

POTENTIAL RESOURCE ISSUE:

Special-status amphibians and aquatic reptiles and their habitat.

PROJECT NEXUS:

Project operations, maintenance activities, and potential Project betterments could result in direct and indirect effects on special-status amphibians and aquatic reptiles and their habitat.

In bypass reaches, project operations influence the seasonal flow and temperature regimes, and in the peaking reach downstream of Oxbow Powerhouse, project operations can cause daily and monthly fluctuations in flow, which could affect instream habitat conditions.

For California red-legged frog (CRLF), flow conditions in the bypass reaches may affect off-channel wetted areas and instream pools, potentially influencing habitat availability. In the peaking reach, flow fluctuation could affect habitat availability and the suitability of instream pools and off-channel wetted areas.

For Foothill yellow-legged frog (FYLF), flow conditions in the bypass reaches could affect habitat availability and suitability (e.g., water temperature) for all life stages. Project operations that result in flow fluctuations could create changes in water stage and velocity that could affect the suitability of instream habitat and potentially scour or strand egg masses and tadpoles. Water temperature regimes downstream of Project facilities (e.g., powerhouses) could alter the timing of breeding and subsequent tadpole development relative to other areas that are not influenced by Project operations.

For western pond turtle (WPT), Project reservoir fluctuations could result in the inundation of potential breeding habitat.

POTENTIAL LICENSE CONDITION:

- Instream flow releases.
- Recreation flows.
- Vegetation and Integrated Pest Management Plan.
- Special-status amphibian and aquatic reptile protection measures.

STUDY OBJECTIVE(S):

- Identify and map potential habitat for California red-legged frog (CRLF) and foothill yellow-legged frog (FYLF) in the study area.
- Document the distribution and abundance of CRLF populations in the study area, as required by USFWS.
- Document the distribution and abundance of FYLF populations in the study area.
- Determine the timing and length of FYLF breeding season.
- Identify existing data and obtain new data necessary to develop habitat suitability criteria for FYLF.

- Characterize the water stage, velocity, and temperature of various flow regimes as it relates to FYLF habitat through coordination with the instream flow and water temperature studies.
- Document the presence of potential WPT breeding habitat near project reservoirs and potential Project betterment inundation zone.
- Document the presence of WPT during CRLF and FYLF surveys.

#### EXTENT OF STUDY AREA:

The study area for CRLF, FYLF, and WPT is limited to the elevational distribution of each species and includes representative study sites in bypass reaches and the peaking reach. A stratified sampling approach was used to select representative sampling sites. In this approach, stream reaches were first stratified by geomorphic type as determined during the Geomorphology Study (PCWA 2006). The geomorphic stream reaches were further stratified by accessibility. Refer to the 2006 Geomorphology and Riparian Habitat Characterization Study Plan (PCWA 2006) for more information on selection of representative study sites.

Additional study sites were selected at the confluences of accessible perennial tributaries, particularly in the peaking reach where the geomorphology is relatively consistent. For FYLF, the study area also includes comparison sites (e.g., Shirttail Creek on the North Fork American River and the North Fork of the Middle Fork American River) and qualitative sampling locations in river reaches with difficult access. Figure AQ12-1 provides the locations of all amphibian and reptile study sites, delineated by type: representative sampling study sites, additional study sites (e.g., at tributary confluences), comparison study sites, and qualitative sampling locations.

The elevational distribution for each species is listed below:

- CRLF – below 5,000 feet in elevation (Jennings and Hayes, 1994)
- FYLF – below 4,500 feet in elevation (personal communication with Jan Williams, USFS regarding known sightings in the region; this would be increased if individuals are found near this elevation)
- WPT – below 4,500 feet in elevation (Holland, 1994; Ashton et al., 1997)

The study area for CRLF and WPT includes Project reservoirs, diversion pools, and off-channel ponds and wetlands that may be present within the following buffer areas around Project facilities, roads, trails, and recreation facilities where maintenance activities occur (Table AQ12-1). This includes:

- 15 feet around the perimeter of the large reservoirs, medium reservoirs and diversion pools;
- 15 feet outside the perimeter fence of powerhouses, switchyards, and substations;
- 60 feet of gate houses, shafts, surge chambers, and adits;
- 60 feet of microwave reflectors;
- 20 feet on either side of penstocks;
- 20 feet on either side of communication lines;
- 35 feet on either side of powerlines;

- 15 feet on either side of roads;
- 150 feet around recreation facilities;
- 10 feet on either side of trails;
- 10 feet around dams; and
- 20 feet around Project buildings.

The survey area for CRLF and WPT also includes off-channel ponds and wetlands that may be present within a buffer area around potential Project betterment construction, staging and disposal sites, and new inundation areas including:

- 15 feet around the potential inundation area of large reservoirs;
- 300 feet around construction areas;
- 100 feet around staging areas; and
- 100 feet around disposal sites.

#### STUDY APPROACH:

The study approaches for each species are provided below.

#### California Red-legged Frog (CRLF)

The following describes the approach to complete a protocol-level site assessment and surveys for CRLF.

- **Site Assessment**
  - Conduct USFWS protocol-level site assessment in accordance with *Revised Guidance on Site Assessments and Field Surveys for the California Red-legged Frog, August 2005* (USFWS 2005). This includes:
    - Identify and map known occurrences of CRLF within 1 mile of the study area, based on agency consultation, museum records, and other existing information. Preliminary information is available in the *Middle Fork American River Hydroelectric Project (FERC No. 2079) Draft Existing Resource Information Report, First Series* (PCWA 2006).
    - Identify and map CRLF habitats within 1 mile of the study area based on review of aerial photography, helicopter surveys, and video surveys.
    - Conduct a field reconnaissance survey in the study area (including Horseshoe Bar ponds) to verify habitat mapping completed based on aerial photography, helicopter surveys, and video surveys.
    - Prepare a Site Assessment Report for submittal to USFWS and the Aquatic Resources Technical Working Group that includes the following:
      - Copies of data sheets;
      - Copies of field notes;
      - GPS data for all field reconnaissance sites;
      - List of known occurrences of CRLF locations within 1-mile of the study area;

- Photographs of the study area including a map of photo locations;
  - GIS map of potential CRLF habitat within 1 mile of the study area; and
  - Description of the Middle Fork American River Hydroelectric Project (Project or MFP) and potential Project betterments.
- **Protocol-level Surveys**
- Following submittal of the Site Assessment Report to USFWS, USFWS will determine if Protocol-level CRLF surveys are required. If USFWS determines that surveys are required, PCWA will complete the surveys in accordance with the *Revised Guidance on Site Assessments and Field Surveys for the California Red-legged Frog, August 2005* (USFWS 2005). USFWS decontamination guidelines will be implemented during the surveys.
  - If appropriate, complete CRLF surveys in areas requested by USFWS that are accessible and can be safely surveyed by a qualified biologist. Protocol-level surveys consist of up to eight visits (two day visits and four night visits during the breeding season and one day and one night visit during the non-breeding season). If necessary, survey protocols will be modified, in consultation with USFWS, to provide for safety of survey personnel.
  - If appropriate, prepare a CRLF survey report that includes the following:
    - Copies of datasheets;
    - Copies of field notes;
    - GPS data for all surveyed sites;
    - Photographs of CRLF observed during surveys and habitats where individual was observed; and
    - GIS map documenting the location of CRLF observed during surveys.
  - Notify USFWS within three working days if CRLF are detected at any location.
  - Prepare and submit a California Native Species Field Survey Form for all CRLF recorded to the California Natural Diversity Database.
  - Record any incidental sightings of CRLF during implementation of any aquatic technical studies.

### Foothill Yellow-legged Frog (FYLF)

The following describes the approach to meet each of the study objectives: (1) identify and map potential habitat, (2) determine the distribution and abundance of FYLF in the study area, (3) determine the timing and length of the breeding season, (4) develop habitat suitability criteria, and (5) characterize the potential effects of stage and velocity fluctuations on FYLF and their habitat through coordination with the AQ-1 Instream Flow Study Plan.

- **Habitat Characterization:**
- Identify and map potential breeding and rearing habitat for FYLF in collaboration with resource agencies in the bypass reaches and the peaking reach based on review of aerial photography, video surveys, and helicopter surveys. Potential breeding and rearing habitat are defined as:

*Breeding Habitat* - Shallow, near-shore areas of low velocity with cobble/boulder substrate in open, sunny areas with little riparian vegetation; often adjacent to low gradient cobble/boulder bars, tributary confluences, side and backwater pools, or pool tail-outs with coarse substrates.

*Rearing Habitat* - Similar to breeding habitats early in the season; but tadpoles may distribute to shallow, warm, low velocity near-shore habitats with smaller substrate (i.e., gravel/sand) as the season progresses.

- Complete a habitat characterization of the study sites and comparison sites (see Figure AQ 12-1) that includes information on the presence of predators and food availability.
- Following completion of habitat mapping, develop a GIS map of potential FYLF habitat.
- **Distribution and Abundance Surveys:**
  - Identify and map known occurrences of FYLF within the study area based on agency consultation and a review of existing information. Preliminary information is available in the *Middle Fork American River Hydroelectric Project (FERC No. 2079) Draft Existing Resource Information Report, First Series* (PCWA 2006).
  - Conduct surveys at study sites and comparison sites identified on Figure AQ 12-1 to determine the distribution and abundance of FYLF. Surveys will follow the Visual Encounter Protocol described in *Measuring and Monitoring Biological Diversity: Standard Methods for Amphibians* (Heyer et al, 1994). Specifically, two surveyors will search stream banks, back channel areas, and potential instream habitats for FYLF progressing upstream in a slow, methodical fashion. To aid in the detection of eggs and tadpoles, surveyors will use a viewing box in shallow margin areas and snorkel in deeper water where possible. During surveys, a minimum of 1,000 meters will be surveyed. For sites located at tributary confluences, a minimum of 1,000 meters will be surveyed in the mainstem as well as 1,000 m up the tributary. Data collected during each survey includes:
    - Sampling Site: time of survey (start, end and total search effort), GPS locations (start and end), weather conditions, and water and air temperatures (at start, mid-day, and end of survey) in both the channel margin and main channel.
    - Observation: lifestage, sex, size, and GPS location.
  - Three visits will be conducted; two visits in the spring for the detection of eggs and early tadpoles, and one in the late summer/early fall to detect older tadpoles and new metamorphs. The first spring visit will be completed when river temperatures have reached a daily average of 11°C and/or when breeding has been verified in one or more comparison sites or the survey sites immediately above Ralston Afterbay.
  - Conduct a one-time site visit and qualitative presence or absence survey at four locations that have difficult access (Figure AQ-1). These sites have potential to be breeding locations (tributary confluences) and/or upstream distribution locations. The surveys will be conducted towards the end of the breeding season when the likelihood of detecting individuals is high, and if possible, 1,000 m of stream will be sampled.

- If FYLF are found at the highest sampling sites in the study area (near 4,500 feet in elevation), PCWA will consult with the Aquatic Technical Working Group to determine if additional sampling sites, at higher elevations, should be identified and surveyed to adequately determine the upstream extent of the FYLF population.
- Prepare and submit a California Native Species Field Survey Form for all FYLF recorded to the California Natural Diversity Database.
- **Timing and Length of Breeding Season:**
  - As described above, the onset of breeding will be determined by monitoring water temperatures and by monitoring the onset of breeding at one or more comparison sites or the survey sites immediately upstream of Ralston Afterbay.
  - Water temperature probes will be monitored at one of the comparison sites (e.g. Shirttail Creek on the North Fork of the American River) and in the Rubicon River (RR0.7) and the Middle Fork American River (MF26.0) near Ralston Afterbay to track water temperature.
  - If breeding does not appear to be finished following completion of the two Distribution and Abundance Survey visits in the spring (i.e., fresh 1-2 day old eggs are found during the second survey), a third visit will be completed at up to three breeding sites to identify the end of the breeding season. The breeding sites to be surveyed will be determined from data obtained in the previous surveys and in consultation with the Aquatic Technical Working Group. The third survey visit at the selected breeding sites will follow the same survey methods as described above under Distribution and Abundance Surveys.
- **Habitat Suitability Criteria Development:**
  - Compile and review existing FYLF habitat suitability criteria information.
  - Collect additional habitat suitability criteria information in conjunction with Distribution and Abundance Surveys where FYLF breeding populations have been identified. During spring visits, habitat suitability data on eggs and early tadpoles will be obtained. In the late summer/early fall visits, data on older tadpoles will be obtained. Data will be collected on individuals (i.e., egg masses and tadpole groups) at a minimum of three sites that represent the range of habitats present in the study area. The number of observations collected will depend on the abundance of individuals at each study site. The target is to collect a total number of observations greater than 150 (but not more than 250) for each lifestage (egg masses, early tadpoles, late tadpoles). It is possible that fewer observations will be obtained if densities are low.
  - Data to be collected at each observation includes:
    - Specimen lifestage; size; and approximate age (categorical);
    - Microhabitat data (type, size, GPS location);
    - Substrate (size, composition);
    - Distance to waters edge;
    - Hydraulic data (total depth, mid-column velocity, depth and velocity) at each observation; and
    - Hydraulic habitat (depth, velocity) availability in the surveyed areas. This will be the amount of area surveyed in different bins of depth (1 ft bins) and velocity (0.5

ft/s bins) (e.g., area sampled with a depth of 0-1 ft and a velocity of 0-0.5 ft/s, etc.).

- Develop habitat suitability criteria for eggs and tadpoles in consultation with the Aquatic Technical Working Group, based on data collected during surveys and existing information sources.
- Develop a lifestage periodicity chart for FYLF.
- **Coordination to Determine Stage and Velocity Effects**
  - Coordinate with the instream flow 1D/2D modeling effort to evaluate habitat suitability for FYLF egg masses and tadpoles under unimpaired and impaired flow regimes. Modeling sites will be chosen in the bypass and peaking reaches that are representative of the range of habitats present and include active breeding locations, where possible. If an active breeding site is not found in the peaking reach, a modeling site will be chosen where suitable breeding habitat is present. Details on the modeling techniques can be found in the AQ-1 Instream Flow Technical Study Plan (AQ1), and are summarized in Table AQ1-1.
  - Evaluate output from the Water Temperature Modeling Technical Study and compare changes in average daily temperatures in FYLF breeding and rearing habitat between unimpaired and impaired flow regimes. Data on margin versus channel water temperatures collected during the Distribution and Abundance Survey will be used to help characterize habitat conditions and aid in relating the model output to FYLF suitability.

#### Western Pond Turtle (WPT)

- Identify and map known occurrences of WPT within the study area, based on agency consultation and a review of existing information. Preliminary information is available in the *Middle Fork American River Hydroelectric Project (FERC No. 2079) Draft Existing Resource Information Report, First Series* (PCWA 2006).
- Record any incidental sightings of WPT during implementation of aquatic technical studies.
- Identify and map potential WPT breeding habitat near project reservoirs and within the potential inundation zones for project betterments.
- Prepare and submit a California Native Species Field Survey Form for all WPT recorded to the California Natural Diversity Database.

#### SCHEDULE:

To be developed in early 2007.

#### REFERENCES:

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Jennings, M. R., and M. P. Hayes. 1994. Amphibian and reptile species of special concern in California. California Department of Fish and Game, Inland Fisheries Division, Rancho Cordova, California, USA.

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Placeholder for Figure AQ12-1

**Special-status Amphibian and Aquatic Reptile Study Sites**

**Non-Internet Public Information**

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