ample aquatic vegetation, algae and terrestrial cover	Split channel with numerous backwater areas
SFA-5: SF American River at Camino Powerhouse	1	N/A	Low gradient riffle. Substrate comprised of cobble and some sand	Dense margin vegetation comprised mostly of grass and willow, with some emergent vegetation	Surveys conducted along left bank only, as crossing was not possible
BC-2: Brush Creek downstream of dam	3	Moderate	Mostly run/glide and low-gradient riffle. Substrate is largely cobble and gravel, some boulder and bedrock	Terrestrial cover is high, mostly woody debris, ample margin vegetation, grasses	Large cascade downstream of site, Brush Creek Dam is immediately upstream of site (<0.25 miles)
SC-2A: SF American downstream of dam	3	High	Primarily run/glide with some low gradient riffle, substrate is largely boulder, cobble and silt.	Submerged vegetation, high amounts of algae and overhanging vegetation, blackberry	Iowa Canyon Creek enters on river left, dam is immediately upstream of site
SC-2B: Iowa Canyon Creek	3	High	Partially subterranean, mainly sand, cobble and boulder	Very thick growth of blackberry, alder and willow at confluence with SF American River	2–3 cfs flowing into SF American River, flows through culvert into SF American River
SC-4: SF American River at White Rock Powerhouse	3	High	Mainly bedrock pools with some low gradient riffle. Substrates were largely bedrock, cobble, sand and boulder.	Margin vegetation present in most of reach, sedges and overhanging sedges and willow	Split channels, cobble bars and boulder sedge margins
SC-6A: SF American River	3	N/A	Mainly low-gradient riffle with some pool, run and pocket-water. Substrate was mostly boulder bedrock and pebble	Ample terrestrial cover, mostly duff and leaf litter and margin vegetation, mostly grasses	Side channels, split channels, and cobble boulder islands

Table 4.2-3. Habitat characteristics for lower elevation VES sites in the UARP area.

Site code and description	Site visits	Original suitability rating [1]	Stream and substrate characteristics	Vegetation characteristics	Other comments
SC-6B: Rock Creek at SF American River confluence	3	N/A	Primarily low-gradient riffle, pool, and cascade, substrate was mainly boulder bedrock and cobble	Margin vegetation was mainly grasses, ample terrestrial cover in duff/leaf litter, and overhanging willow	Seeps, side channels and split channels throughout segment
SC-7: SF American River at upstream of White Rock Powerhouse	1	N/A	Low gradient stream with mostly bedrock pools and pocket water	Large amount of margin vegetation comprised mostly of grass, and some emergent and submerged vegetation, including sedges	Large complex of backwater areas mid-way through site with potentially suitable habitat, although evidence of predators (crayfish, bullfrogs, and otter) were observed
SC-8: SF American River 1 mile downstream of Rock Creek	1	N/A	Low gradient riffle habitat with substrate mostly comprised of cobble, boulder, and bedrock	Emergent and margin vegetation comprised of sedges, with some algae	Backwater areas seem suitable for breeding and basking habitat

[1] Suitability was determined for the target species (see Table 3.2-2) based on the preliminary habitat assessment and determination of suitability. N/A (not applicable) refers to those sites that were added after the initial habitat assessment was completed in 2002.

4.2.2.2 VES Results

Foothill Yellow-Legged Frog

FYLF were observed at four of the VES sites in the lower elevation area: C-3, SFA-3, SFA-4, and SFA-5. Site C-3 is located on Silver Creek, approximately 3.75 miles downstream from Camino Dam and Site SFA-4 is located on Silver Creek just upstream of the confluence with the SF American River. Site SFA-3 is located on the SF American River downstream of EID's Akin Powerhouse and Site SFA-5 is located further downstream, near SMUD's Camino Powerhouse. Each site is discussed in detail in the following sections.

Breeding and oviposition: Egg masses were found at Site C-3 (UTM 0710153 E, 4298592 N) and Site SFA-3 (UTM 0706831 E, 4296419 N) in 2003, and at Site SFA-5 (UTM 0706673 E, 4296673 N) in 2004. Although tadpoles were observed at Site SFA-4, no egg masses were found during the surveys. One egg mass was found at Site C-3 (Figures 4.2-1 and 4.2-2), three egg masses were found at Site SFA-3 (Figures 4.2-3 and 4.2-4), and one egg mass was found at Site SFA-5 (Figures 4.2-5). All egg masses were small, approximately two to four centimeters in diameter and were tucked underneath boulders and not clearly visible. The egg masses were found only by touch by the surveying crews. Egg masses were typically deposited where they were sheltered from the main flow. Habitat characteristics for these egg masses are summarized in Table 4.2-4 below.

Table 4.2-4. Egg mass habitat characteristics at three lower elevation sites in the UARP area.

Site	Date of visit	Egg mass no.	Location description	Depth of egg mass (cm)	Distance from shore (m)	Velocity (cm/s)	Temp. (°C)	Comments
C-3	6/11/03	1A	• Underneath a large boulder in a small backwater pool. • Backwater area approximately 4 m long by 15 m wide; connected to the mainstem by an inlet and an outlet (both about 1 m in width). • Predominantly bedrock substrate.	27	1.5	1.5	17	An adult female FYLF was observed in the near vicinity of the egg mass and may have been actively laying eggs at the time of the survey.
SFA-3	6/25/03	1A	• Egg mass was sheltered from the main flow; in section of primarily run habitat with boulder/cobble substrate.	30	2	3	13.5	
		2A	• Egg mass was sheltered from the main flow; in a	33	2.1	1	13.5	

Table 4.2-4. Egg mass habitat characteristics at three lower elevation sites in the UARP area.								
Site	**Date of visit**	**Egg mass no.**	**Location description**	**Depth of egg mass (cm)**	**Distance from shore (m)**	**Velocity (cm/s)**	**Temp. (ºC)**	**Comments**
			small side-channel adjacent to a section of run.					
		3A/B	• Egg mass was sheltered from the flow; attached on the shore side of a boulder.	17.5	2	3	14	Egg mass was actually two clusters attached at one point so an egg mass letter was given for each mass (A and B). An adult female FYLF was observed near the egg mass.
SFA-5	6/14/04	1A	• Egg mass sheltered from main flow, approximately 20 cm under boulder ledge.	30	0.5	0	12	

Tadpoles: Over 30 tadpoles were found at both Site C-3 (Figures 4.2-6 and 4.2-7) and Site SFA-4 (Figure 4.2-8) during a mid-season survey in early August 2003. Only one tadpole was found at Site SFA-3 (Figure 4.2-9). Tadpoles were typically associated with connected side pools with little or no water velocity and temperatures between 17° and 20°C. Additional habitat details for tadpoles are summarized in Table 4.2-5 below.

Table 4.2-5. Tadpole habitat characteristics at lower elevation sites in the UARP area.

Site	Date of visit	Tadpole group no.	Location description	No. of tadpoles	Avg. length (mm)	Distance from shore (cm)	Max. depth (cm)	Velocity (cm/s)	Temp. (ºC)	Developmental stage
C-3	8/7/03	1A	• Located in small backwater pool • Abundant algae and detritus • Substrate primarily bedrock	2	48	100	20	0	17	Rear legs observed on both tadpoles.
		2A	• Located in small backwater pool • Abundant algae and detritus	4	44	100	30	0	18	Rear legs observed on all tadpoles.
		3A	• Located in small backwater pool • Abundant algae and detritus • Substrate primarily bedrock	6	45	20	45	0	21	Rear legs and beginnings of front legs observed on all tadpoles.
		4A	• Located in small backwater pool • Large amount of detritus and very little algae • Substrate primarily bedrock	10	42	75	20	0	18	Various stages of tadpole development observed.
		4B	• Adjacent to Group 4A, and located in cobble side-channel • Abundant algae and detritus	3	48	150	30	1	16.5	Rear legs observed on all tadpoles.
		5A	• Located in isolated bedrock pothole full of detritus and algae	5	43	n/a	45	0	20.5	Rear legs observed on all tadpoles.
SFA-3	8/5/03	1A	• Located in isolated side pool • The pool appeared to be drying; no inlets or outlets • Some detritus and minimal amount of algae in pool • Primarily sand substrate	1	45		60	- -	20	No legs observed on tadpole.
SFA-4	8/16/03	1A	• In connected side pool off of main channel • Substrates in the pool primarily silt and mud	36	60		19.5		20	Rear legs and beginnings of front legs observed on most tadpoles.
		2A	• In an isolated side pool • Primarily boulder substrate	2	60		40		20	Rear legs and beginnings of front legs observed on both tadpoles.

Table 4.2-5. Tadpole habitat characteristics at lower elevation sites in the UARP area.

Site	Date of visit	Tadpole group no.	Location description	No. of tadpoles	Avg. length (mm)	Distance from shore (cm)	Max. depth (cm)	Velocity (cm/s)	Temp. (ºC)	Developmental stage
		3A	• Located in side channel • Primarily boulder substrate in the pool	2	50					Rear legs observed on both tadpoles.

Juveniles and adults: Juvenile and adult FYLF were found at three sites, C-3, SFA-3, and SFA-4 (Table 4.2-6). FYLF from 22 to 39 mm snout-to-vent length (SVL) were considered juveniles, and frogs with at least 40 mm SVL were considered adults (Seltenrich and Pool 2002). Frogs that have recently metamorphosed were generally 22 to 27 mm total length, and were classified as juveniles. FYLF are sexually dimorphic and adult females are generally 20–25 mm longer than males. The total number of juveniles or adults found at any given site during the entire sampling period is not an accurate statistic and was not used; totals were given per site visit to avoid counting repeat observations. Not all individuals were captured and processed; some were only documented visually to minimize physiological and habitat impacts.

Table 4.2-6. Number of juvenile and adult foothill yellow-legged frogs observed.

Site	Egg survey (mid-June)		Tadpole survey (early August)		Juvenile/Adult survey (September)		Juvenile/Adult survey (October)	
	J	A	J	A	J	A	J	A
C-3: Silver Creek at Camino adit	6	1	-	-	6	1	-	-
SFA-3: SF American River at Eldorado Powerhouse	3	-	-	-	2	1	-	-
SFA-4: Silver Creek at SF American River	2	3	5	-	1	-	8	-

The length frequency distributions of juvenile and adult FYLF at the three sites are shown in Figures 4.2-10a through 4.2-10c. Juveniles found early in the season (during the egg survey) were likely first-year juveniles (metamorphosed in 2002). Juveniles and adults were generally found basking in the sunlight near the water on bedrock or boulder substrates.

At Site C-3, many of the juveniles and adults were associated with small seeps along the right bank shoreline. The seeps opened up into larger standing backwater areas upslope from the creek, and many were connected to the mainstem by side pools. The water temperature of the seeps was approximately 14ºC. Adults, juveniles, and sub-adults were also found in these off-channel ponds (although observations were not recorded). A female FYLF (SVL of 59 mm) was found immediately next to the egg mass at Site C-3 during the first site visit and was probably in the process of egg deposition. The water temperature at the site of the egg mass was 17ºC.

Upslope from Site C-3, off of a SMUD access road, is an adit off the Camino Powerhouse Tunnel. During a visit in mid-September 2003, two juveniles and one adult male were observed at the adit tunnel entrance. Water seeping in the adit was 12ºC. The substrate was primarily gravel, and all FYLF found were underwater. The adult SVL was 45 mm and both juveniles were 38 mm SVL. Water depth in the tunnel entrance was approximately 7 cm. In September 2004, both tadpoles and adults were found within the adit. One adult male and one adult female, and five juveniles were observed, along with 10-15 tadpoles, suggesting successful breeding is occurring within the adit.

At Sites SFA-3 and SFA-4, substrates were comprised mostly of boulders, and juveniles were often found basking. FYLF juveniles were distributed throughout Site SFA-3 along the left bank, downstream of the Eldorado Irrigation District's Akin Powerhouse, near side pools and pocket water habitats. At Site SFA-4, juveniles were also associated with side pool and pocket water areas.

California Red-Legged Frog

Suitable habitat for CRLF was not observed during the reconnaissance phase of the study in this elevational range, and therefore no surveys targeting CRLF were conducted in the lower elevations of the UARP. No CRLF were found incidentally at sites targeting FYLF. Stock ponds on private land were identified in the Slab Creek Dam Reach, off of Mosquito Road. No access was secured for these sites to conduct CRLF surveys. It was assumed, from the topographic maps, that these ponds were not perennial.

Western Pond Turtle

Although no sites targeting CRLF were identified during the reconnaissance phase of the study, several sites targeting FYLF did have suitable habitat for western pond turtle, such as Sites C-3, SC-6B, SC-8, and BC-2. Although none of these sites had deep pools or associated ponds, the stream habitat contained side channel or side water habitats with suitable vegetation for this species. However, no western pond turtles were observed at the lower elevation UARP sites.

4.2.2.3 Incidental Observations

Non-target species were observed at many of the sites visited (Table 4.2-7). Pacific tree/chorus frogs, various species of garter snake, and bullfrogs were all observed at one or more of the VES sites. Garter snakes are natural predators of FYLF and CRLF, but feed on a wide range of aquatic vertebrates, including tree frogs and western toads. Bullfrogs were the most dominant amphibian species found, particularly in the Slab Creek Dam Reach. No bullfrogs were found at the sites where FYLF were found.

Table 4.2-7. Number of non-target aquatic herpetofauna observed at lower elevation sites in the UARP area.

Site	Species and number per life stage[1]								
	Tree/chorus frog			Garter snake (*Thamnophis* spp.)		Bullfrog			California newt
	T	J	A	J	A	T	J	A	A
J-11: Silver Creek downstream of Junction Dam	-	-	-	-	-	-	-	-	8
J-12: Silver Creek 1 mile downstream of Junction Dam	-	-	-	-	-	-	-	-	-
J-13: Grey Horse Creek upstream of Silver Creek confluence	-	-	-	-	-	-	-	-	5

Table 4.2-7. Number of non-target aquatic herpetofauna observed at lower elevation sites in the UARP area.

Site	Species and number per life stage[1]								
	Tree/chorus frog			Garter snake (*Thamnophis* spp.)		Bullfrog			California newt
	T	J	A	J	A	T	J	A	A
J-14: Unnamed tributary to Silver Creek, approximately 1 mile downstream of Junction Dam	-	-	-	-	-	-	-	-	1
J-15: Silver Creek upstream of Camino Reservoir	-	-	-	-	-	-	-	-	-
J-16: Little Silver Creek, approximately 0.5 miles upstream of Junction Reservoir	-	-	-	-	-	-	-	-	3
J-17: Little Silver Creek at Junction Reservoir	-	-	-	-	-	-	-	-	5
C-3: Silver Creek, Camino Adit	4	-	-	3	-	-	-	-	1
SFA-3: SF American River at El Dorado Powerhouse	-	-	-	2	-	1	-	-	-
SFA-4: SF American River at Silver Creek confluence	-	-	-	1	1	-	-	-	-
SFA-5: SF American River at Camino Powerhouse	-	-	-	-	-	-	-	-	-
BC-2: Brush Creek downstream of dam	-	-	-	1	-	-	-	-	-
SC-2A: SF American River downstream of dam	-	-	-	1	2	-	-	-	-
SC-2B: Iowa Canyon Creek	-	-	-	-	-	-	-	-	-
SC-4: SF American River at White Rock Powerhouse	-	-	-	-	-	9	27	6	-
SC-6A: SF American	-	-	-	-	1	-	-	-	-
SC-6B: Rock Creek at SF American River confluence	-	-	-	-	-	-	-	-	-
SC-7: SF American River upstream of White Rock Powerhouse	-	-	-	-	-	7	-	1	-

Table 4.2-7. Number of non-target aquatic herpetofauna observed at lower elevation sites in the UARP area.

Site	Species and number per life stage[1]								
	Tree/chorus frog			Garter snake (*Thamnophis* spp.)		Bullfrog			California newt
	T	J	A	J	A	T	J	A	A
SC-8: SF American River 1 mile downstream of Rock Creek	-	-	-	-	-	6	-	-	-

[1]Life stages abbreviated as: T = Tadpole J = Juvenile A = Adult

4.2.2.4 Results of Surveys by USFS

One FYLF adult sighting was reported by Jann Williams (USFS) in the Slab Creek Dam Reach of the UARP. She observed a FYLF adult on the SF American River on August 20, 2003, approximately 0.5 miles upstream of White Rock Powerhouse.

Three juvenile western pond turtles were observed by Jann Williams and Jens Hamar (USFS) on the Slab Creek Dam Reach. One juvenile was observed on August 20, 2003, approximately 0.5 miles upstream of White Rock Powerhouse on the SF American River, and two juveniles were observed on September 10, 2003 just downstream of the Rock Creek confluence on the SF American River.

4.2.3 Reach Downstream of Chili Bar

A total of 21 sites were surveyed in the Reach Downstream of Chili Bar, eight on the mainstem of the SF American River, 11 tributaries to the mainstem, and two off-channel waterbodies (Table 4.2-8). Mainstem sites were surveyed primarily for FYLF and were surveyed in 2003. Greenwood, Hastings, and Weber creeks were all surveyed for FYLF and CRLF in 2003; Dutch Creek was surveyed for FYLF only in 2003. The following tributaries were also evaluated to assess habitat potential for CRLF and FYLF in 2004: Norton Ravine, Clark Creek, Jacobs Creek, Shingle Creek, Granite Canyon Creek, Indian Creek, and Big Canyon Creek.

4.2.3.1 Habitat Description

Physical habitat characteristics for sites surveyed in the Reach Downstream of Chili Bar are summarized in Table 4.2-8. Additional habitat data was collected and is provided in Appendix D for reference.

Many of the sites originally identified as moderate quality under low-flow conditions (200-500 cfs), were re-evaluated during the initial VES under high flow conditions. Initial VES at each of the mainstem sites was conducted at high flows to assess habitat changes from low flows observed in the Reach Downstream of Chili Bar during the preliminary habitat assessment. Two sites (Site CB-5 and CB-14) were deemed unsuitable after the first VES because habitat became completely inundated with deep, fast water at high (1,200 cfs) flows, and was therefore deemed

unsuitable. Mainstem sites at CB-20 and CB-5, however, did maintain suitable habitat even under high flow conditions. Site CB-20 has a wide floodplain with bedrock outcrops and overhanging vegetation, as well as a side channel that became inundated at higher flows. Likewise, Site CB-5 included a side channel where depths and velocities did not fluctuate as greatly as the mainstem when discharge increased from 200 cfs to 1,200 cfs. Both sites were visited for FYLF egg mass, tadpole, and juvenile/adult VES. Several of the tributaries surveyed in 2004 were dry by mid-July when habitat evaluations were conducted. In some cases, access onto private property was not granted, and a no habitat assessment or VES could not be completed.

Table 4.2-8. Habitat characteristics for VES sites in the Reach Downstream of Chili Bar.

Site code and description	Number of site visits	Original suitability rating*	Stream/pond and substrate characteristics	Vegetation characteristics	Other comments
CB-2: Weber Creek	4	Moderate	Primarily pool and low-gradient riffle. The substrate was mainly bedrock, boulder and cobble.	Abundant margin vegetation, grasses and overhanging vegetation. Aquatic vegetation was very thick in some parts.	Algae and diatoms were extremely thick at this site; aquatic vegetation clogged the entire waterway in some areas. River otter activity was evident.
CB-4.1: Stock Ponds (A)	4	Moderate	The larger of the two ponds, substrate is primarily silt with some sand.	Some margin vegetation and grasses, some overhanging vegetation.	Maximum water depth is 15 feet; water is very turbid and discolored.
CB-4.2: Stock Ponds (B)	4	Moderate	The smaller of the two ponds. Substrate is predominantly silt with some sand.	Abundant margin vegetation, mostly forbs, some emergent and submerged vegetation, ample aquatic vegetation and LWD.	More shoreline available at pond B, also shallower than Pond A.
CB-5: SF American River at Hook gravel bar	2	Moderate	Mostly low-gradient riffle and run/glide. Substrate is largely cobble with some gravel and boulder.	Margin vegetation, overhanging vegetation and canopy is mainly alder.	Split channel, cobble bar and lateral/point bars present. High recreational use in this area.
CB-7A: SF American River at Hastings Creek	1	Moderate	Mostly run/glide with some low-gradient riffle. Substrate is mainly boulder and bedrock.	Margin vegetation is mostly grasses, some terrestrial cover, leaf litter/duff.	Split/side channel at confluence, heavy recreational use in this area, mainstem fluctuation is evident on shore, algal and silt deposits are heavy.
CB-7B: Hastings Creek	5	Moderate	Primarily run/glide with some low gradient riffle and pool. Substrates are mainly cobble and gravel.	Margin grasses and forbs present in all of reach, ample willow and alder canopying stream.	Split channels and ample terrestrial cover in this segment.
CB-8A: SF American River at Greenwood Creek	1	Low	Predominantly bedrock pools with some run/glide and low-gradient riffle. Substrate is mainly bedrock, boulder, and cobble.	Ample margin vegetation, aquatic cover and terrestrial cover. Rootwads and grasses/forbs present in majority of reach.	Side split channel on right bank, mainstem fluctuation is evident on shore, algal and silt deposits are heavy.
CB-8B: Greenwood Creek	5	Low	Mainly pool, run/glide and low-gradient riffle. The substrate was mainly cobble, gravel, and boulder.	Margin vegetation, terrestrial cover, and overhanging vegetation are prominent. Willow and grasses appear dominant.	Split channels, cobble/boulder island and moderate use due to landowners.

Table 4.2-8. Habitat characteristics for VES sites in the Reach Downstream of Chili Bar.

Site code and description	Number of site visits	Original suitability rating*	Stream/pond and substrate characteristics	Vegetation characteristics	Other comments
CB-12: SF American River	1	Moderate	Mainly low-gradient riffle and run/glide. Substrate was predominantly cobble with some gravel.	Margin vegetation was mainly alder and willow, some emergent vegetation was present.	Heavy recreational activities in this area due to rafting. Mainstem fluctuation is evident on shore, algal and silt deposits are heavy.
CB-14: SF American River at Camp Lotus	1	Moderate	Mostly low gradient riffle, with cobble and boulder substrates dominant. Side channel habitat provides some protection from mainstem flow.	Margin vegetation of alder, willow, and blackberry along side channel area. Vegetation encroaches along the mainstem.	Fluctuations in flows made this site unsuitable for FYLF.
CB-15: SF American River at Scott Road	3	Moderate	Mainly run/glide, low-gradient riffle and some pool. The predominant substrate is cobble with some gravel, sand, and silt.	Margin vegetation is mainly grasses, decent terrestrial cover and overhanging vegetation.	Evidence of high recreational use observed, side channel isn't as affected by flow fluctuations as other sites.
CB-16A: SF American River at Dutch Creek	2 **	Moderate	Primarily run/glide with some low-gradient riffle and pocketwater. Substrate is mainly boulder with some gravel and cobble.	Margin vegetation is mainly forbs, ample terrestrial cover.	Recreation and homeownership has low/moderate impact on habitat, mainstem fluctuation is evident on shore, algal and silt deposits are heavy.
CB-16B: Dutch Creek	2 **	Moderate	Run/glide with some low-gradient riffle and pool. Substrate is mainly cobble and gravel.	Large amount of margin vegetation, mostly forbs, decent terrestrial cover as well.	Homeowner effects are moderate, abundant split/side channels in creek.
CB-19/20: SF American River at unnamed tributary	3	Moderate	All run/glide habitat, substrate is mainly bedrock with some boulder.	Abundant margin vegetation and emergent vegetation, mostly pondweed. Some submerged vegetation and overhanging vegetation.	Several split/side channels, mainstem fluctuation is evident on shore, algal and silt deposits are heavy, at high flows depth is >1 m near shore.
CB-22: Norton Ravine	1	N/A	Dry at confluence with SFAR, with some stagnant pools farther upstream.	Most of stream overgrown with blackberry and alder with relatively continuous margin vegetation.	Habitat on mainstem SFAR at confluence includes large backwater pool; however, flow fluctuations preclude its suitability for CRLF.

Table 4.2-8. Habitat characteristics for VES sites in the Reach Downstream of Chili Bar.

Site code and description	Number of site visits	Original suitability rating*	Stream/pond and substrate characteristics	Vegetation characteristics	Other comments
CB-23: Clark Creek	1	N/A	No information.	No information.	Unable to access creek at mouth because of private land. Dry further upstream.
CB-24: Jacobs Creek	1	N/A	Discontinuous wetted pools with aquatic vegetation and silt substrate.	Some emergent vegetation, shrubs along bank.	Unable to access creek at mouth because of private land.
CB-25: Shingle Creek	1	N/A	Narrow, aggrading channel with sandy substrate, and some gravel. Split channel through surveyed portion. Mostly run/pool.	Abundant emergent vegetation.	Access further upstream not granted.
CB-26: Granite Canyon Creek	1	N/A	Substrates suitable for FYLF egg deposition present, but very little cover for adults and tadpoles. Mostly standing water pools with narrow channel width.	Blackberry abundant along channel margins. Very little aquatic vegetation.	Creek channel dry at confluence with SFAR.
CB-27: Indian Creek	1	N/A	Low gradient channel with cobble and boulder substrate. Some flow but predominantly intermittent pools separated by dry sections.	Submerged algae within pools suitable for tadpole food/cover. Margin and riparian vegetation largely restricted to pools and wetted sections.	Blackberry cover associated with pools and wetted sections. Pools separated by segments of dry barren channel.
CB-28: Big Canyon Creek	1	N/A	No information.	Overgrown with blackberry and alder, with 100% cover.	Unable to access creek because canopy cover was too thick.

* Suitability was determined for the target species (see Table 3.2-2) based on the preliminary habitat assessment and determination of suitability. N/A (not applicable) refers to those sites that were added after the initial habitat assessment was completed in 2002.

** Site was only visited twice as access was not granted for third and fourth visits.

4.2.3.2 VES Results

Foothill Yellow-Legged Frog

Twenty sites were surveyed for FYLF, 14 of which were on tributaries or on the SF American River near tributaries. FYLF were not observed at any of the sites surveyed in 2003. Mainstem sites were visited at least once. Suitable habitat such as small cobble bars, split channels, margin vegetation, basking areas, and shallow backwater areas was present in the tributaries. Most of the mainstem sites were not suitable due to flow fluctuations of several feet in less than 24 hours. Sites CB-5 and CB-14 were visited once and eliminated due to inundation of suitable habitats at high flows. Suitable habitat such as small cobble bars, split channels, margin vegetation, basking areas, and shallow backwater areas were present in the tributaries.

In 2003, FYLFs were incidentally observed by the BLM in a section of Indian Creek about 1.0 mile upstream of the SF American River. A survey of accessible portions of Indian Creek (Site CB-27), from its confluence with the SF American River upstream, was conducted in 2004. One adult FYLF and approximately 14 tadpoles were observed in two disconnected pools along the creek during this survey (Figure 4.2-11). Habitat characteristics associated with the FYLF tadpole locations at Site CB-27 are provided in Table 4.2-9.

Table 4.2-9. Tadpole habitat characteristics at sites in the Reach Downstream of Chili Bar.

Site	Date of visit	Tadpole group no.	Location description	No. of tadpoles	Avg. length (mm)	Distance from shore (cm)	Max. depth (cm)	Velocity (cm/s)	Temp. (ºC)	Developmental stage[1]
CB-27	7/16/04	1	• Located in small, isolated pool with intermittent flow upstream and no flow directly downstream • Some algae present within pool • Substrate primarily cobble	10	45	20	50	0	18	Gosner stage 36
		2	• Located in small main channel, isolated pool intermittent flow both upstream and downstream of pool • Some algae and detritus present in pool • Substrate primarily cobble with some bedrock	4	40	0	20	0	18	Gosner stage 36

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

California Red-Legged Frog

Surveys were conducted at five sites in the Reach Downstream of Chili Bar. Survey protocols were completed at all sites (i.e., 2 night surveys and 2 days surveys were completed at each site).

Stock Ponds: Two stock ponds on the south side of the SF American River were surveyed in 2003 (Sites CB-4.1 and CB-4.2). The stock ponds were approximately 0.2 mile from the SF American River and were connected to one another (not to the SF American River) by a small, ephemeral creek. Site CB-4.1 is approximately 20 m wide and 80 m long. Site CB-4.2 is approximately 20 m wide and 40 m long. Both had a variety of fish species present, mostly cyprinids. The ponds have dried up completely during dry years and were fed by remnants of a historic flume that is preserved by local citizens. Several tree frogs and large bullfrogs were observed in both ponds; no CRLF were observed at Site CB-4.

Tributary sites: Surveys in tributaries were completed from the tributary confluence with the SF American River upstream 0.5 to 1.0 mile. All the tributaries surveyed had shallow margin areas, emergent and submergent vegetation, basking areas, and backwater pools. No CRLF were found on Weber, Hastings, or Greenwood creeks in surveys conducted in 2003.

Western Pond Turtle

Although no formal surveys were conducted for western pond turtle, surveys for CRLF were conducted at five sites with suitable habitat for western pond turtle.

Stock Ponds: Although the two stock ponds at Sites CB-4.1 and CB-4.2 did provide suitable basking and foraging habitat for western pond turtle, no turtles were observed during surveys.

Mainstem/Tributary Sites: Adult western pond turtles were observed at two of the sites in this reach. In May 2003, one individual was found basking on a large rootwad along the left bank of Greenwood Creek near the confluence with SF American River. In June 2003, one individual was observed basking in emergent vegetation in the side channel adjacent to a mid-channel island at Site CB-15, on the SF American River.

4.2.3.3 Incidental Observations

Non-target species were observed at many of the sites surveyed. Pacific tree/chorus frogs, various species of garter snake, bullfrogs, and western toad were all observed at one or more of the VES sites. Garter snakes are natural predators of FYLF, CRLF, tree frogs, and toads.

Bullfrogs were found at seven of the 21 sites surveyed. Bullfrogs were observed throughout the study period on Weber, Hastings, and Greenwood creeks, but not on Dutch Creek; they were most abundant on Weber Creek and at Site CB-15 on the SF American River. At both of those sites, multiple life stages were observed (tadpoles, juveniles, and adults) (Table 4.2-10). One bullfrog adult was observed on Granite Canyon Creek. Adult bullfrogs were also found in the stock ponds (Sites CB-4.1 and CB-4.2) and were large in size (typical SVL was approximately 150 mm).

A number of adult western toads were found along the river margin at Site CB-15 on the SF American River.

Table 4.2-10. Number of non-target aquatic herpetofauna observed in the Reach Downstream of Chili Bar.

Site	Species and number per life stage*									
	Tree/chorus frog			Garter snake (*Thamnophis* spp.)		Bullfrog			Western Toad	
	T	J	A	J	A	T	J	A	J	A
CB-2: Weber Creek	-	-	-	-	-	100	3	180	-	-
CB-4.1: Stock Ponds	-	-	5	1	-	-	3	6	-	-
CB-4.2: Stock Ponds	-	-	-	-	-	-	-	-	-	-
CB-5: SF American River at Hook gravel bar	-	-	-	-	-	-	-	-	-	-
CB-7A: SF American River at Hastings Creek	-	-	1	-	-	-	-	-	-	-
CB-7B: Hastings Creek	-	2	2	-	-	1	1	-	-	-
CB-8A: SF American River at Greenwood Creek	-	-	-	-	-	-	-	-	-	-
CB-8B: Greenwood Creek	-	-	-	-	-	1	-	5	-	-
CB-12: SF American River	-	-	-	-	-	-	-	-	-	-
CB-14: SF American River at Camp Lotus	-	-	-	-	-	-	-	-	-	-
CB-15: SF American River at Scott Rd.	50	-	-	-	-	50	-	1	-	5
CB-16A: SF American River at Dutch Creek	-	-	-	-	-	-	-	-	-	-
CB-16B: Dutch Creek	-	-	-	-	-	-	-	-	-	-
CB-19/20: SF American River at unnamed tributary	-	-	1	-	-	1	-	-	-	-
CB-22A: SF American River at Norton Ravine	-	-	-	-	-	-	-	-	-	-
CB-22B: Norton Ravine	-	-	-	-	-	-	-	-	1	-
CB-23: Clark Creek	-	-	-	-	-	-	-	-	-	-
CB-24: Jacobs Creek	15	5	2	-	-	-	-	-	-	-
CB-25: Shingle Creek	-	-	-	-	-	-	-	-	-	-
CB-26: Granite Canyon Creek	-	-	-	-	-	-	-	1	-	-
CB-27: Indian Creek	-	-	-	-	-	-	-	-	-	-
CB-28: Big Canyon Creek	-	-	-	-	-	-	-	-	-	-

*Life stages abbreviated as: T = Tadpole J = Juvenile A = Adult

4.2.3.4 Results of Other Surveys

Western pond turtles were observed by ECORP Inc. at two locations on Chili Bar Reservoir in June 2004. These incidental observations were made during surveys for nesting raptors along the reservoir margin.

BLM archaeologists documented over 50 FYLF on Indian Creek (a tributary to SF American River near the town of Coloma) approximately one mile from the SF American River during an archeological survey on September 27, 2003 (P. Cranston, BLM, pers. comm., 2003). Site CB-15 is the closest mainstem site to Indian Creek, located approximately 0.4 mile upstream of the mouth of Indian Creek. Although suitable habitat is present at CB-15, no FYLF were found at this site during 2003 surveys. However, bullfrogs and a western pond turtle were observed at this site.

5.0 ANALYSIS

5.1 Mountain Yellow-Legged Frog

In the Sierra Nevada, MYLF have been documented to occur in ponds, lakes, and small streams from 5,000 feet to over 12,000 feet elevation. Reproduction begins soon after water bodies are free of ice (Knapp 2003). Breeding and oviposition generally occurs in ponds or lakes from April through July, depending on the elevation. MYLF may breed in streams, although not as commonly as FYLF; in addition, streams may be important to MYLF as dispersal corridors. MYLF tadpoles are likely to be present from June through September and adults can be found from June through October. Since water temperatures at higher elevations in the Sierra Nevada remain relatively cold throughout the year, MYLF tadpoles overwinter 2–3 times before metamorphosing (Knapp 2003). The tadpoles spend the winter beneath the ice and do not metamorphose until their third or fourth year when they are 2–3 inches (50–80 mm) in length (Knapp 2003).

Although the historical range of MYLF includes the UARP area, no MYLF were found within the surveyed reaches (14 stream sites) or reservoirs (17 pond or reservoir margin sites). MYLF populations are typically found in water bodies (lakes or streams) that provide deep pools for overwintering, preferably without tadpole predators, such as trout (Knapp 2003). Although most of the reservoirs found within the study area have deep pools, trout were observed in all three of the upper elevation reservoirs (Rubicon, Rockbound, and Buck Island) surveyed.

MYLF do, however, occur in the vicinity of the UARP (Table 4.1-1). A stream-breeding population has been documented on Bassi Fork Silver Creek in Desolation Wilderness (USFS, unpublished data). Other known locations of MYLF in the vicinity of the UARP area (other than locations in Desolation Wilderness) are at elevations of 7,600 feet and higher; populations of MYLF have been observed at both Highland Lake (7,800 ft) and Lake Zitella (7,600 ft). Although the highest elevation water body in the UARP itself is approximately 6,500 feet at Rubicon Reservoir, it should also be noted that the surface areas of both Highland Lake and Lake Zitella are much smaller than that of UARP reservoirs.

Lake Aloha (8,100 feet, approximately eight miles south of the Rubicon Reservoir) is likely the largest lake supporting a MYLF population close to the study area (CDFG, unpublished data; S. Lehr, pers. comm., 2004). Compared with lakes and ponds that were surveyed nearby, Lake Aloha has abundant side-channels, backwater areas, and small islands that create sheltered areas for species like MYLF. Rockbound Lake and Rubicon Reservoir are mostly bedrock along the margin, with a minimal amount of sheltered cove habitat suitable for MYLF. Buck Island Reservoir does have some sheltered areas, but MYLF were not found. Most recent MYLF sightings have been in relatively small rivers, ponds, and lakes (USFS, unpublished data); Lake Aloha, being a larger lake nearly eight miles wide, is an exception.

5.2 Foothill Yellow-Legged Frog

FYLF occur in the Coast Ranges from the Oregon border south to the Transverse Mountains in Los Angeles County, and in most of central and northern California along the west slopes of the Sierra/Cascade crest. The elevational range of FYLF extends from sea level to 6,000 feet in the Sierra Nevada Mountains (Stebbins 2003, Jennings and Hayes 1994). Egg deposition is generally initiated on the descending limb of the spring hydrograph when water temperatures reach 12–15°C (Seltenrich and Pool 2002). Metamorphosis generally occurs within three to four months. Once breeding has occurred, adults and juveniles generally move upstream into nearby tributaries or to cooler microhabitats (Jennings and Hayes 1994). Little is known about average life spans of FYLF, but it is believed that two years are required to reach adult size (Storer 1925).

5.2.1 UARP

Habitat associations of FYLF were similar among the four sites at which FYLF were found. Based on site observations, bedrock seeps likely provide important refugia for adults, juveniles, and subadults. Water seeping from the Camino tunnel adit provided habitat for a number of juveniles and adults in an area that was a significant distance from Silver Creek. This area may provide potential overwintering in addition to breeding habitat for FYLF.

Although suitable habitat and substrates were available on Silver Creek in the Junction Dam Reach, water temperatures were relatively low (8-12°C) for two miles downstream of Junction Dam. At the downstream end of the reach, although water temperatures were suitable for FYLF breeding, algae covered most of the available cobble and boulder habitat and may obscure suitable egg-laying sites, and may explain why no FYLF were observed in this reach.

Unlike other Sierran FYLF populations (e.g., NF Feather River), where large, open cobble bars comprise most of the suitable breeding habitat, bedrock and boulder side water and backwater areas dominated the habitats associated with FYLF in the UARP. Sheltered microhabitats were a prominent feature of all the habitats where FYLF were observed.

Predators such as crayfish and fish may limit amphibian breeding habitat, by directly preying on eggs and tadpoles. Fish were observed at all three sites where FYLF were found, and crayfish were observed at Site SFA-3. Rainbow and brown trout were observed at Site C-3 during snorkeling surveys in 2002 (*Stream Fisheries Technical Report*). Invasive predators such as bullfrogs may also affect FYLF populations; bullfrogs are known to prey on egg masses and

tadpoles (Hayes and Jennings 1986, Kupferberg 1997). However, no bullfrog adults were observed at sites where FYLF were found. Moreover, bullfrogs were found, sometimes in large numbers, at many of the sites downstream of the Camino Dam and SF American River reaches.

5.2.2 Reach Downstream of Chili Bar

Many sites identified under low flow conditions as being moderately suitable were deemed low quality when re-visited during high flow conditions. Suitable habitat was present at low and high flows, but fluctuations in the flow reduced habitat stability and constancy necessary for egg and tadpole development. Large cobble bars along mid-channel islands, split channels, and protected side-channels were identified at low flows (200–500 cfs), but were often completely inundated and inaccessible less than 24 hours later (e.g., Site CB-5). As discharge increased, suitable edgewater habitats became deep (greater than 50 cm) and velocities increased to unsuitable levels. Conversely, in many cases, suitable habitat at high flows (1,200 cfs) located in side channels and protected backwater areas, became dewatered when discharge decreased. The presence of introduced fishes (such as brown trout, smallmouth bass, green sunfish, and bluegill) and bullfrogs and crayfish may further limit the viability of the mainstem as breeding habitat for FYLF. Although egg-laying and tadpole rearing may be precluded from mainstem habitats in the Reach Downstream of Chili Bar, use of the mainstem SF American River by FYLF as a dispersal corridor is possible. Major tributaries to the mainstem SF American River do provide potential habitat for breeding, and are protected from daily flow fluctuations. Observations of adult, juvenile and tadpole FYLF on one of the tributaries (see Section 4.2.3) in the Reach Downstream of Chili Bar verifies that tributary streams could indeed support breeding populations.

Foothill yellow-legged frogs were documented on Indian Creek (Site CB-27), a tributary to the SF American River near Coloma. Adults and tadpoles were observed approximately 0.5 mile upstream of its confluence with the SF American River. Adults and juveniles were also documented approximately one mile upstream of the confluence. No FYLF were observed near the confluence of Indian Creek and the SF American River, despite the availability of suitable habitat. The lower one-quarter mile of the tributary becomes dry by mid-summer.

The presence of a breeding population of FYLF on a tributary stream in the Reach Downstream of Chili Bar, coupled with the apparent lack of adults or breeding activity on the mainstem, suggests that the mainstem does not provide suitable conditions for successful reproduction. As a result, the species has evidently adapted to use the tributary to complete its life cycle despite the fact that habitat in the tributary is limited in distribution and does not provide optimal conditions for breeding. It is possible that the FYLFs on Indian Creek represent a remnant of a much larger historical population along the SF American River in the Reach Downstream of Chili Bar. Based on the available information, it would be difficult to ascertain whether the mainstem is used by FYLF for dispersal or whether it is a population sink.

5.3 California Red-Legged Frog

CRLF are found in ponds and intermittent and permanent streams with slow or still water from sea level to approximately 5,000 feet elevation. Intermittent streams must retain surface water in

pools year-round in order for frogs to survive (Jennings et al. 1993). Red-legged frogs generally require cool water for survival. Jennings and Hayes (1989) report that adult CRLF become stressed when exposed to water temperatures at or above 29°C, and can die if the exposure is chronic. CRLF breed from late November to early April (Jennings and Hayes 1989). Egg masses are typically attached to emergent vegetation at or near the surface of the water (Hayes and Miyamoto 1984). Larvae metamorphose between July and September, 3.5 to 7 months after egg laying (Jennings et al. 1993). Jennings and Hayes (1989) estimated life spans of eight years for males and ten years for females.

The closest known CRLF occurrence to the hydroelectric projects is at Spivey Pond, southwest of Pollock Pines, approximately six miles from the study area. There are very few known CRLF populations that have persisted in the Sierra Nevada (Jennings et al. 1993). Reservoirs within the study area were evaluated for providing potentially suitable habitat, but the lack of suitable shoreline cover, shallow water areas, basking locations, and suitable vegetation eliminated these from any focused VES. Tributary streams connected to study reaches seemed more likely to support suitable habitat conditions and were the focus of the surveys, but no CRLF were found.

5.3.1 UARP

Two sites were surveyed for CRLF in the UARP. Jones Fork Silver Creek just upstream of Union Valley Reservoir contains backwater areas with deep pools, with substrates typically consisting of sand, gravel, and small cobble. Site GC-8, on SF Rubicon River, just downstream of the confluence of Gerle Creek, was also surveyed for CRLF. Deep pools and abundant nearshore and emergent vegetation were present at this site, but no CRLF were observed. No perennial ponds occur within one mile of the study reaches and therefore no off-channel waterbodies were surveyed for CRLF.

5.3.2 Reach Downstream of Chili Bar

Three tributary sites and two stock ponds were surveyed for CRLF in this reach. The tributary sites included Weber, Hastings, and Greenwood creeks. Weber Creek at Spivey Pond has a known population of CRLF approximately ten river miles upstream of the confluence with the SF American River. Over 50 bullfrog tadpoles were observed in one small backwater pool during surveys conducted in October of 2003 on Weber Creek, just upstream of its confluence with the SF American River. Although red-legged frogs and bullfrogs can co-exist, bullfrogs are known to prey on CRLF (Hayes and Jennings 1986) and could preclude high CRLF densities. Bullfrogs have been documented in Spivey Pond, however, where CRLF populations are robust and have been documented for the last several years.

Both stock ponds surveyed near this reach contained suitable shallow water fringe habitats, with appropriate vegetation, and deeper areas within the center of the pond. Bullfrogs and tree frogs were abundant at both ponds, but no CRLF were observed.

5.4 Western Pond Turtle

Western pond turtles inhabit a wide range of fresh or brackish water habitats including ponds, lakes, backwater and low flow regions of streams and rivers, ditches, and pools remaining in intermittent streams (Jennings and Hayes 1994). Sites for basking are an important habitat element (Jennings and Hayes 1994). Basking substrate includes rocks, logs, banks, emergent vegetation, root masses, and tree limbs (Reese 1996). Although primarily an aquatic reptile, western pond turtles often spend time on land. Terrestrial activities include basking, overwintering, nesting, and moving between ephemeral sources of water (Reese 1996). Breeding activity peaks from June to July, but may occur year-round, when females begin to search for suitable nesting sites upslope from water.

Historically, western pond turtles had a relatively continuous distribution throughout California. It is currently found throughout much of its historical range, principally west of the Sierra-Cascade crest, from western Washington south to northwest Baja California (Stebbins 1985), though at population levels that are much less than historical levels.

Low fecundity, low hatchling and juvenile survivorship, high adult survivorship, and potentially long lifespan are characteristic of this species (Jennings et al. 1992). Bullfrogs will prey on hatchlings and young turtles (Holland 1994).

5.4.1 UARP

Many of the stream sites surveyed contained suitable habitats, including undercut banks, emergent vegetation, and basking sites, as well as suitable adjacent upslope areas for breeding. While no western pond turtles were observed at project study sites, USFS did document several individuals approximately 0.5 mile upstream of White Rock Powerhouse in the Slab Creek Dam Reach.

5.4.2 Reach Downstream of Chili Bar

Western pond turtles were found at two sites within the Reach Downstream of Chili Bar: one on the mainstem near Coloma, and one in Greenwood Creek. The turtle found on the mainstem was in a protected side channel, and was found close to shore amidst emergent vegetation. Both sites also had bullfrogs. ECORP, Inc. also documented western pond turtles at two locations within Chili Bar Reservoir while conducting surveys for nesting raptors.

6.0 LITERATURE CITED

Berger, L., R. Speare, P. Daszak, D. E. Green, A. A. Cunningham, C. L. Goggin, R. Slocombe, M. A. Ragan, A. D. Hyatt, K. R. McDonald, H. B. Hines, K. R. Lips, G. Marantelli, and H. Parkes. 1998. Chytridiomycosis causes amphibian mortality associated with population declines in the rain forests of Australia and Central America. Proceedings of the National Academy of Sciences, USA 95:9031-9036.

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.

Cranston, P. 2003. Personal communication with P. Cranston, BLM, Folsom, CA with R. Peek, Stillwater Sciences, Davis, CA.

Crump, M.L. and N.J. Scott, Jr. 1994. Visual encounter surveys. Pages 84-92 in W.R. Heyer, MA Donnelly, R.W. McDiarmid, L.C. Hayek, and M.S. Foster, eds. Measuring and Monitoring Biological Diversity: Standard Methods for Amphibians.

Hanson, J. 2003. Personal communication with J. Hanson, Fisheries Biologist, CDFG, Rancho Cordova with S. Khandwala, Stillwater Sciences, Berkeley, California. September.

Hayes, M. P., and M. R. Jennings. 1986. Decline of ranid frog species in western North America: are bullfrogs (*Rana catesbiana*) responsible? Journal of Herpetology 20: 490-509.

Hayes, M. P., and M. M. Miyamoto. 1984. Biochemical, behavioral, and body size differences between *Rana aurora aurora* and *Rana aurora draytonii*. Copeia 1984: 1018-1022.

Hayes, M.P., and M.R. Jennings. 1988. Habitat correlates of distribution of the California red-legged frog (*Rana aurora draytonii*) and the foothill yellow-legged frog (*Rana boylii*): Implications for management. Pp. 144-158 *In* R.C. Szaro, K.E. Severson, and D.R. Patton (technical coordinators), Proceedings of the symposium on the management of amphibians, reptiles, and small mammals in North America. United States Department of Agriculture, Forest Service, General Technical Report RM-166.

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

Hoover, S. 2003. Personal communication with S. Hoover, ECORP, Inc., Roseville, California with R. Peek, Stillwater Sciences, Davis California.

Jennings, M. R., and M. P. Hayes. 1985. Pre-1900 overharvest of California red-legged frogs (*Rana aurora draytonii*): the inducement for bullfrog (*Rana catesbiana*) introduction. Herpetologica 41: 94-103.

Jennings, M. R., and M. P. Hayes. 1994. Amphibian and reptile species of special concern in California. Final Report. Prepared by California Academy of Sciences, Department of Herpetology, San Francisco and Portland State University, Department of Biology, Portland, Oregon for California Department of Fish and Game, Inland Fisheries Division, Rancho Cordova.

Jennings, M. R., M. P. Hayes and D. C. Holland. 1993. A petition to the U. S. Fish and Wildlife Service to place the California Redlegged Frog (*Rana aurora draytonii*) and the Western Pond Turtle (*Clemmys marmorata*) on the list of endangered and threatened wildlife and plants.

Jennings, M. R. and M. P. Hayes. 1989. Final report of the status of the California redlegged frog (*Rana aurora draytonii*) in the Pescadero Marsh Natural Preserve. Contract No. 48239018. California Academy of Sciences, pp. 56.

Jennings, M. R., M. Hayes, and D. Holland. 1992. A petition to the USFWS to place the California red-legged frog (*Rana aurora draytonii*) and the western pond turtle (*Clemmys marmorata*) on the list of endangered and threatened wildlife and plants.

Knapp, R. 2003. Mountain yellow-legged frog website. Sierra Nevada Aquatic Research Laboratory, University of California, Mammoth Lakes. http://www.mylfrog.com

Kupferberg, S. J. 1997. Bullfrog (*Rana catesbiana*) invasion of a California river: the role of larval competition. Ecology 78: 1736-1751.

Lehr, S. 2004. Personal communication with S. Lehr, CDFG, Rancho Cordova, CA with S. Khandwala, Stillwater Sciences, Berkeley, CA.

Lind, A. 1997. Survey protocol for foothill yellow-legged frogs (*Rana boylii*) in streams. USDA Forest Service, Pacific Southwest Research Station, Arcata, California. 21 March.

PG&E (Pacific Gas and Electric Company). 2001. Survey protocols, standard operating procedures, and data sheets for amphibian surveys and habitat assessments. Pacific Gas and Electric Company, Technical and Ecological Services.

Reese, D. A. 1996. Comparative demography and habitat use of western pond turtle in northern California: the effects of damming and related alterations. Doctoral dissertation. University of California, Berkeley.

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.

SMUD (Sacramento Municipal Utility District). 2001. Initial Information Package for Relicensing of the Upper American River Project (FERC Project No. 2101). Sacramento, CA.
Stebbins, R. C. 1985. A field guide to western reptiles and amphibians. Second, revised edition. Houghton Mifflin, Boston.

Stebbins, R. C. 2003. A field guide to western reptiles and amphibians. Third, revised edition. Houghton Mifflin, Boston.

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

SMUD (Sacramento Municipal Utility District). 2001. Initial Information Package for Relicensing of the Upper American River Project (FERC Project No. 2101). Sacramento, CA.

Thoms, C., C.C. Corkran, and D.H. Olson. 1997. Basic amphibian survey for inventory and monitoring in lentic habitats. Pages 35-46 in Sampling Amphibians in Lentic Habitats, D.H. Olson, W.P. Leonard, and R.B. Bury, eds. Society for Northwestern Vertebrate Biology, Northwest Fauna Number 4.

USFWS (U.S. Fish and Wildlife Service). 1997. Guidance on site assessment and field surveys for California red-legged frogs (*Rana aurora draytonii*).

FIGURES

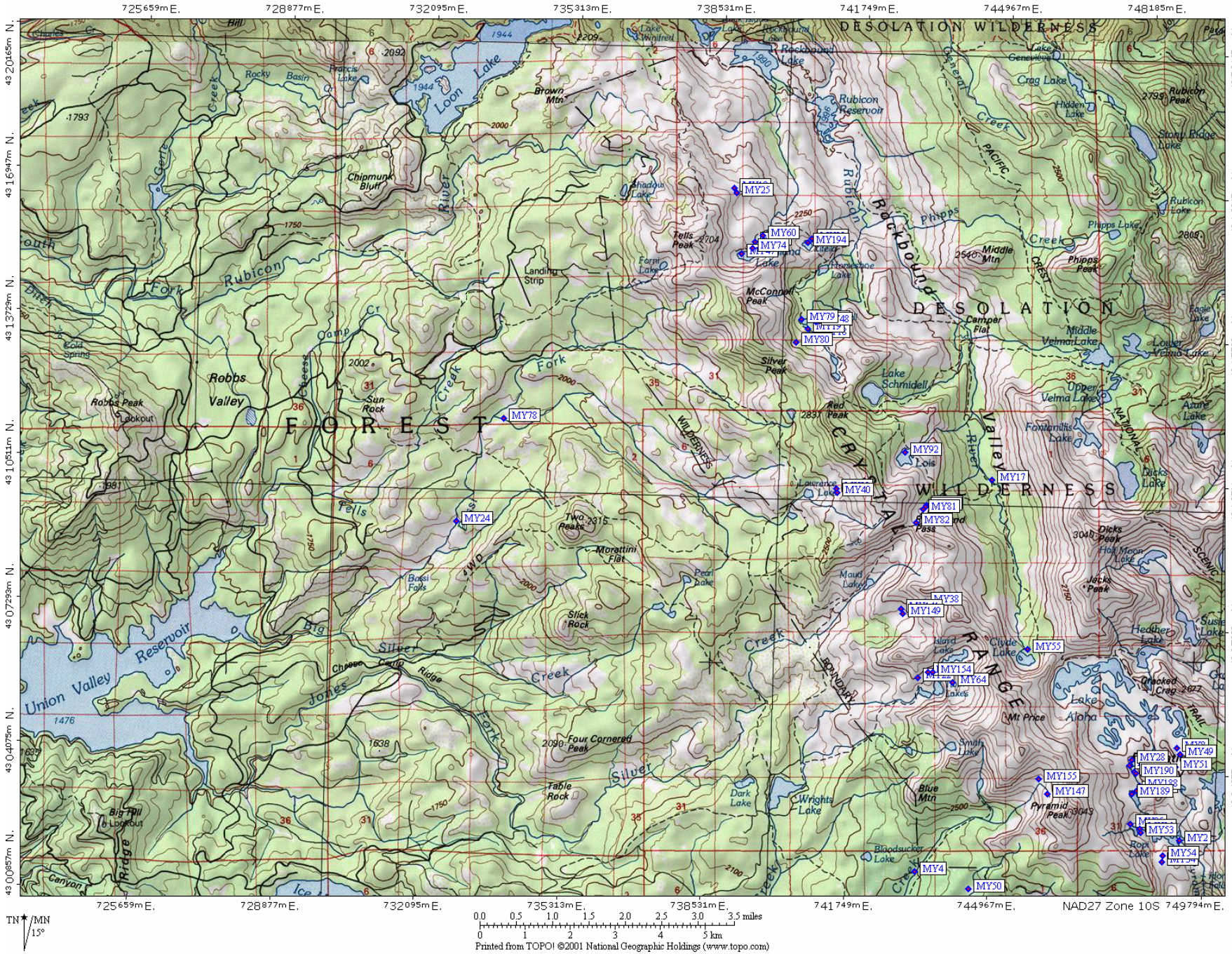

Figure 4.1-1. Previous sightings of mountain yellow-legged frog in the vicinity of the study area. (USFS, unpublished data)

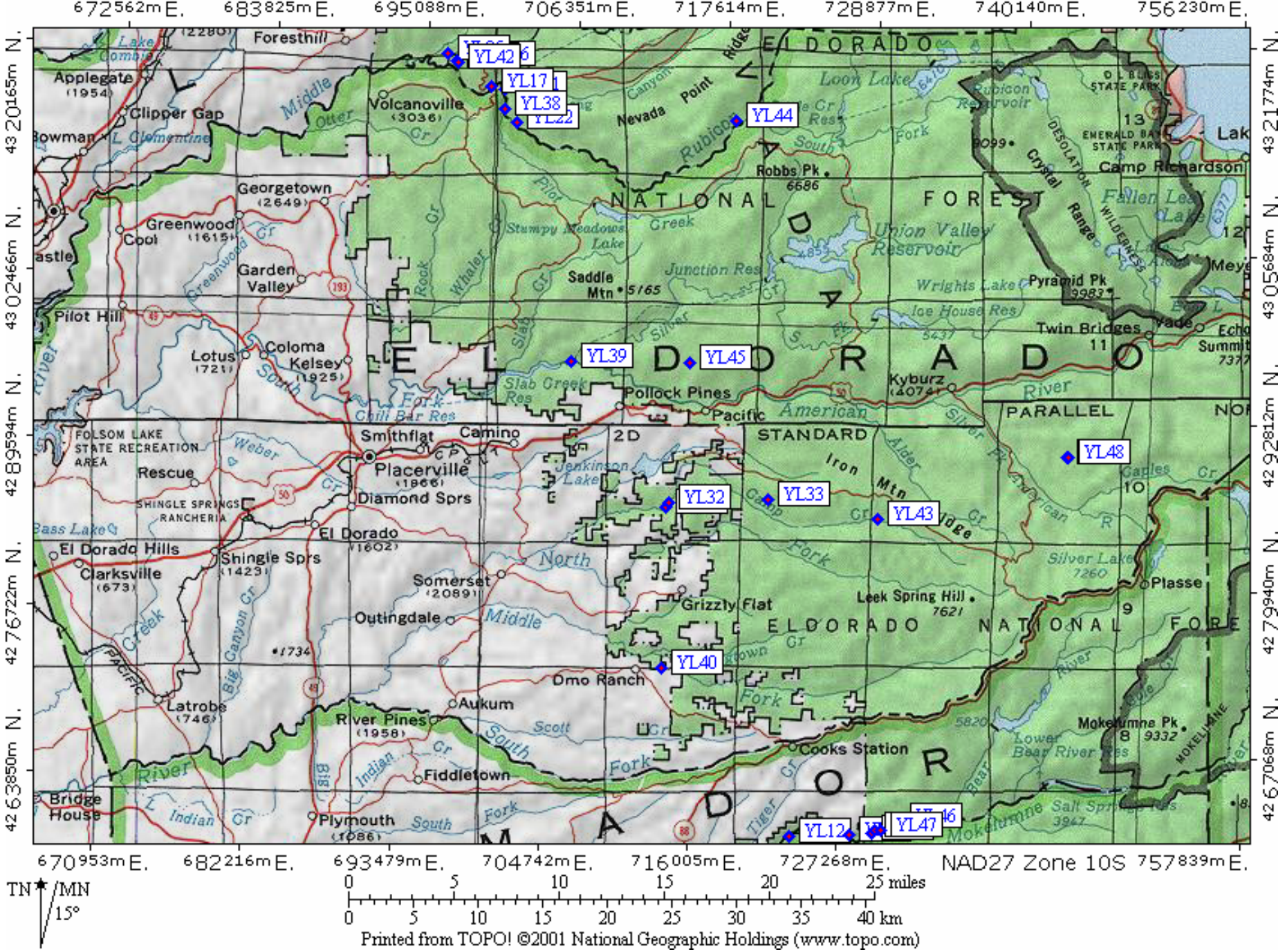

Figure 4.1-2. Previous sightings of foothill yellow-legged frog in the vicinity of the study area. (USFS, unpublished data)

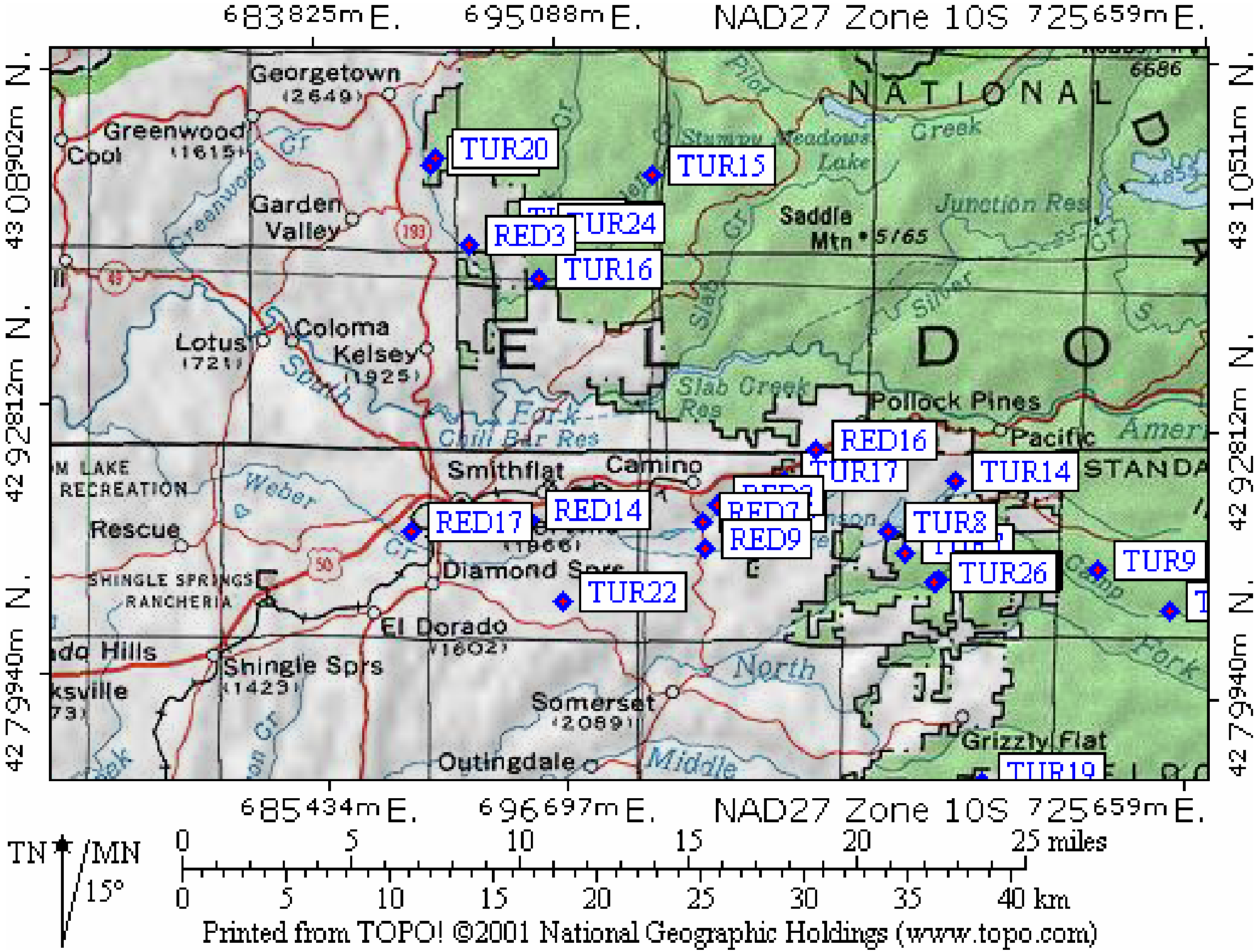

Figure 4.1-3. Previous sightings of California red-legged frog and Western pond turtle in the vicinity of the study area. (USFS, unpublished data)

Figure 4.2-1. Location of FYLF egg mass 1-A site at Site C-3, looking downstream at right bank.

Figure 4.2-2. Location of FYLF egg mass 1-A at Site C-3, egg mass attached beneath boulder to the left of submerged cobbles.

Figure 4.2-3. Location of FYLF egg mass 1-A at Site SFA-3, looking at left bank.

Figure 4.2-4. Location of FYLF egg mass at Site SFA-3, looking at left bank.

Figure 4.2-5. Location of FYLF egg mass 1-A at Site SFA-5, looking upstream at left bank.

Figure 4.2-6. Location of FYLF tadpole group 1-A at Site C-3, looking upstream at right bank.

Figure 4.2-7. Location of FYLF tadpole group 3-A at Site C-3, looking upstream at right bank.

Figure 4.2-8. Location of FYLF tadpoles at Site SFA-4, looking at right bank.

Figure 4.2-9. Location of FYLF tadpoles at Site SFA-3, looking at left bank, downstream end of site.

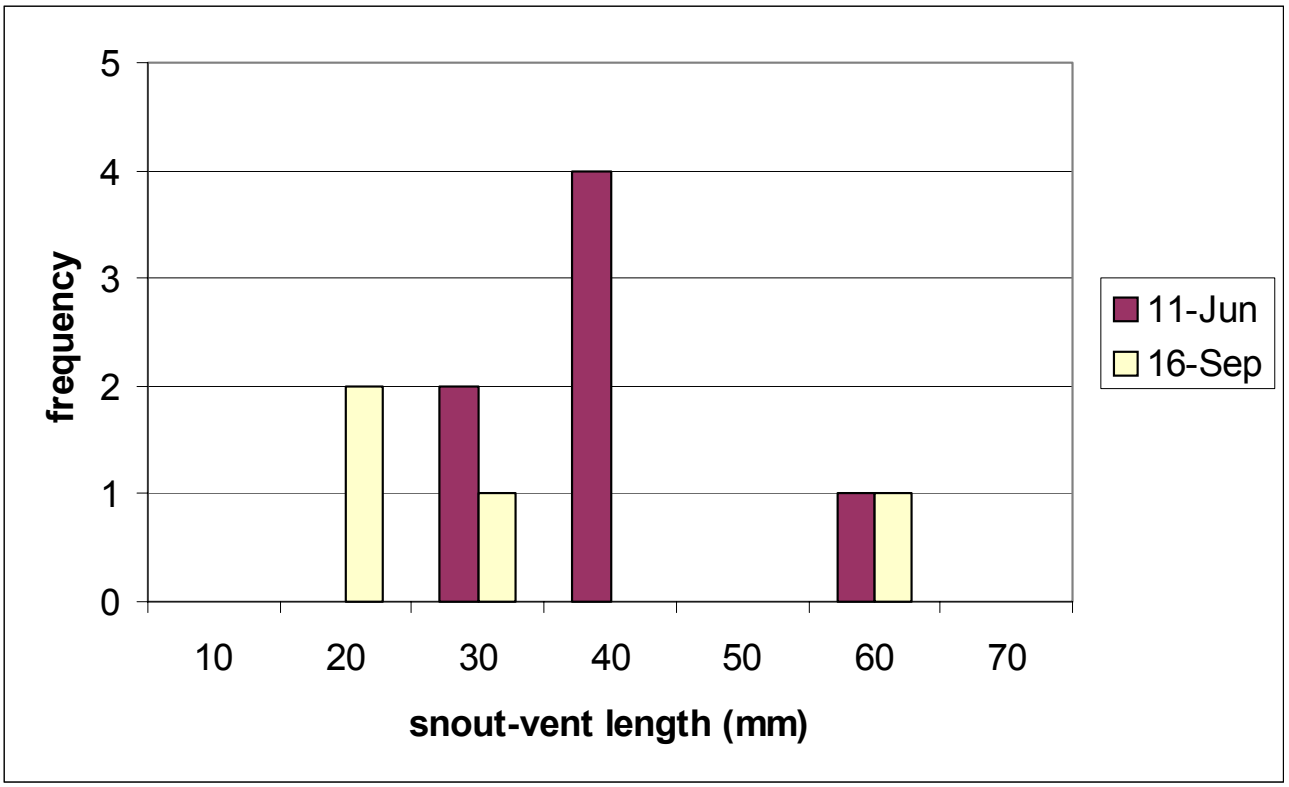

Figure 4.2-10a. Length frequency distribution of juvenile and adult foothill yellow-legged frog at Site C-3 by visit date, 2003.

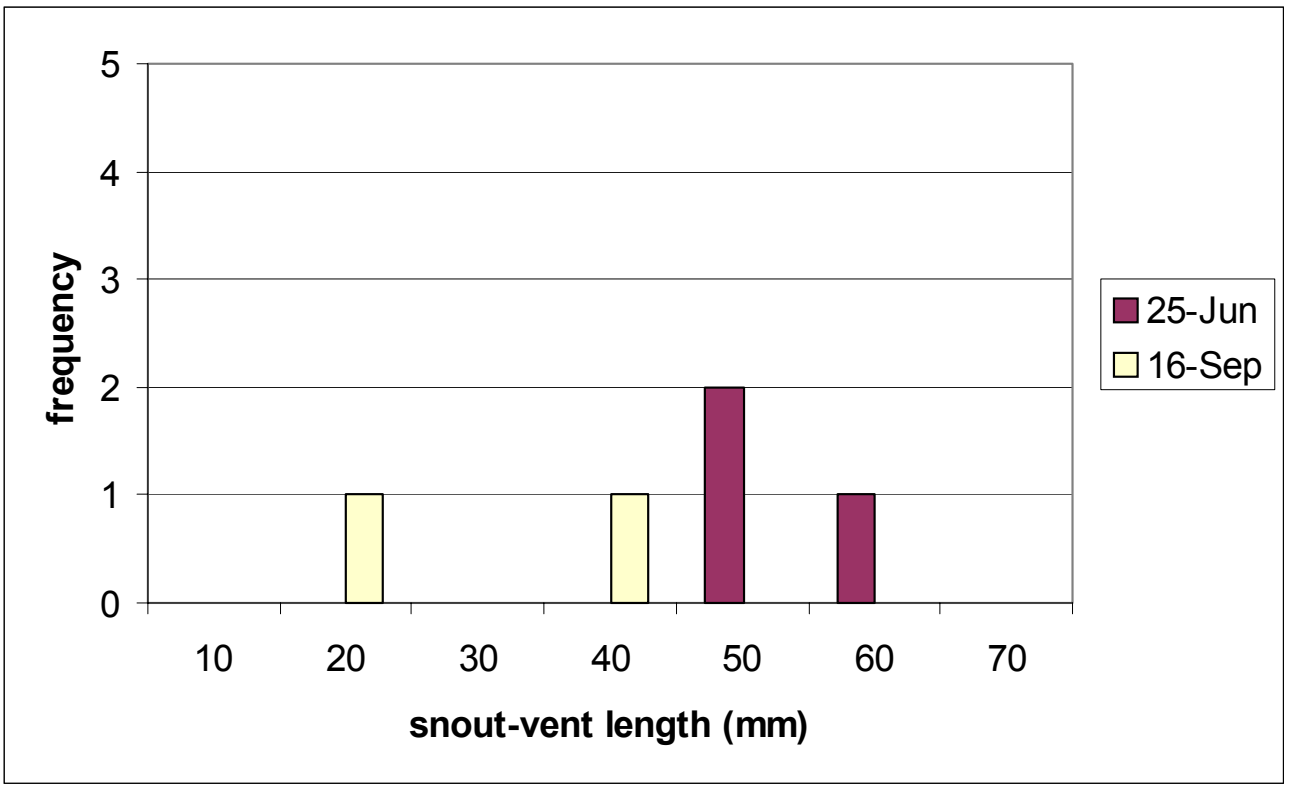

Figure 4.2-10b. Length frequency distribution of juvenile and adult foothill yellow-legged frog at Site SFA-3 by visit date, 2003.

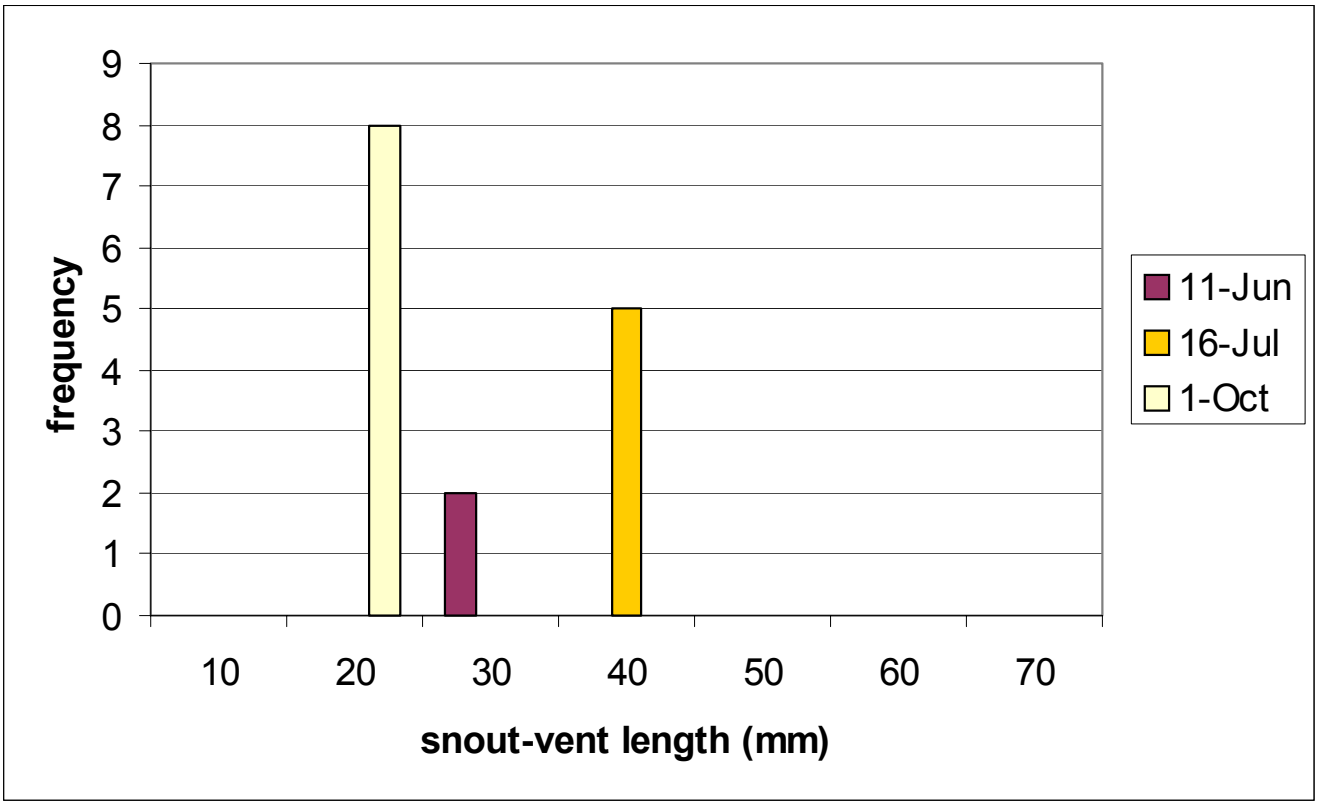

Figure 4.2-10c. Length frequency distribution of juvenile and adult foothill yellow-legged frog at Site SFA-4 by visit date, 2003.

Figure 4.2-11. Location of FYLF tadpoles at Site CB-27, looking at right bank.

APPENDIX A

PHASE I AND II SUMMARY

Appendix A
Phase I and II Summary

This appendix is adapted from the progress report distributed to the Aquatics Technical Working Group on February 14, 2003. Because numerous sites were added following the distribution of the progress report and the initial presentation of sites, and some sites were re-evaluated, this represents a more current and complete version of the potential sites evaluated and final list of VES sites.

Habitat suitability

Habitat type, flow type (ephemeral or perennial), aquatic/terrestrial vegetation, gradient, substrate, and stream channel type (e.g., meandering, step-pool) were noted at each site visited during the habitat reconnaissance. The criteria in Table A-1 were kept in mind while evaluating the various habitats into "unsuitable," "low suitability," "moderate suitability," and "high suitability." In general, classification was based on professional judgment using these criteria, habitat complexity, and known occurrences of these species. "Highly suitable habitats" were those that met many of these criteria; "moderately suitable habitats" were those that met some of these criteria, and combined with other factors, the habitat could potentially support the species; "low suitability habitats" were those that met a few of the key requirements, but were unlikely to support the species; and "unsuitable habitats" were those that met very few of these criteria, and were highly unlikely to support the species.

Phase II evaluated potentially suitable habitats during the first year of field study. Moderate and/or high quality habitats were identified in 12 of the 13 reaches surveyed, including the Reach Downstream of Chili Bar. Only the Gerle Creek Dam Reach had no moderate or high quality habitats for any of the target species. The Rubicon Dam, Rockbound Dam, and Buck Island Dam reaches contained the most suitable habitat along reservoir perimeters and not in the stream reaches themselves. Approximately 5-10 percent of each of these reservoirs was considered moderate or high quality habitat. Loon Lake Dam Reach contained suitable habitat along the northeast margins of the reservoir and along much of Gerle Creek itself. On Robbs Peak and Ice House Dam reaches, the stream reaches themselves were more suitable than the reservoirs. Very little suitable habitat was found on the Union Valley/Junction Dam Reach and only tributaries to this reach were surveyed. Camino Dam Reach contained suitable habitat for FYLF in small patches. SF American River and Slab Creek Dam reaches contained suitable habitat throughout the reach, particularly at tributary confluences in the Slab Creek Dam Reach. The Brush Creek Dam Reach supported very little moderate to high habitat. The Reach Downstream of Chili Bar supported very little high quality habitat along the mainstem because of fluctuating flow conditions. Habitat on tributaries to the mainstem was generally of better quality.

Table A-1. Suitability criteria for target amphibian and aquatic reptile species.

	Eggs	Larvae/Tadpoles	Adults
Mountain yellow-legged frog	Open stream and lake margins that gently slope to a depth of 12-20 inches for oviposition, which generally occurs in shallow water with the egg mass unattached, though it may be attached in steam situations.	Open stream and lake margins that gently slope to a depth of 12-20 inches for tadpole refugia from fish predators; overwinter in deep pools with undercut banks. Larvae move to warm shallows in spring.	Rocky margins, clumps of grass for cover; streams/lakes/ponds in montane riparian, lodgepole pine, subalpine conifer, and wet meadow habitats. Prefer open, sloping banks of meadow streams, riverbanks, isolated pools, and lake borders with vegetation. Inhabits ponds, tarns, lakes, and streams at moderate to high elevations.
Foothill yellow-legged frog	Low to moderate gradient streams, shallow edgewater areas; often close to confluences with tributary streams; low gradient cobble and small boulder bars, side pools, side channels. Open sunny areas, little riparian vegetation. Deposits masses of eggs on the downstream side of cobbles and boulders over which a thin, gentle stream of water flow.	Adjacent to riffles, cascades, main channel pools, and plunge-pools that provide escape cover. Tadpoles show affinity to oviposition site. Edgewater habitat with substrate interstices, vegetation, and detritus for cover. Cobble bars and slow-moving segments of streams.	Perennial streams and ephemeral creeks with pools. Prefer areas that provide exposed basking sites and cool shady areas adjacent to water's edge. Shallow, flowing water, preferentially in small to moderate-sized streams with some cobble-sized substrate.
California red-legged frog	Ponds or backwater pools attached to emergent vegetation (*Typha* and *Scirpus*). Females attach egg masses to an emergent vegetation brace.	Same habitat as eggs; slow-moving, shallow riffle zones, margins of pools. Larvae spend most time in submergent vegetation or organic debris.	Emergent and/or riparian vegetation, undercut banks, semi-submerged root masses; open grasslands with seeps or springs with dense growths of woody riparian vegetation, willows; *Typha*, *Scirpus*, and *Salix* are good indicator species for frog presence. Associated with deep (>0.7 m), still or slow-moving water. Juveniles prefer open, shallow aquatic habitats with dense submergents.
Western pond turtle	Upland sites in the vicinity of aquatic habitats with high clay or silt content, in low gradient slopes (less than 25 degrees). Eggs require a dry nest, typically located on an unshaded slope that may be partly south-facing.	Shallow water habitat with relatively dense submergent or short emergent vegetation.	Aerial and aquatic basking sites important; permanent ponds, lakes, low-flow regions of rivers, and river side-channels and backwater areas. Abundant emergent woody debris, overhanging vegetation and rock outcrops. Not common in high gradient streams. May overwinter on land or in water. Require some slack- or slow-water aquatic habitat. Favor mats of submergent vegetations for basking, esp. pondweed and ditch grass.

Predicted timing of surveys

Based on available information, the following tables summarize the predicted timing of VES within the UARP and the Reach below Chili Bar for the target species mentioned above, as well as providing some habitat associations used in evaluating the potential VES sites (habitat associations largely based on Jennings and Hayes, *Amphibian and Reptile Species of Special Concern in California*, California Department of Fish and Game, 1994). Exact timing of surveys will be determined based on a combination of local environmental factors (e.g., 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).

Mountain yellow-legged frog

Mountain yellow-legged frog is most active March through August, depending on elevation and local conditions. Adults prefer open, sloping banks of meadow streams, riverbanks, isolated pools, and lake borders with vegetation. This species typically inhabits ponds, lakes, and streams in lodgepole pine, subalpine conifer, and wet meadows at moderate to high elevations (typically above 4,500 ft). Mountain yellow-legged frog has no threatened or endangered listing status, but is considered to be a species of concern by the State and federal government. It was recently placed on the candidate species list by the USFWS.

Target Life Stage	Time of Surveys	Frequency of Surveys	Habitat associations
Metamorphs and adults (post-metamorphic)	Aug – Sep	One site visit to all potential sites; a repeat site visit 2-4 weeks later to highest quality habitats.	Rocky margins, clumps of grass for cover; streams/lakes/ponds in montane riparian, lodgepole pine, subalpine conifer, and wet meadow habitats.

Foothill yellow-legged frog

Foothill yellow-legged frog is most active March through June or July. Egg-laying typically follows the period of high flow discharge with winter rainfall and snowmelt, as well as an increase in ambient air and water temperatures. Foothill yellow-legged frog is typically found at elevations below 5,000 ft. Foothill yellow-legged frog is a species of concern under the State and federal endangered species acts.

Target Life Stage	Time of Surveys	Frequency of Surveys	Habitat associations
Determination of breeding period, oviposition, and larval distribution.	April–June	One initial site visit and if not found, a second site visit 2-4 weeks later for egg surveys	Low to moderate gradient streams, shallow edgewater areas; often close to confluences with tributary streams; low gradient cobble and small boulder bars, side pools, side channels. Open sunny areas, little riparian vegetation. Deposits masses of eggs on the downstream side of cobbles and boulders over which a thin, gentle stream of water

Target Life Stage	Time of Surveys	Frequency of Surveys	Habitat associations
			flow.
Larval	June–September	One visit per site	Adjacent to riffles, cascades, main channel pools, and plunge-pools that provide escape cover. Tadpoles show affinity to oviposition site. Edgewater habitat with substrate interstices, vegetation, and detritus for cover. Cobble bars and slow-moving segments of streams.
Juveniles, subadults, & adults	July–October	The third site visit will be conducted only at those sites where eggs were found during the initial site visits, or to identify larvae found during previous site visits.	Perennial streams and ephemeral creeks with pools. Prefer areas that provide exposed basking sites and cool shady areas adjacent to water's edge. Shallow, flowing water, preferentially in small to moderate-sized streams with some cobble-sized substrate.

California red-legged frog

California red-legged frog is listed as threatened by the federal government. In order to minimize disturbance to breeding frogs, egg masses, or tadpoles, surveys for this species are confined to only target the adult life stage (USFWS 1997).

Target Life Stage	Time of Surveys	Frequency of Surveys	Habitat associations
Adults	May 1 to November 1	Four visits per site, twice during the day and twice during the night, with at least 24 hours between surveys at each site.	Emergent and/or riparian vegetation, undercut banks, semi-submerged root masses; open grasslands with seeps or springs with dense growths of woody riparian vegetation, willows; Typha, Scirpus, and Salix are good indicator species for frog presence. Associated with deep (<0.7 m), still or slow-moving water. Juveniles prefer open, shallow aquatic habitats with dense submergents.

Western pond turtle

Western pond turtle is most active mid-April through July, depending on elevation and local weather conditions. Adults emerge from overwintering sites (usually upslope within the forest) in the spring and travel to aquatic sites to breed during this time. Western pond turtle is a species of concern to the federal and state governments.

Target Life Stage	Time of Surveys	Frequency of Surveys	Habitat associations
Adults	June–September	Incidental observations with California red-legged frog (as well as other target species) surveys	Aerial and aquatic basking sites important; permanent ponds, lakes, low-flow regions of rivers, and river side-channels and backwater areas. Abundant emergent woody debris, overhanging vegetation and rock outcrops. Not common in high gradient streams. May overwinter on land or in water. Require some slack- or slow-water aquatic habitat. Favor mats of submergent vegetations for basking, especially pondweed and ditch grass.

Rationale for selecting or rejecting potential VES sites

Table A-2 summarizes the rationale for selecting or rejecting VES sites based on habitat reconnaissance and preliminary habitat assessments and considering quality of habitat, reach length, diversity of habitat types per reach, and accessibility.

Table A-2. Potential sites identified during Phase I and II of study.

Reach	reach length (miles)	# of sites selected for reach[1]	site number and description (elevation)[2]	target species[3]	suitability[4]	selected?	comments
Rubicon Reservoir Reach	4.1	2 stream sites, 1 pond, perimeter of Reservoir	RR1: Inlet to Rubicon Reservoir (6656 ft)	MYLF	Mod	No	• Dries up by mid-summer • Open, chute-like channel through granite, with little cover • Lack of suitable habitat for target species
			RR2: Downstream of Rubicon Reservoir (6500 ft)	MYLF	Mod	No	• When viewed from air given "high" suitability • On-the-ground surveys suggest lack of suitable habitat for target species
			RR3: Habitat Unit #24 (5855 ft)	MYLF	High	Yes	• Shallow margin areas, adjacent meadow habitat • Large woody debris in channel • Some deep pools • Site was selected for VES surveys
			RR4: Habitat Unit #66 (6089 ft)	MYLF	High	Yes	• Shallow margin areas, some meadow habitat • Overhanging vegetation • Low gradient • Site was selected for VES surveys
			Fox Lake	MYLF	Mod	Yes	• Small pond with emergent vegetation • Site was selected for VES surveys
			perimeter of Rubicon Reservoir	MYLF	Low-Mod	Yes	• Site was requested by TWG
Rubicon Tunnel Outlet Reach	0.2	0	RT1: Below Rubicon Dam (6599 ft)	MYLF	Mod	No	• Man-made canal; not much cover • Short reach • Lack of suitable habitat for target species

Table A-2. Potential sites identified during Phase I and II of study.

Reach	reach length (miles)	# of sites selected for reach[1]	site number and description (elevation)[2]	target species[3]	suitability[4]	selected?	comments
Rockbound Lake Reach	0.4	1 stream site, 3 ponds, perimeter of Rockbound Lake	RL1: Downstream of Rockbound Dam (6514 ft)	MYLF	Mod	Yes	• Deep pools • Large substrates • Adjacent meadow habitat available • Site was selected for VES surveys
			RL2: Highland Creek (6528 ft)	MYLF	High	No	• Dries up by mid-summer • Not much cover • High gradient • Lack of suitable habitat for target species
			RL3: Rockbound Lake margin near inlet (6528 ft)	MYLF	High	Yes (included in perimeter survey)	• Overhanging vegetation • Moderate gradient • Adjacent meadow/marsh • Based on input from the TWG, site was selected for VES surveys
			3 ponds near Rockbound Lake	MYLF	Mod	Yes	• Small ponds with emergent vegetation • Site was selected for VES surveys
			perimeter of Rockbound Lake	MYLF	Low-Mod	Yes	• Site was requested by TWG
Buck Island Dam Reach	2.8	1 stream site and perimeter of Reservoir	BI1: Creek crossings southwest of Buck Island Dam (6416 ft)	MYLF	High	No	• Probably ephemeral streams • No habitat for YT • Site did not have connection to reservoir, to potentially tie into reservoir operations
			BI2: Buck Island Reservoir margin (6414 ft)	MYLF	High	Yes (encompassed in perimeter survey)	• Shallow margin areas along reservoir • Aquatic macrophytes / overhanging vegetation • Backwater habitats with no fish • Site was selected for VES surveys

Table A-2. Potential sites identified during Phase I and II of study.							
Reach	**reach length (miles)**	**# of sites selected for reach[1]**	**site number and description (elevation)[2]**	**target species[3]**	**suitability[4]**	**selected?**	**comments**
			BI3: Downstream of Buck Island Dam (6408 ft)	MYLF	High	Yes	• Shallow pools with gravel/cobble substrates • Deeper pools • Overhanging vegetation • Low gradient • Site was selected for VES surveys
			perimeter of Buck Island Reservoir	MYLF	Mod	Yes	• Site requested by TWG
Loon Lake Reach	8.9	3 sites along Loon Lake Reservoir, 2 stream sites, perimeters of 4 ponds southwest of Loon Lake	LL1: Loon Lake, Lily Pad Cove (first cove on north shore) (6377 ft)	MYLF	Mod	No	• Rocky outcrops, emergent vegetation along bank • Short drop off • Found one western toad at this site
			LL2: Toad Cove (6413 ft)	MYLF	High	Yes	• Many more western toads than LL1 • Habitat more complex than LL1 • Large meadow behind road suitable for YT • Site was selected for VES surveys
			LL3: Loon Lake, east side of "island" in cove (6377 ft)	MYLF	Mod	No	• Backwater ponded area • Side channel with dense canopy • Overall, habitat not as suitable as LL4
			LL4 (A&B): (A) Loon Lake at (B) Ellis Creek (western side of "island" in cove) (6431 ft)	MYLF	High	Yes	• Reservoir margin as well as creek provide suitable high elevation habitat • Backwater areas present, streamside vegetation • Some braiding of channel • Site was selected for VES surveys

Table A-2. Potential sites identified during Phase I and II of study.							
Reach	**reach length (miles)**	**# of sites selected for reach[1]**	**site number and description (elevation)[2]**	**target species[3]**	**suitability[4]**	**selected?**	**comments**
			LL5: Gerle Creek d/s of Loon Lake (6326 ft)	MYLF	Mod	No	• Small cobble and boulder habitat • Left bank heavily vegetated
			LL6: Gerle Creek at Jerrett Creek confluence (5896 ft)	MYLF	Mod	No	• Some sidewater habitats • Gravel and cobble substrates • Some emergent vegetation, but not a lot of cover for amphibians
			LL7: Gerle Creek u/s of waterfall (6046 ft)	MYLF	Mod	No	• Similar to LL5 • Boulder and cobble substrates • Few backwater/slower water areas
			LL8: Gerle Creek downstream of waterfall (5979 ft)	MYLF	High	Yes	• Large bedrock outcrops for basking • Rushes along bank edges • High macroinvertebrate standing crop • Split channel, complex habitat • Widened channel • Site was selected for VES surveys
			LL9: Gerle Creek into Gerle Creek Reservoir (5233 ft)	MYLF	Low	No	• Lack of suitable habitat for target species
			LL10: Gerle Creek at Gerle Meadow (5847 ft)	MYLF	High	Yes	• Meadow habitat close to 6,000 ft elevation • Adjacent creek habitat with large, deep pools • Site was selected for VES surveys
			LL11: Loon Lake Reservoir at old Ellis Creek confluence	MYLF	Mod	Yes	• Large meadow habitat
			perimeter of 12 ponds southwest of Loon Lake	MYLF	Mod	Yes	• Sites requested by TWG • 8 ponds had already been surveyed by CDFG; the Licensee completed remaining 4 ponds

Table A-2. Potential sites identified during Phase I and II of study.

Reach	reach length (miles)	# of sites selected for reach[1]	site number and description (elevation)[2]	target species[3]	suitability[4]	selected?	comments
Gerle Creek Dam Reach	1.1	0 sites	GC1: Angel Creek into Gerle Creek Reservoir (5217 ft)	MYLF	Low	No	• Lack of suitable habitat for target species
			GC2: Gerle Creek d/s of Gerle Creek Reservoir (5179 ft)	MYLF	Mod	No	• Large boulder and cobble substrate • No backwater areas, some cascading falls • Lack of suitable habitat for target species
Robbs Peak Reach	5.6	2 stream sites	GC6: Gerle Creek upstream of confluence with SF Rubicon (5031 ft)	MYLF	High	Yes	• Heavily vegetated banks • Large, wide deep pools • Mostly cobble and small boulder substrate • Overall, best suitable habitat within reach • Site was selected for VES surveys
			GC3: SF Rubicon d/s of Robbs Peak Forebay (5194 ft)	FYLF	Mod	No	• Cascading riffle habitat with moderate gradient • Moderate habitat and similar to GC8 • Dam in close proximity to site • Some suitable habitats, but only of moderate quality
			GC4: SF Rubicon further d/s of GC3 (5184 ft)	FYLF	Low	No	• Less habitat complexity than GC3 • Less vegetation cover
			GC5: Robbs Peak Forebay (5196 ft)	FYLF	Low	No	• High, rocky banks • Deep water with large boulders at bottom • Lack of suitable habitat for target species
			GC7: SF Rubicon River u/s of 13N29 crossing (5001 ft)	FYLF	Low	No	• Large boulders and narrow channel • Like GC2 • Lack of suitable habitat for target species
			GC8: SF Rubicon d/s of 13N29 crossing (4987 ft)	FYLF, CRLF	High	Yes	• More suitable than GC3 • GC3 and GC8 within 2 miles of each other; one site is sufficient • Open channel, overhanging vegetation • Site was selected for VES surveys

Table A-2. Potential sites identified during Phase I and II of study.

Reach	reach length (miles)	# of sites selected for reach[1]	site number and description (elevation)[2]	target species[3]	suitability[4]	selected?	comments
Ice House Reservoir Reach	11.5	3 stream sites	J6: SF Silver Creek d/s of Ice House Reservoir (u/s of Ice House Rd) (5219 ft)	FYLF	Mod	No	• Sedges along bank, algae over cobble and gravel stream channel substrate • Near campground, so disturbance high • Site does not include reservoir margin
			J7: Downstream of Ice House Rd on SF Silver Creek (5223 ft)	FYLF	Mod	No	• Low gradient, large boulders and bedrock • Some emergent vegetation; not as much habitat complexity as IH1
			J8: SF Silver Creek d/s of Peavine Creek confluence (5249 ft)	FYLF, WPT	High	Yes	• Emergent vegetation and wetland plants along margin of stream • Large, deep pools • Upslope soils suitable for WPT • Site was selected for VES surveys
			J9&J10: Meadow and SF Silver Creek d/s of Ice House Dam (5281 ft)	FYLF	Mod	No	• Observed Pacific treefrog tadpoles • Small meadow habitat created by culvert seepage • Meadow habitat at IH3 is of higher quality
			IH1: SF Silver Creek u/s of Junction Reservoir at Bryant Springs Rd (4488 ft)	FYLF	High	Yes	• Aquatic substrate cobble and gravel • High habitat complexity • Overhanging vegetation, cobble bar along right bank • Low to moderate gradient • Site was selected for VES surveys
			IH2: Ice House Reservoir (A) reservoir area, and (B) inlet and vegetated area (5441 ft)	MYLF	Mod	No	• Reservoir habitat very exposed and not likely to support amphibians • Tributary area somewhat more suitable • Overall lack of suitable habitat for target species

Table A-2. Potential sites identified during Phase I and II of study.							
Reach	**reach length (miles)**	**# of sites selected for reach[1]**	**site number and description (elevation)[2]**	**target species[3]**	**suitability[4]**	**selected?**	**comments**
			IH3 (A & B): SF Silver Creek within burn area (4869 ft)	FYLF	High	Yes	• Braided channel, mid-channel bar with adjacent meadow habitat • Long, consistent riffles, channel substrate gavel and small cobbles • Overhanging vegetation made up of sedges and young willows, rushes • Site was selected for VES surveys
Union Valley and Junction Reservoirs Reach	8.3	2 stream sites (one site includes reservoir margin)	UV1: Jones Fork Silver Creek at Ice House Road (4902 ft)	FYLF, CRLF, WPT	High	Yes	• Sedges along right bank • Some standing water pools during low flows suitable for CRLF • Large woody debris • Site was selected for VES surveys
			UV2: Big Silver Creek at Ice House Rd (4919 ft)	FYLF, CRLF, WPT	Mod	No	• Some side channel pool habitat • Large boulders in channel; less habitat complexity than UV1 • Water velocity high near margins of channel
			UV3: Tells Creek d/s of Ice House Rd (5065 ft)	FYLF, CRLF, WPT	High	No	• Step-pool, moderate to high gradient morphology • Large boulders, some backwater pools • Downed wood • Not as suitable as UV1
			UV4 (A&B): Yellow Jacket Creek confluence with Union Valley Reservoir (4917 ft)	FYLF	Mod to High	Yes	• Reservoir margin with some backwater areas • Small, narrow channel • Cobbles and small boulder substrate • Some streamside vegetation and downed wood • Site was selected for VES surveys
			J1: Upstream end of Junction Reservoir at Powerhouse (4421 ft)	FYLF	Low	No	• Right bank has steep gradient and rock cliff, highly disturbed due to toe of dam. • Left bank is steep and rocky, no vegetation along the banks. • Lack of suitable habitat for target species

Table A-2. Potential sites identified during Phase I and II of study.							
Reach	**reach length (miles)**	**# of sites selected for reach[1]**	**site number and description (elevation)[2]**	**target species[3]**	**suitability[4]**	**selected?**	**comments**
			J2: Junction Reservoir at boat avoidance floats (4424 ft)	FYLF, CRLF, WPT	Low	No	• Steep banks, and little cover • Lack of suitable substrates/habitat for target species
			J3: Southern arm of Junction Reservoir (4527 ft)	FYLF, CRLF, WPT	Low	No	• Margin habitat is rocky cliffs, barren, no vegetation • Water appears deep and unsuitable for target species • From road, access is difficult
			J4: Junction Reservoir, along road to Junction Dam near mouth of south arm (4419 ft)	FYLF, CRLF, WPT	Low	No	• Habitat appears similar to u/s reservoir areas • Rocky banks, Douglas firs along steep banks; deep stillwater habitat
			J5: Below Junction Dam (4310 ft)	FYLF	Mod	No	• Cobble and gravel substrates downstream of dam • Some habitat complexity, and potentially suitable habitat for FYLF
Camino Reservoir Reach	6.0	2 stream sites	C1: Camino Reservoir at Jaybird Powerhouse (2928 ft)	FYLF	Mod	No	• No aquatic vegetation or overhanging bank vegetation • Steep canyon banks
			C2: Jaybird Creek confluence with Camino Reservoir (3454 ft)	FYLF	Low	No	• Creek habitat high gradient • Lack of suitable habitat for target species
			C3: Silver Creek at tunnel adit (2417 ft)	FYLF	Mod	Yes	• Some widening of channel from upstream areas • Bank vegetation (small woody vegetation) • Deep bedrock and boulder pools • FYLF found at this location during fish snorkel surveys • Site was selected for VES surveys

Table A-2. Potential sites identified during Phase I and II of study.							
Reach	**reach length (miles)**	**# of sites selected for reach[1]**	**site number and description (elevation)[2]**	**target species[3]**	**suitability[4]**	**selected?**	**comments**
			SFA4: Silver Creek at confluence of SF American River	FYLF	High	Yes	• Site was requested by agencies
SF American Reach		1 stream site	SFA1: SF American d/s of Camino PH at Forebay Rd crossing (1878 ft)	FYLF	Low	No	• Wide, swift channel confined by canyon walls on both sides • Deep channel with little cover habitat • Lack of suitable habitat for target species
			SFA2: SF American u/s of Camino PH and u/s of Forebay Rd crossing (1917 ft)	FYLF	Low	No	• Wide, swift channel • Banks steep and densely vegetation • Access is difficult • Lack of suitable habitat for target species
			SFA3: SF American in the vicinity of El Dorado PH (1905 ft)	FYLF	Mod-High	Yes	• Site was selected for VES surveys based on observations of adult FYLF by biologists contracted by EID.
Brush Creek Reservoir Reach	2.1	1 stream site	BC1: Brush Creek Reservoir (2955 ft)	FYLF, WPT	Mod	No	• Similar habitat to BC2 • Accessibility more difficult (requires boat across Slab Creek Reservoir) than BC2 • Reservoir margin not likely to be suitable habitat (so no advantage to placement there)
			BC2: D/s of Brush Creek Reservoir (2817 ft)	FYLF, WPT	Mod	Yes	• More forested than BC1 • Less gradient than BC1 • Site was selected for VES surveys

Table A-2. Potential sites identified during Phase I and II of study.							
Reach	**reach length (miles)**	**# of sites selected for reach[1]**	**site number and description (elevation)[2]**	**target species[3]**	**suitability[4]**	**selected?**	**comments**
Slab Creek Reservoir Reach	8.0	3 stream sites	SC1: Slab Creek Reservoir (1747 ft)	FYLF, CRLF, WPT	Low	No	• Reservoir margin • Lack of suitable habitat for target species
			SC2: SF American d/s of Slab Creek Dam (1643 ft)	FYLF	High	Yes	• Wide channel • Cobble, gravel, some boulder substrate • Particle sizes get larger further downstream, and channel becomes more confined • Site was selected for VES surveys
			SC3: SF American at Mosquito Rd bridge (1352 ft)	FYLF, CRLF, WPT	Mod	No	• Large substrates, shallow pools • High gradient • Little vegetation along margin of channel
			SC4: SF American at White Rock PH (1014 ft)	FYLF	High	Yes	• Wide channel • Gravel and cobble substrate • Sedges proving some cover/protection • Some backwater/side channel habitat • Site was selected for VES surveys
			SC5: D/s of White Rock PH (981 ft)	FYLF	Low	No	• Swift flow, steep canyon walls • Narrow, deep channel • Lack of suitable habitat for target species
			SC6: SF American at Rock Creek	FYLF	Mod	Yes	• Site requested by TWG
UARP TOTAL		**34**					
Reach below Chili Bar Dam	20.0	7 stream sites, 2 stock ponds	CB1: Mainstem (488 ft)	FYLF	Low	No	• Perennial stream margins • Little bank vegetation • Lack of suitable habitat for target species
			CB2: Weber Creek (522 ft)	CRLF, WPT	Mod	Yes	• Tributary confluence with deep pools • Boulder substrate further up creek; at mouth cobbles and gravels • No suitable habitat for FYLF • Site was selected for VES surveys (CRLF)

Table A-2. Potential sites identified during Phase I and II of study.

Reach	reach length (miles)	# of sites selected for reach[1]	site number and description (elevation)[2]	target species[3]	suitability[4]	selected?	comments
			CB3: Upstream of Weber Creek (528 ft)	FYLF	Mod	No	• Shallow side channel areas protected from main flow • Mid-channel bar • Less complexity than other side channel and mid-channel bar sites
			CB4: Stock ponds (900 ft)	CRLF, WPT	Mod	Yes	• Emergent vegetation around pond • Site was selected for VES surveys
			CB5: "Hook" gravel bar (603 ft)	FYLF	Mod	Yes (deemed unsuitable after first site visit)	• Side channel and mid-channel bar habitat • Cove habitats along bar • Small cobble and gravel substrate • Site was selected for VES surveys • Subsequent visit to site determined it was unsuitable at high flows
			CB6: Mainstem near confluence with Hastings Creek (635 ft)	FYLF	Low	No	• No backwater areas with flow refuge • Lack of suitable habitat for target species • Difficult to access
			CB7: Hastings Creek (650 ft)	FYLF	Mod	Yes	• Perennial tributary stream to SF American • open to moderately-open riparian canopy • Site was selected for VES surveys
			CB8: Greenwood Creek (672 ft)	FYLF	Low	Yes	• Perennial tributary stream to SF American • Adjacent mainstem habitat not suitable for FYLF oviposition • Site was requested for survey by TWG
			CB9: Upstream of Greenwood Creek (675 ft)	FYLF	Mod	No	• Side channel and point bar habitat • Shallow edgewater areas, some bank vegetation
			CB10 (675 ft)	FYLF	Mod	No	• Side channel and point bar habitat • Faster flow habitats, not as much flow refuge as other side channel/point bar sites

Table A-2. Potential sites identified during Phase I and II of study.							
Reach	**reach length (miles)**	**# of sites selected for reach[1]**	**site number and description (elevation)[2]**	**target species[3]**	**suitability[4]**	**selected?**	**comments**
Reach below Chili Bar Dam			CB11: Stock ponds (824 ft)	CRLF, WPT	Mod	No	• Emergent vegetation around pond • Site was selected for VES surveys • Site access was not gained
			CB12 (684 ft)	FYLF	Mod	Yes (deemed unsuitable after first site visit)	• Side channel and mid-channel bar habitat • Side channel shallow with some streamside vegetation • Site was selected for VES surveys • Subsequent visit to site determined it was unsuitable at high flows
			CB13: Five stock ponds (832 ft)	CRLF, WPT	Mod	No	• Emergent vegetation around pool; cattails • Access appeared to be difficult
			CB14: Lateral bar with side channel (d/s Coloma) (692 ft)	FYLF, CRLF?	Mod	No	• Side channel and lateral bar habitat • Backwater areas • Small pools • Site was selected for VES surveys • Subsequent visit to site determined it was unsuitable at high flows
			CB15: Coloma between two bridges (758 ft)	FYLF	Mod	Yes	• Long, narrow side channel and lateral bar • Vegetation cover available on both sides of side channel • Site was selected for VES surveys
			CB16: Dutch Creek (upstream of Coloma Bridge) (784 ft)	FYLF	Mod	Yes	• Perennial tributary stream to SF American River • Adjacent mainstem habitat suitable for oviposition • Accessibility high • Site was selected for VES surveys
			CB17 (761 ft)	FYLF	Low	No	• Perennial stream with lateral point bar • Channel area much narrower than other sites • During high flows, likely not as suitable habitat • Lack of suitable habitat for target species

Table A-2. Potential sites identified during Phase I and II of study.

Reach	reach length (miles)	# of sites selected for reach[1]	site number and description (elevation)[2]	target species[3]	suitability[4]	selected?	comments
			CB18 (858 ft)	FYLF	Low	No	• Perennial stream and lateral point bar • High water velocities • Habitat complexity lower than other sites • Likely lack of suitable habitat for target species, particularly at higher flows
			CB19&20: SF American at unnamed creek mouth and creek (898 ft)	FYLF	Mod	Yes	• Perennial tributary to SF American River • Adjacent mainstem habitat suitable for oviposition • Some evidence of channel braiding at mouth of tributary • Site was selected for VES surveys
			CB21: Just below Highway 193 (995 ft)	FYLF	Low	No	• Perennial stream and point bar • Little riparian vegetation • Heavily disturbed • Lack of suitable habitat for target species
CHILI BAR TOTAL		**11**					

1 Number of sites selected per reach is based on a consideration of reach length, diversity of available habitat types, and accessibility.
2 Site numbers do not correspond directly to the reach name (e.g., not all "J" numbers are in the Junction Dam Reach)
3 MYLF=Mountain yellow-legged frog, FYLF=Foothill yellow-legged frog, CRLF=California red-legged frog, WPT=Western pond turtle
4 Suitability was determined for the target species listed in the previous column based on the preliminary habitat assessment (High=high, Mod=moderate, Low=low)

APPENDIX B

UARP AND CHILI BAR PROJECT MAPS AND SITE PHOTOGRAPHS

APPENDIX C

AMPHIBIAN VES SURVEY DATA SHEETS

Amphibian and Fish Inventory Data Sheet - 2001

Site ID:	Date: (mmm-dd-yy)	Water type: Lake Unmapped pond Stream Marsh Spring seep ⋮ Perennial Ephemeral If not sampled, reason: stream widening frozen, dry, or not found part of another water body	
Lake Name: (from map)	Planning Watershed: (from "Lakes Checklist")	Location:	
County:	Elevation: m ft	North UTM:	East UTM: (only for lakes w/o a site ID; obtain from GPS unit)
Topographic Map (7.5'):	Weather: Clear Overcast Rain Snow	Wind: Calm Light Strong	pH: source:
Max. lake depth (m):	Team members:		

Person recording habitat information: | Substrate transects with aquatic vegetation:

Littoral zone substrate composition (3m; ~50 total):
__________ Silt __________ < 2 mm __________ 2-75 mm __________ 75-300 mm __________ > 300 mm __________ bedrock

Shoreline terrestrial substrate composition (1.5m; ~50 total):
__________ Silt-75 mm __________ >75-300 mm __________ > 300 mm __________ grass/sedge/forb __________ woody debris

Width (cm) and depth (cm) of inlets (width/depth):
(1)___/___ (2)___/___ (3)___/___ (4)___/___ (5)___/___ (6)___/___ no inlets

Width (cm) and depth (cm) of outlets (width/depth):
(1)___/___ (2)___/___ (3)___/___ none

Fish present in inlets?
(1) Y N ? (2) Y N ? (3) Y N ? (4) Y N ? (5) Y N ? (6) Y N ?

Fish present in outlets?
(1) Y N ? (2) Y N ? (3) Y N ?

Amphibian observer(s):	Survey start time: End time (hhmm):	Total survey duration: (min)	Weather: Clear Overcast Rain Snow Wind: Calm Light Strong
Stream only: Start North UTM East UTM	End North UTM East UTM	Stream order:	Color: Clear Stained Turbidity: Clear Cloudy

Amphibian/reptile species	# adults	# subadults	# larvae	# egg masses	diseased/checked	Survey Method
Calling? Y N Voucher? Y N #____						Visual Trapped Aural Hand Collected Dip Net/Seine
Calling? Y N Voucher? Y N #____						Visual Trapped Aural Hand Collected Dip Net/Seine
Calling? Y N Voucher? Y N #____						Visual Trapped Aural Hand Collected Dip Net/Seine
Calling? Y N Voucher? Y N #____						Visual Trapped Aural Hand Collected Dip Net/Seine
Calling? Y N Voucher? Y N #____						Visual Trapped Aural Hand Collected Dip Net/Seine

Water Temperature (.5m from shore, 10cm deep): C or F | Air Temperature (1m above water): C or F

amphibians: mountain yellow-legged frog (RAMU) Pacific tree frog (HYRE) Yosemite toad (BUCA) CA newt (TATO) bullfrog (RACA) Long-toed salamander (AMMA)
reptiles: W. aquatic garter snake (THCO) W. terrestrial garter snake (THEL) common garter snake (THSI) W. pond turtle (CLMA)
fish: rainbow trout (RT), golden trout (GT), cutthroat trout (CT), brown trout (BN), brook trout (BK), hybrids (GT x RT, CT x RT)
Comments:

C-1. MYLF Lake and Pond datasheet.

Mountain Yellow-Legged Frog
Lake, River and Creek Visual Encounter Survey Data Sheet
Tadpoles

Date: mm _____ dd _____ yy _____ Site #:_____ Location/Name:_____ Observers:_____/_____

Survey Method: tandem separate Start Time: _____ End Time: _____ Start Air Temp (C°):_____ End Air Temp (C°):_____

Water Temp (C°): (edgewater)_____ (main channel/body)_____ Total Site Length: _____ Site Visit: 1 2 3 4

Weather: *Sky* : Overcast / Partly Overcast / Clear *Wind : Inclement / Fair / Ideal* Past 24 hrs: *Sky* : Overcast / Partly Overcast / Clear *Wind : Inclement / Fair / Ideal*

Group Letter[1]	Approx. No. of Tadpoles	Distance From Shore[2]	Tadpole Stage[3]	Avg TL[4] (mm)	Aquatic Habitat[5]	Microhabitat Type[6]	Dominant Substrate[7]	% Algae	% Detritus	Water Temperature (C°)	Max Water Depth (cm)	Comments

[1]Group Letter-if multiple groups of tadpoles at a site/subsite

[2]Distance-For an aggregation of tadpoles, measure to the center of the group. If tadpoles are dispersed along the shoreline, record an average distance from the water's edge

[3]Tadpole Stage-(1) no legs, (2) rear legs, (3) rear legs and front nubs, (4) legs fully grown but with tail, (5) mixed

[4]Avg. TL-Average total length of tadpoles

[5] Aquatic Habitat- (1) backwater pool, (2) undercut banks, (3) sedge/cobble edgewater, (4) shallow-lake shelf, (5) inlet, (6) outlet, (7) marsh, (8) stream, (9) boulder/talus, (10) other

[6]Microhabitat- (1) isolated backwater, (2) boulder/sedge, (3) emergent veg, (4) vegetated shoreline, (5) lakeshelf/edgwater, (6) exposed bank, (7) bedrock/boulder, (8) protected bank, (9) other

[7]Dominant Substrate- (1) silt/clay/mud, (2) sand, (3) gravel/pebble, (4) cobble, (5) boulder, (6) bedrock, (7) small woody debris, (8) large woody debris, (9) aquatic veg, (10) margin veg, (11) other

Checked for Chytrid? Yes No N/A

Fish Present: Yes No Type: Salmonid Centrarchid Cyprinid Other:_____

Herpetofauna & Lifestage (A J T E) tree frog____ bullfrog _____ western toad _____ western pond turtle_____ garter snake_____ Other_____

Other Species Observed: _____

Comments:_____

_____

_____

_____

_____

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_____

QA/QC (initials):_____ Date:_____

C-2. Mountain yellow-legged frog tadpole datasheet.

Mountain Yellow-Legged Frog
Lake, River and Creek Visual Encounter Survey Data Sheet
Juveniles/Subadults and Adults

Date: mm _____ dd _____ yy _____ Site #:_____ Location/Name:_____ Observers:_____ _____

Survey Method: tandem separate Start Time: _____ End Time: _____ Start Air Temp (C°):_____ End Air Temp (C°):_____

Water Temp (C°): (edgewater)_____ (main channel/body)_____ Total Site Length: _____ Site Visit: 1 2 3 4

Weather: *Sky* : Overcast / Partly Overcast / Clear *Wind : Inclement / Fair / Ideal* Past 24 hrs: *Sky* : Overcast / Partly Overcast / Clear *Wind : Inclement / Fair / Ideal*

Number of Frogs	Distance[1]	Sex (M/F)	Age[2] (J, A)	Snout-Vent Length (mm)	Activity[3]	Aquatic Habitat[4]	Microhabitat Type[5]	Dominant Substrate[6]	Temperature	Comments

[1]Distance-distance from edge of water or bottom of site

[2]Age-**J**=Juvenile/subadult (<=49mm), **A**=Adult (>=50mm), snout-vent length

[3]Activity-(1) sitting in shade, (2) basking, (3) hiding, (4) swimming, (5) floating, (6) amplexus, (7) underwater, (8) other

[4]Aquatic Habitat- (1) backwater pool, (2) undercut banks, (3) sedge/cobble edgewater, (4) shallow-lake shelf, (5) inlet, (6) outlet, (7) marsh, (8) stream, (9) boulder/talus, (10) other

[5]Microhabitat- (1) isolated backwater, (2) boulder/sedge, (3) emergent veg, (4) vegetated shoreline, (5) lakeshelf/edgwater, (6) exposed bank, (7) bedrock/boulder, (8) protected bank, (9) other

[6]Dominant Substrate- (1) silt/clay/mud, (2) sand, (3) gravel/pebble, (4) cobble, (5) boulder, (6) bedrock, (7) small woody debris, (8) large woody debris, (9) aquatic veg, (10) margin veg, (11) other

Checked for Chytrid? Yes No N/A

Fish Present: Yes No Type: Salmonid Centrarchid Cyprinid Other:_____

Herpetofauna & Lifestage (A J T E) tree frog____ bullfrog _____ western toad _____ western pond turtle_____ garter snake_____ Other_____

Other Species Observed: _____

Comments:_____

_____

_____

_____

_____

_____

_____

_____

QA/QC (initials):_____ Date:_____

C-3. Mountain yellow-legged juvenile and adult datasheet.

Foothill Yellow-Legged Frog
River and Creek Visual Encounter Survey Data Sheet
Egg Masses

Date: mm____ dd____ yy____ Site #: _____ River Name/Location: _____ Observers: _____ _____

Survey Method: tandem separate Start Time: _____ End Time: _____ Actual VES Time: _____ Start Air Temp: _____ End Air Temp: _____

Water Temp: (edgewater) _____ (main channel) _____ (pool) _____

Site Visit: 1 2 3 4

Weather: *Sky*: Overcast Partly Overcast Clear *Wind:* Inclement Fair Ideal Past 24 hrs: *Sky*: Overcast Partly Overcast Clear *Wind:* Inclement Fair Ideal

Egg Mass Letter[1]	Distance[2] (m)	No. of Egg Masses	Egg Mass Attachment Substrate[3]	Distance from Shore (m)	Depth of Egg Mass (cm)	% Silt on Egg Mass[4]	Egg Mass Orientation[5]	Flow Orien-tation[6]	Velocity[7] (cm/sec)	River and Creek Habitat[8]	Micro-habitat[9]	Substrate at Egg Mass[10]	Max. Water Depth[11] (cm)	Water Temp (°C)

[1] Egg Mass Letter – for individual egg masses or groups of egg masses

[2] Distance – distance from bottom of site/subsite to egg mass

[3] Egg Mass Attachment Substrate – (1) sand, (2) gravel/pebble (3) cobble, (4) boulder, (5) bedrock, (6) small woody debris, (7) large woody debris, (8) other

[4] % Silt on Egg Mass – (1) none, (2) < 25%, (3) 25 – 50%, (4) 51 – 75%, (5) > 75%

[5] Egg Mass Orientation – (1) upstream side, (2) downstream side, (3) shore side, (4) stream side, (5) on top of substrate, (6) underneath substrate

[6] Flow Orientation – (1) oriented into flow, (2) sheltered from flow, (3) flow along side of egg mass, (4) egg mass in eddy current, (5) flow over the top, (6) no flow

[7] Velocity – flow taken in water column as close to egg mass as possible

[8] River and Creek Habitat – (1) low gradient riffle, (2) high gradient riffle, (3) run, (4) glide, (5) main channel pool (6) step-pool, (7) other

[9] Microhabitat – (1) isolated side pool, (2) connected side pool, (3) scour pool, (4) backwater pool, (5) side channel, (6) boulder/sedge, (7) edgewater, (8) pool tail-out (9). riffle, (10) other

[10] Substrate at Egg Mass – (1) silt/clay/mud, (2) sand, (3) gravel/pebble, (4) cobble, (5) boulder, (6) bedrock, (7) small woody debris, (8) large woody debris

[11] Max. Water Depth – total depth at egg mass location

Note: On return visits note condition of egg masses – hatched, detached partially or entirely from substrate, attacked by fungus, predated upon, etc.

Fish Present: Yes No Type: Salmonid Centrarchid Cyprinid Other: _____

Herpetofauna & Life Stage (A J T E) tree frog _____ bullfrog _____ western pond turtle _____ garter snake _____ Other _____

Other Species Observed: _____

Comments: _____

QA/QC (initials): _____ Date: _____

C-4. Foothill yellow-legged frog egg mass datasheet.

Foothill Yellow-Legged Frog

River and Creek Visual Encounter Survey Data Sheet

Tadpoles

Date: mm____ dd____ yy____ Site #: _____ River Name/Location: _____ Observers: _____ _____

Survey Method: tandem separate Start Time: _____ End Time: _____ Actual VES Time: _____ Start Air Temp: _____ End Air Temp: _____

Water Temp: (edgewater) (main channel) _____ (pool) _____

Site Visit: 1 2 3 4

Weather: *Sky*: Overcast Partly Overcast Clear *Wind: Inclement Fair Ideal* Past 24 hrs: *Sky*: Overcast Partly Overcast Clear *Wind: Inclement Fair Ideal*

Group Letter[1]	Distance[2] (m)	Approx. No. of Tadpoles[3]	Distance From Shore[4]	Velocity[5] (cm/sec)	Tadpole Stage[6]	Avg. TL[7] (mm)	River or Creek Habitat[8]	Micro-Habitat[9]	Dominant Substrate[10]	% Algae	% Detritus	Max. Water Depth[11] (cm)	Water Temp. (°C)

[1] Group Letter – if multiple groups of tadpoles at a site/subsite

[2] Distance – distance from bottom of site/subsite

[3] No. of Tadpoles – Estimate the total number of tadpoles for the area. If tadpole counts are determined by number/meter^2, convert number of tadpoles/m^2 to number of tadpoles/site/subsite

[4] Distance From Shore –For an aggregation of tadpoles, measure to the center of the group. If tadpoles are dispersed along the shoreline, record an average distance from the water's edge.

[5] Velocity – measure where tadpoles are located

[6] Tadpole Stage – (1) no legs, (2) rear legs, (3) rear legs and front nubs, (4) legs fully grown, but with tail, (5) mixed

[7] Avg. TL – average total length of tadpoles

[8] River or Creek Habitat (1) low gradient riffle, (2) high gradient riffle, (3) run, (4) glide, (5) main channel pool, (6) step-pool, (7) other

[9] Microhabitat – (1) isolated side pool, (2) connected side pool, (3) scour pool, (4) backwater pool, (5) side channel, (6) boulder/sedge, (7) edgewater, (8) pool tail-out, (9) riffle, (10) other

[10] Dominant Substrate – (1) silt/clay/mud, (2) sand, (3) gravel/pebble, (4) cobble, (5) boulder, (6) bedrock, (7) small woody debris, (8) large woody debris (9) aquatic vegetation

[11] Max. Water Depth – Max. depth at tadpole location

Fish Present Yes No Type: Salmonid Centrarchid Cyprinid Other: _____

Herpetofauna & Lifestage (A J T E) tree frog _____ bullfrog _____ western pond turtle _____ garter snake _____ Other _____

Other Species Observed: _____

Comments: _____

QA/QC (initials): _____ Date: _____

C-5. Foothill yellow-legged frog tadpole datasheet.

Foothill Yellow-Legged Frog
River and Creek Visual Encounter Survey Data Sheet
Juveniles/Subadults and Adults

Date: mm____ dd____ yy____ Site #: _____ River Name/Location: _____ Observers: _____ _____
Survey Method: tandem separate Start Time: _____ End Time: _____ Actual VES Time: _____ Start Air Temp: _____ End Air Temp: _____
Water Temp: (edgewater) _____ (main channel) _____ (pool) _____ Total Site Length: _____
Site Visit: 1 2 3 4
Weather: *Sky*: Overcast Partly Overcast Clear *Wind: Inclement Fair Ideal* Past 24 hrs: *Sky*: Overcast Partly Overcast Clear *Wind: Inclement Fair Ideal*

Number of Frogs	Distance[1]	Sex (M/F)	Age[2] (J, A)	Snout-Vent Length (mm)	Activity[3]	River or Creek Habitat[4]	Microhabitat Type[5]	Dominant Substrate[6]	Comments

[1] Distance – distance from bottom of site/subsite to frogs
[2] Age – J = Juvenile/Subadult (<= 39 mm), A = Adult (>= 40 mm), snout-vent length
[3] Activity – (1) sitting in shade, (2) basking, (3) hiding, (4) calling, (5) swimming, (6) foraging, (7) amplexus, (8) floating, (9) underwater, (10) other
[4] River or Creek Habitat – (1) low gradient riffle, (2) high gradient riffle, (3) run, (4) glide, (5) main channel pool, (6) step-pool, (7) other
[5] Microhabitat – (1) isolated side pool, (2) connected side pool, (3) scour pool, (4) backwater pool, (5) side channel, (6) boulder/sedge, (7) edgewater, (8) pool tail-out, (9) riffle, (10) exposed bank, (11) protected bank, (12) other
[6] Dominant Substrate – (1) silt/clay/mud, (2) sand, (3) gravel/pebble, (4) cobble, (5) boulder, (6) bedrock, (7) small woody debris, (8) large woody debris, (9) aquatic vegetation, (10) margin vegetation, (11) other

Fish Present Yes No Type: Salmonid Centrarchid Cyprinid Other: _____
Herpetofauna & Lifestage (A J T E) tree frog _____ bullfrog _____ western pond turtle _____ garter snake _____ Other _____
Other Species Observed: _____
Comments: _____

QA/QC (initials): _____ Date: _____

C-6. Foothill yellow-legged frog juvenile/adult datasheet.

APPENDIX D

HABITAT CHARACTERISTICS OF VES SITES

- Stream Sites Habitat Information
- Lake Sites Habitat Information
- Amphibian VES
- Egg Masses
- Tadpoles
- Frog Adults & Juveniles
- Other Herpetofauna Stream Sites
- Other Herpetofauna Lake Sites

(Raw Data Available by Request)