

Study 4.2
**SPECIAL-STATUS WILDLIFE –
BATS**
August 2011

1.0 Project Nexus

Yuba County Water Agency's (YCWA or Licensee) continued operation and maintenance (O&M) of the existing Yuba River Development Project (Project) has a potential to affect special-status¹ bats.

2.0 Resource Management Goals of Agencies with Jurisdiction Over the Resource to be Studied

YCWA believes that three agencies have jurisdiction over special-status bats in the geographic area included in this study proposal: 1) the United States Department of Agriculture, Forest Service (Forest Service) on National Forest System (NFS) land; 2) United States Department of Interior, Fish and Wildlife Service (USFWS); and 3) California Department of Fish and Game (CDFG). Each of these agencies and their jurisdiction and management direction, as understood by YCWA at this time, is discussed below.

Forest Service

The Forest Service's jurisdiction and applicable management goals are described by the Forest Service from page 59 to 76 in the Forest Service's March 2, 2011 letter to FERC providing the Forest Service's comments on YCWA's PAD. The Forest Service's jurisdiction and management goals are not repeated here.

USFWS

USFWS's jurisdiction and goals and objectives are described by USFWS on pages 1 through 3 of USFWS's March 7, 2011 letter to FERC that provided USFWS's comments on YCWA's Pre-Application Document (PAD). USFWS's jurisdiction, goals and objectives are not repeated here.

CDFG

CDFG's jurisdiction and management goals are found in their requested edits to Study 4.2 Special-status Wildlife - Bats, which is located on page 85 of the attachment to CDFG's March 2, 2011 letter to FERC providing CDFG's comments on YCWA's PAD. CDFG's jurisdiction and goals are not repeated here.

¹ Special-status wildlife are considered those species: 1) found on National Forest System land and formally listed by the United States Department of Agriculture Forest Service as a Sensitive Species or a Management Indicator Species; 2) listed under the federal Endangered Species Act (ESA) as Proposed or a Candidate for listing as endangered or threatened or proposed for delisting; 3) listed under the California Endangered Species Act (CESA) as Proposed for listing as endangered or threatened or proposed for delisting; or 5) formally listed by California Department of Fish and Game as a Species of Concern. For the purpose of this study proposal, species listed as threatened or endangered under the ESA or CESA are addressed separately.

3.0 Study Goals and Objectives

The goal of this study is to provide the data necessary to perform an analysis of how special-status bats would be affected by the No-Action alternative and YCWA’s Proposed Project. The objective of this study is to gather the information necessary to perform this analysis.

4.0 Existing Information and Need for Additional Information

Section 7.4 of YCWA’s PAD includes existing and relevant information regarding special-status bats. This information is summarized below.

Existing and relevant information regarding known and potentially occurring special-status bats in the Project vicinity is available from the California Natural Diversity Database (CNDDDB) and CDFG’s California Wildlife Habitat Relationships (CWHR) program. Based on the general vegetation patterns described in the Botanical Resources section (Section 7.5) of the Pre-Application Document (PAD), YCWA classified wildlife habitats in the Project Vicinity using the CWHR system (CDFG 2009). The CWHR model predicts wildlife use based on habitat type, age class, size class, canopy closure or cover, and occurrence of specific habitat elements that influence thermal cover, forage, prey availability, nesting, escape cover, and breeding. The CNDDDB is a continually refined and updated, computerized inventory of location information on the most rare animals, plants, and natural communities in California. YCWA performed a CNDDDB search of project quadrangles to compile available data on bat species within the project vicinity. The results of the CNDDDB search are provided in Table 4.0-1 below.

Based on this analysis, Table 4.0-1 provides the target list of special-status bats for this study, including the following information for each species: special status, general habitat type, and recorded occurrence in the Project Vicinity.²

Table 4.0-1. Special-status bat species known to occur or likely to occur in the Project Vicinity.

Bat Species	Special Status ¹	Suitable Habitat Type	Occurrence in Project Vicinity
Western red bat <i>Lasiurus blossevillii</i>	FSS, SSC	Roosts in foliage, forages in open areas (sea level up through mixed conifer forests).	Two occurrences found on CNDDDB: one occurrence within Smartville and Oregon House quads, one occurrence within Strawberry Valley quad (CDFG 2009).
Spotted bat <i>Euderma maculatum</i>	SSC	Arid deserts, grasslands, and mixed conifer forests (0–9,800 ft).	Potentially occur within suitable habitat.
Townsend’s big-eared bat <i>Corynorhinus townsendii</i>	FSS, SSC	Roosts in buildings, mines, tunnels, and caves; feeds along habitat edges (0-10,365 ft).	Potentially occur within suitable habitat.
Pallid bat <i>Antrozous pallidus</i>	FSS, SSC	Roosts in caves, crevices, and buildings; feeds in a variety of open habitats (8,000 ft).	One occurrence found on CNDDDB within Strawberry Valley quad (CDFG 2009).

² For the purposes of the Relicensing, the Project Vicinity is defined as the area surrounding the Project in the order of a county or USDOJ, United States Geological Survey (USGS) 1:24,000 topographic quadrangle.

Table 4.0-1. (continued)

Bat Species	Special Status ¹	Suitable Habitat Type	Occurrence in Project Vicinity
Western mastiff bat <i>Eumops perotis</i>	SSC	Open areas with abundant roost locations provided by crevices in rock outcrops and buildings at lower elevations, but as high as 8,700 ft.	Potentially occur within suitable habitat.

¹Status: FSS = Forest Service Sensitive Species (USFS 2001)
SSC = CDFG Species of Special Concern (CDFG 2008)

Existing information is too general to meet the goal of the study. There are no available reports summarizing bat populations within the Project Area. Additional information needed to address the study goal is the specific location of special-status bats in relation to Project facilities and normal Project O&M activities that might affect these special-status species.

5.0 Study Methods and Analysis

5.1 Study Area

The study area consists of the area within the existing FERC Project Boundary.³ All Project facilities that may be used by bats and road bridges within the FERC Project Boundary will be included in the assessment.

If YCWA proposes an addition to the Project, the study area will be expanded if necessary to include areas potentially affected by the addition.

5.2 General Concepts and Procedures

The following general concepts and practices apply to the study:

- Personal safety is the most important consideration of each fieldwork team.
- Licensee will make a good faith effort to obtain permission to access private property where needed well in advance of entering the property.
- Field crews may make minor variances to the FERC-approved study in the field to accommodate actual field conditions and unforeseen problems. When minor variances are made, Licensee’s field crew will follow the protocols in the FERC-approved study.
- When Licensee becomes aware of major variances to the FERC-approved study, Licensee will issue an e-mail to the Relicensing Contact List describing the variance and reason for the variance. Licensee will contact by phone the Forest Service (if the variance is on National Forest System land), USFWS, SWRCB and CDFG to provide an opportunity for input regarding how to address the variance. Licensee will issue an e-mail to the Relicensing Contact List advising them of the resolution of the variance. Licensee will summarize in the final study report all variances and resolutions.

³ The existing FERC Project Boundary is the area that YCWA uses for normal Project operations and maintenance, and is shown on Exhibits G, J, and K of the current license.

- Licensee's performance of the study does not presume that Licensee is responsible in whole or in part for measures that may arise from the study.
- Global Positioning System (GPS) data will be collected using either a Map Grade Trimble GPS (sub-meter data collection accuracy under ideal conditions), a Recreation Grade Garmin GPS unit (3 meter data collection accuracy under ideal conditions), or similar units. GPS data will be post-processed and exported from the GPS unit into Geographic Information System (GIS) compatible file format in an appropriate coordinate system using desktop software. The resulting GIS file will then be reviewed by both field staff and Licensee's relicensing GIS analyst. Metadata will be developed for deliverable GIS data sets. Upon request, GIS maps will be provided to agencies in a form, such as ESRI Shapefiles, GeoDatabases, or Coverage with appropriate metadata, that is useful for interactive data analysis and interpretation. Metadata will be Federal Geographic Data Committee (FGDC) compliant.⁴
- Licensee's field crews will record incidental observations of aquatic and wildlife species observed during the performance of this study. All incidental observations will be reported in the appropriate Licensee report (e.g., incidental observations of special-status fish recorded during fieldwork for the Special-Status Turtles – Western Pond Turtle Study will be reported in Licensee's Stream Fish Populations Study report). The purpose of this effort is not to conduct a focus study (i.e., no effort in addition the specific field tasks identified for the specific study) or to make all field crews experts in identifying all species, but only to opportunistically gather data during the performance of the study.
- Field crews will be trained on and provided with materials (e.g. Quat) for decontaminating their boots, waders, and other equipment between study sites. Major concerns are amphibian chytrid fungus, and invasive invertebrates (e.g. zebra mussel, *Dreissena polymorpha*). This is of primary importance when moving: 1) between tributaries and mainstem reaches; 2) moving between basins (e.g. Middle Yuba River, Yuba River, and North Yuba River); and 3) moving between isolated wetlands or ponds and river or stream environments.

5.3 Study Methods

The study methods will consist of the following five steps: 1) initial reconnaissance; 2) focused surveys; 3) Long Term Acoustic Monitoring; 4) quality assurance/quality control (QA/QC review); and 5) prepare report. Each step is described below.

5.3.1 Step 1 – Initial Reconnaissance

YCWA will evaluate all recreation facilities, bridges, dams, powerhouses, and adits within the study area. At each location, YCWA will survey the exterior and interior of buildings, and underside of road decks, and associated support structures of bridges for active bat roosts and signs of historic use via the presence of guano and staining resulting from urine and body oils. Any observed bat use (not just special-status bats, but all bat species) will be documented on a

⁴ The Forest Service and CDFG each have requested that a copy of the GIS maps be provided to them when the maps are available.

standard data sheet, photographed and the location will be recorded with a GPS. Table 5.3.1-1 summarizes the Project recreation facilities within the study area that will be included in the initial reconnaissance surveys. YCWA will use the information collected during the visits to identify and prioritize locations that will be targeted for focused special-status bat surveys described in Step 2.

Table 5.3.1-1. List of Project facilities and recreation facilities within the study area.

Project Feature	Project Recreation Facility
NEW COLGATE DEVELOPMENT	
Camptonville Diversion Tunnel	New Bullards Bar – Madrone Cove Campground
Log Cabin Diversion Dam	New Bullards Bar – Frenchy Point Campground (Decommissioned)
Lohman Ridge Diversion Tunnel	New Bullards Bar – Garden Point Campground
Our House Diversion Dam	New Bullards Bar – Dark Day Boat Ramp
New Bullards Bar Dam	New Bullards Bar – Dark Day Campground
New Colgate Power Tunnel	New Bullards Bar – Schoolhouse Family Camp
New Colgate Powerhouse	New Bullards Bar – Hornswoggle Group Camp
NEW BULLARDS FISH RELEASE DEVELOPMENT	
New Bullards Min Flow Powerhouse	None
NARROWS 2 DEVELOPMENT	
Narrows 2 Powerhouse	None

The following types of bat roosts will be considered during the reconnaissance:

- **Maternity Roosts.** A maternity roost is a manmade or natural structure that provides protection from the elements and predators, and provides the correct thermal environment for young rearing. Maternity roosts tend to be warmer in temperature because breeding females need to maintain a high metabolism to aid in lactation. Juvenile bats need to keep warm to maintain a metabolic rate that allows for rapid growth. According to Tuttle and Taylor (1998) maternity roost thermal requirements are species dependent but generally remains between 70 degrees Fahrenheit (°F) and 90°F, however big-eared bat nursery roosts have been discovered in sites where ambient temperatures are as low as 60°F. Species that form large colonies can be found raising young in mines with ambient temperatures as low as 56°F, but often prefer 66°F or higher.
- **Day Roosts.** A day roost is a manmade or natural structure where bats are able to spend the non-active period of the day resting or in torpor, depending on weather conditions. Day roosts provide shelter from the elements and safety from predators.
- **Night Roost.** A night roost is a manmade or natural structure where bats may rest between foraging bouts, digest prey, escape from predators, shelter from weather, and possibly for social purposes. Night roosts are typically sites or structures that retain heat to aid the bat in maintaining the higher metabolism necessary for digestion.
- **Winter Hibernacula.** Manmade or natural structures used by bats during colder winter months. During this time, bats enter torpor, receiving nourishment from their fat storage gained during summer months. Many species will awaken for brief periods of time to stretch, but will resume torpor. Bats, such as the Townsends big-eared bat, will hibernate for short periods of time and will often resume feeding behavior during warm winter spells (Tuttle & Taylor 1998). According to Tuttle and Taylor (1998), airflow and temperature are key determinants in use of structures, such as tunnels and adits, as hibernacula.

Temperatures within these roost sites are generally below 53° F at the onset of hibernation, and remain between 34° F and 50° F by midwinter. Structures that have a varying temperature regime allow bats to find suitable temperatures during warm or cold winters (Tuttle and Taylor 1998).

5.3.2 Step 2 – Focused Surveys

YCWA will conduct surveys at locations where evidence of bat activity is found. All bat species, not just special-status bat species, will be recorded. Specific sampling sites will be selected based on the results of the reconnaissance survey, taking into consideration habitat suitability, accessibility, and the overall objective of sampling a broad range of habitat types and localities within the FERC Project Boundary. YCWA will invite Relicensing Participants into the field to comment on the location of both acoustic and mist net sampling sites.

Specific sampling sites will be sampled once during July or early August and then again during September to maximize the likelihood of detecting special-status bats in a given season, based upon the life history patterns and habitat associations of the species that potentially occur during each season.

Focused surveys will include the use of both ultrasonic acoustic detectors and mist nets. Surveys will be conducted near dusk as bats begin to emerge from their roosts. YCWA will obtain the appropriate CDFG permits and approvals prior to beginning surveys. Each survey location will be sampled twice during the study: once during the peak reproductive period (July-August); and once during the fall migration (September). Sampling methods are described below.

- Acoustic Sampling. Acoustic sampling will be conducted during peak bat activity using an Anabat SD1 bat detector system (Titley Scientific™ East Brisbane, Australia) to identify bat species. The Anabat system detects bat ultrasonic echolocation calls and converts them into sonograms. Anabat SD1 detectors will be programmed to automatically record echolocation calls and save them to a compact flash card for later analysis. If a bat roost is adjacent to a mist net site, Anabat units will be oriented so that roost exodus is captured. If no known roosts are present, units will be placed in adjacent foraging habitat or flight corridors. Analook computer software developed by Chris Corbin (version 3.7j, May 6, 2009) will be employed to analyze the acoustic data collected by the Anabat SD1 system to identify bat species (O'Farrell et al. 1999).
- Mist Net Sampling. Mist net surveys will be conducted at locations identified during the reconnaissance surveys within the study area. Two mist net sampling sessions will occur at each site with the first session occurring between July and August, and the second session occurring in September. Mist nets will be opened from 0.5-hour before sunset to approximately midnight or until bat activity ceased. Nets will be placed in proximity to project structures (i.e., powerhouses, dams, supply buildings), over or immediately adjacent to water, and in flight corridors between potential roosting structures and foraging habitat. Nets will be checked every 15 minutes for captured bats.

Captured bats will be identified to species via comparison of physical characteristics to those described in the key *Bats of the Northwestern United States* (Bat Conservation International 2008). The sex, age (adult or juvenile), and breeding status (reproductive or non-reproductive) will be recorded on a standardized data sheet. Additionally forearm length and ear length will be recorded in millimeters as well as weight in grams.

5.3.3 Step 3 – Long-Term Acoustic Monitoring

At four sites, selected in consultation with Relicensing Participants, Long-Term Acoustic Monitoring (LTAM) will be conducted. LTAM will involve the deployment of AnaBat SD1 bat detectors for monitoring of bat activity over time. Analoop software will be used to analyze the data recorded by the detectors. YCWA will deploy the LTAM equipment in select riparian zones adjacent to Project facilities such as dams and powerhouses. Deployment of the LTAM equipment will be from early April through October in order to capture spring migration, young rearing, periods of peak bat activity, and fall migration. Sampling methods are described below.

- **LTAM Sampling.** The AnaBat SD1 bat detectors will be coupled with an external power source (e.g., 12 volt battery and small solar panel) for long term deployment, and EME Systems Bat-Hats (Berkeley, California) to aid in acoustic data collection. During each day of the study period, all detectors will be programmed to record echolocation calls emitted from bats in flight between sunset and sunrise. Calls will be saved directly to a compact flash (CF) card as an individual Anabat call file, with the date and time of the recording as the file name. Initially (April and May) all sites will be visited twice per month in order to download recorded calls, and to ensure that all equipment is functioning properly. After May visits to each sight may be reduced to once every three weeks or once per month.

Upon download, data from each site is saved to folders that corresponded to the site location and period for which monitoring occurred (e.g., July 1-15). Call files are further organized into folders that specify the date recorded (e.g., 070111). The latter is performed by the software during data transfer from the CF cards to a laptop computer.

5.3.4 Step 4 – Quality Assurance/Quality Control Review

YCWA will perform a QA/QC review of all data, including maps, recordings, identifications, and sightings.

5.3.5 Step 5 – Prepare Report

YCWA will prepare a report that includes the following sections: Study Goals and Objectives; Methods and Analysis; Results; Discussion; and Description of Variances from the FERC-approved study proposal, if any. The report will include maps and raw acoustic files.

For all special-status bat occurrences, YCWA will complete a CNDDB form and transmit the form to the CNDDB as applicable.

6.0 Study-Specific Consultation

The study includes one study-specific consultation:

- YCWA will invite Relicensing Participants into the field to comment on the location of both acoustic and mist net sampling sites.

7.0 Schedule

YCWA anticipates the schedule to complete the study as follows assuming FERC issues its Study Determination by September 16, 2011 and the study is not disputed by a mandatory conditioning agency:

Planning and Reconnaissance (Step 1)	October 2011 – July 2012
Fieldwork (Step 2)	April – October 2012
QA/QC Review (Step 3)	September 2012
Report Preparation (Step 4)	September – October 2012

8.0 Consistency of Methodology with Generally Accepted Scientific Practices

This study is consistent with the goals, objectives, and methods outlined for recent FERC hydroelectric relicensing efforts in California, and uses well established data from the CDFG and other reputable sources for the analysis.

9.0 Level of Effort and Cost

YCWA estimates the cost to complete this study in 2011 dollars is between \$75,000 and \$100,000

10.0 References Cited

- Bureau of Land Management (BLM). 2006. California-BLM Animal Sensitive Species List, Updated September 2006. Available http://www.blm.gov/ca/pdfs/pa_pdfs/biology_pdfs/SensitiveAnimals.pdf.
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Tuttle, Merlin D. and Daniel A. R. Taylor. 1998. Bats and Mines. Resource Publication No. 3 - revised. Bat Conservation International, Austin, Texas. 50 pp.

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