



# **TECHNICAL MEMORANDUM 3-3**

## **Special-Status Mollusks**

### **Yuba River Development Project FERC Project No. 2246**

September 2012

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TECHNICAL MEMORANDUM 3-3

## EXECUTIVE SUMMARY

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In July 2012, Yuba County Water Agency (YCWA or Licensee) conducted surveys for special-status mollusks for the Yuba River Development Project (Project).

The study was conducted on National Forest Service (NFS) land at three sites within New Bullards Bar Reservoir, at one site on Oregon Creek downstream of Log Cabin Diversion Dam, and at one site in the Middle Yuba River downstream of Our House Diversion Dam. Surveys were performed by qualified biologists using qualitative timed-search methods and snorkel gear.

No mollusks were observed in New Bullards Bar Reservoir. Several different families of non special-status aquatic mollusks were observed at the Oregon Creek and Middle Yuba River sample sites. Live specimens of the western pearlshell mussel (*Margaritifera falcata*), and two gastropod families, Pleuroceridae and Physidae, were found at both stream sites. The specimens of Pleuroceridae were identified as *Juga* sp. based on Burch (1989) but were not either of the two special-status *Juga* species based on descriptions by Frest and Johannes (1999). A single shell of the family Lymnaeidae was also found at Oregon Creek.

YCWA is unaware of any historic records of special-status aquatic mollusks within the FERC Project Boundary or in streams affected by the Project.

There were no variances to the FERC-approved study.

The study is complete.

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TECHNICAL MEMORANDUM 3-3

# SPECIAL-STATUS MOLLUSKS<sup>1</sup>

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Yuba County Water Agency's (YCWA or Licensee) continued operation and maintenance (O&M) of the Yuba River Development Project, Federal Energy Regulatory Commission (FERC or Commission) Project Number 2246 (Project) may have an adverse effect on special-status<sup>2</sup> aquatic mollusks.

## 1.0 Goals and Objectives

The goal of the study was to provide information concerning special-status aquatic mollusk species within Project reservoirs and stream reaches affected by the Project. The objective of the study was to document the presence/absence of special-status aquatic mollusk species relative to Project features.

## 2.0 Methods

### 2.1 Study Area

The study area included Project-affected stream reaches on National Forest Service (NFS) land downstream of Project dams, powerhouses, and diversions.

### 2.2 Selection of Target Species

Table 2.2-1 presents the target species of special-status mollusks developed in consultation with the Relicensing Participants. According to the United States Department of Agriculture, Forest Service, seven aquatic mollusk species are considered Forest Sensitive Species (FSS) and have a potential to occur in Project-affected reaches on NFS lands. These FSS mollusk species include one freshwater mussel (California floater [*Anodonta californiensis*]), one Sphaeriid (montane peaclam [*Pisidium ultramontanum*]), and five gastropods (Great Basin rams-horn [*Hellisoma newberryi newberryi*], topaz juga [*Juga acutifilosa*], scalloped juga [*J. occata*], Owen's Valley springsnail [*Pyrgulopsis owensensis*], and Wong's springsnail [*P. wongi*]). The associated habitat requirements and known distributions of the target species are described in Table 2.2-1.

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<sup>1</sup> This technical memorandum presents the results for Study 3.3, Special-Status Aquatic Mollusks, which was included in YCWA's September 8, 2011 Revised Study Plan for relicensing of the Yuba River Development Project, and approved by FERC in its September 30, 2011 Study Plan Determination. There were no modifications to Study 3.3 subsequent to FERC's September 30, 2011 Study Determination.

<sup>2</sup> For this relicensing, special-status species are considered those species: 1) found on National Forest System (NFS) land and formally listed by the 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; or 3) formally listed by CDFG as a Species of Special Concern. Species listed as threatened or endangered under the ESA, or California Endangered Species Act (including fully protected species) are addressed in separate relicensing technical memoranda.

**Table 2.2-1. Target Forest Service Sensitive mollusk species.**

| Species                   |                                | Habitat Requirements   | Current Distribution by State |
|---------------------------|--------------------------------|--|-------------------------------|
| Common Name               | Scientific Name                |  |                               |
| California floater        | <i>Anodonta californiensis</i> | Shallow muddy or sandy habitats in large rivers, reservoirs, and lakes                                   | AZ, CA, ID, V, OR, UT, WA, WY |
| Great Basin rams-horn     | <i>Hellisoma newberryi</i>     | Large lakes, slow rivers, and spring-fed creeks; burrows in soft mud                                     | CA, NV, OR, WY                |
| Topaz juga                | <i>Juga acutifilosa</i>        | Sand and gravel substrates in spring-influenced streams and lakes and occasionally in large spring pools | CA, OR                        |
| Scalloped juga            | <i>J. occata</i>               | Cold, moving waters of large rivers, often spring-influenced, with stable boulder and cobble substrates  | CA                            |
| Montane peaclam           | <i>Pisidium ultramontanum</i>  | Sand and gravel substrates in spring-influenced streams and lakes and occasionally in large spring pools | CA, OR                        |
| Owen's Valley springsnail | <i>Pyrgulopsis owensensis</i>  | Small springs and spring runs, typically in watercress   | CA, NV                        |
| Wong's springsnail        | <i>P. wongi</i>                | Perennial seeps and small- to moderate-sized springs and spring runs, only in flowing waters             | CA, NV                        |

Sources: Duncan (2008), Frest and Johannes (1999), and Furnish (2005).

The California Department of Fish and Game (CDFG) does not list any special-status aquatic mollusks in the vicinity of the Project. CDFG noted concern for invasive species of mollusks. These included the zebra mussel (*Dreissena polymorpha*), quagga mussel (*Dreissena rostriformis bugensis*) and New Zealand mud snail (*Potamopyrgus antipodarum*). However, none of these species are known to occur in the vicinity of the Project.

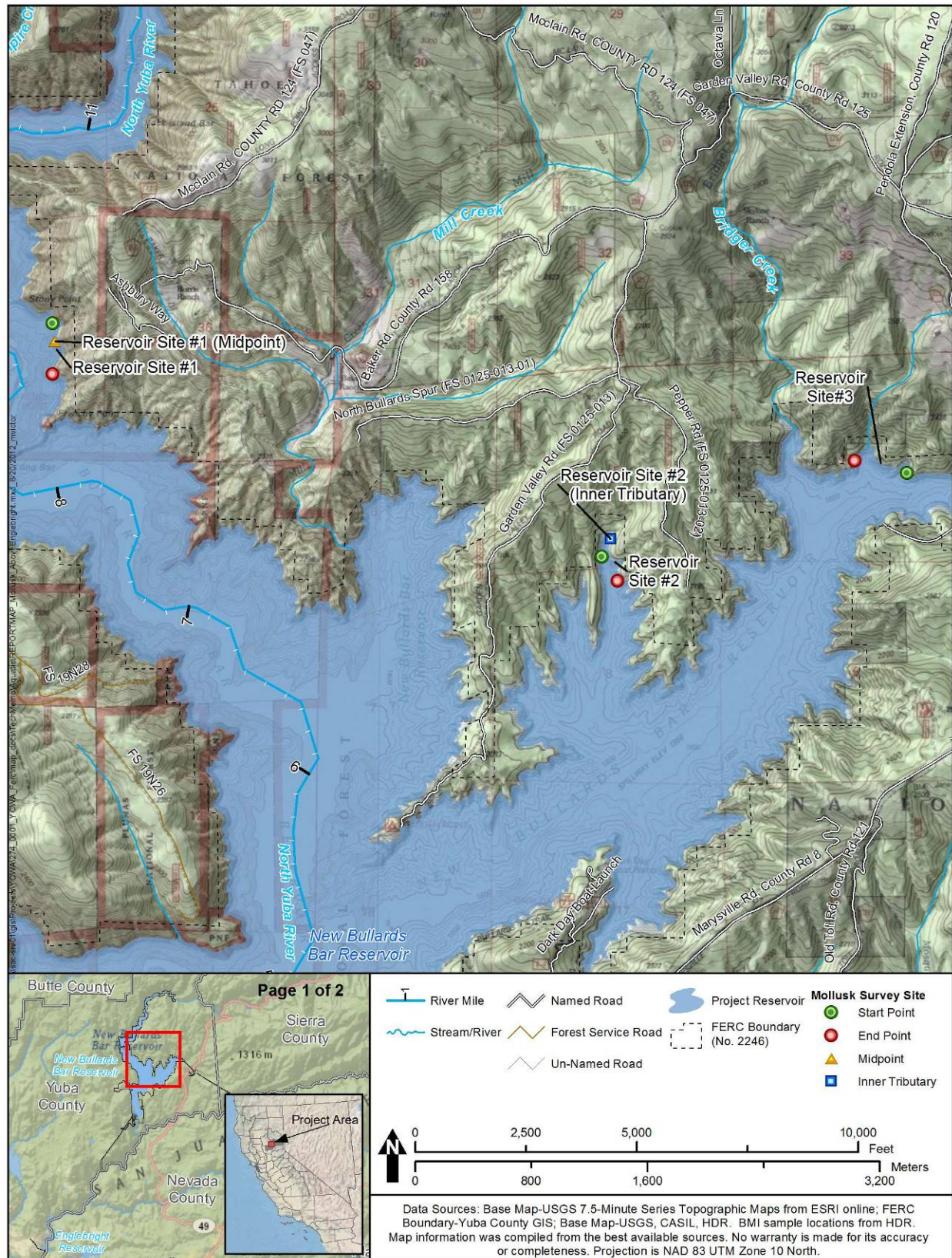
A review of CDFG's California Natural Diversity Database also showed no record of special-status mollusks in the Project Vicinity.

## 2.3 Selection of Sites

Survey locations were selected in New Bullards Bar Reservoir, in Oregon Creek from and including the Log Cabin Diversion Dam Impoundment to the confluence with the Middle Yuba River, and in the Middle Yuba River from and including Our House Diversion Dam Impoundment to the confluence with the North Yuba River. NFS land does not occur downstream of these areas.

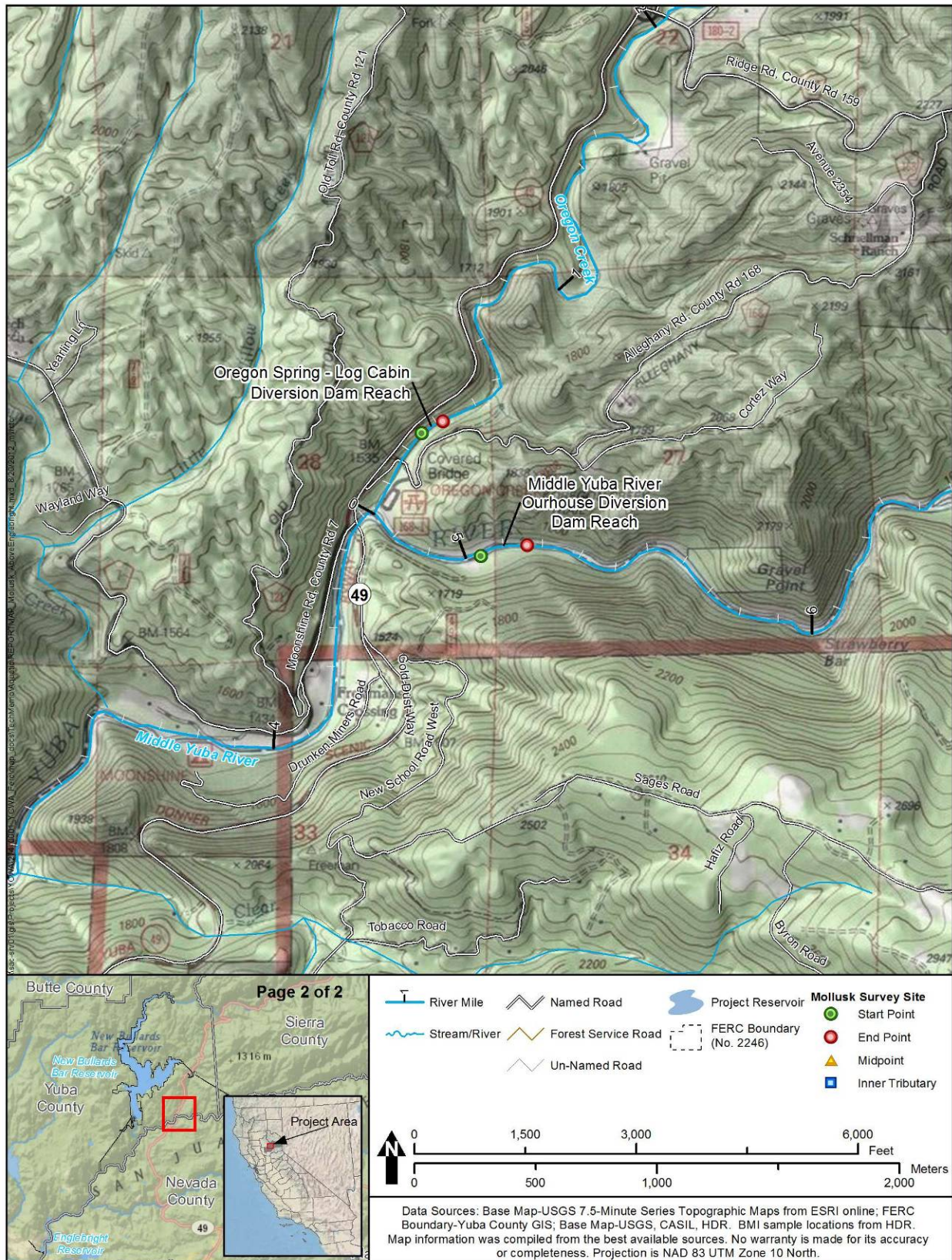
Three sites were selected in New Bullards Bar Reservoir (Figure 2.1-1). Figure 2.1-2 presents the locations of the two stream sites; one on Oregon Creek and one on the Middle Yuba River. Stream sites were co-located with YCWA's Stream Fish Population Upstream of Englebright Dam Study (Study 3.8). The Oregon Creek site was located approximately 200 meters upstream of the covered bridge just upstream of the confluence with the Middle Yuba River. The Middle Yuba River site was located upstream of the confluence with Oregon Creek. The sites were collaboratively agreed upon in the field on July 14 and 28, 2008, by the Forest Service and CDFG.





**Figure 2.1-1. Overview map of reservoir sampling locations for aquatic mollusks.**





**Figure 2.1-2. Overview map of riverine sampling locations for aquatic mollusks.**

## **2.3 Field Methods**

Field methods established protocol methods for determination of presence or absence of mollusk species. All sites were surveyed using qualitative timed-search methodology. A two-person team conducted visual and tactile searches in all areas with depths at least approximately 60 centimeters (cm) or less in depth, depending on visibility. Each site was surveyed for a total of four hours (two hours per person) sample effort and a minimum of 100 meters distance. Areas with fine substrates were sieved or explored by tactile search to determine the presence of mollusks that may be buried within the substrate. All substrates and any woody debris or aquatic vegetation present were closely examined for the presence of mollusks. All sites had sufficient depth and were surveyed using snorkel gear to maximize visibility and survey depth.

The three reservoir sites had steep shorelines which narrowed the width of the survey area. The two surveyors staggered position with one concentrating on searching the nearshore area and the second surveyor searching in slightly deeper water. For the two stream sites, the two surveyors started on either side of the stream and quartered back and forth to the middle of the stream while proceeding in an upstream direction. Water clarity was good and allowed the search to cover all but the deepest pool depths. Both surveyors visually searched the land adjacent to the selected shoreline.

Identification of freshwater mussels was made in the field using Nedeau et al. (2009) and McMahon (1991). Aquatic gastropods (i.e., snails) were field identified to family using the keys in Burch (1989). The detailed descriptions of FSS mollusks in Frest and Johannes (1999) were used as needed. Mussel shells were collected as voucher specimens when present. Photographs were taken of all representative mollusk species observed.

Physical habitat characteristics consisting of water temperature, substrate composition, visually estimated water velocity and channel gradient, wetted width, and mean depth were recorded for each site. Global Positioning System (GPS) coordinates were collected for each site's survey area start and end points and used for map preparation and calculation of survey area distance. Reservoir elevation and stream discharge data were obtained from the California Department of Water Resources (CDWR) California Data Exchange Center website.

## **3.0 Results**

No special-status mollusks were observed at any sample site. Table 3.0-1 presents the survey results, including site descriptions and non special-status mollusks observed.

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Table 3.0-1. Results of the 2012 special-status aquatic mollusk surveys.

| Site Description                                      |           |  |         |  |         |                    |  |  |                            |                              |                              |  | Visual Surveys              |                                    |  |                            |
|---|-----------|--|---------|--|---------|--------------------|--|--|----------------------------|------------------------------|------------------------------|--|-----------------------------|------------------------------------|--|----------------------------|
| Site Name   | Date      | Survey Start UTM <sup>1</sup><br>(NAD83) |         | Survey End UTM <sup>1</sup><br>(NAD83) |         | Site Length<br>(m) | Average Width<br>of Survey Area<br>(m) | Survey<br>Effort <sup>2</sup><br>(hours) | Substrate <sup>3</sup>     | Gradient <sup>4</sup><br>(%) | Water<br>Temperature<br>(°C) | Reservoir<br>Stage/<br>Stream Flow<br>(feet/cfs) | Special- Status<br>Mollusks | Non Special-<br>Status<br>Mollusks | Family/Genus   | Abundance                  |
|   |           | Northing                                 | Easting | Northing                               | Easting |                    |  |  |                            |                              |                              |  |                             |                                    |  |                            |
| New Bullards Bar<br>Reservoir<br>Site#1               | 7/17/2012 | 658942                                   | 4369886 | 658952                                 | 4369538 | 459                | 1                                      | 4  | bdrk/bldr and<br>cbl/gr/sd | >60                          | 25.1                         | 1928.7   | No                          | No                                 | --   | --                         |
| New Bullards Bar<br>Reservoir<br>Site#2               | 7/19/2012 | 662763                                   | 4368388 | 662877                                 | 4368226 | 622                | 1                                      | 4  | sd and gr/slt              | >60                          | 26                           | 1926.1   | No                          | No                                 | --   | --                         |
| New Bullards Bar<br>Reservoir<br>Site#3               | 7/17/2012 | 664846                                   | 4369020 | 664486                                 | 4369094 | 728                | 1                                      | 4  | sd and gr/slt              | >60                          | 27.5                         | 1928.7   | No                          | No                                 | --   | --                         |
| Oregon Creek<br>Log Cabin Diversion<br>Dam Reach      | 7/18/2012 | 665205                                   | 4362684 | 665291                                 | 4362736 | 111                | 7.6                                    | 4  | bdrk/bldr and<br>gr/sd     | 3                            | 19                           | 9  | No                          | Yes                                | <i>Margaritiferidae falcata</i><br><i>Physidae</i><br><i>Juga</i> sp.<br><i>Lymnaeidae</i> | 57<br>3<br>~260<br>1 shell |
| Middle Yuba River<br>Our House Diversion<br>Dam Reach | 7/18/2012 | 665464                                   | 4362186 | 665653                                 | 4362236 | 205                | 17                                     | 4  | bdrk/bldr/cbl<br>and gr/sd | 1.5                          | 25                           | 36   | No                          | Yes                                | <i>Margaritiferidae falcata</i><br><i>Physidae</i><br><i>Juga</i> sp.                      | 4<br>104<br>1              |

<sup>1</sup> Universal Transverse Mercator  
<sup>2</sup> Two person survey team X 2 hours = 4 hours total  
<sup>3</sup> Dominant and subdominant substrates. bdrk - bedrock; bldr - boulder; cbl - cobble; gr - gravel; sd - sand; slt - silt/mud  
<sup>4</sup> Visual estimation of reservoir shoreline gradient or stream reach gradient.

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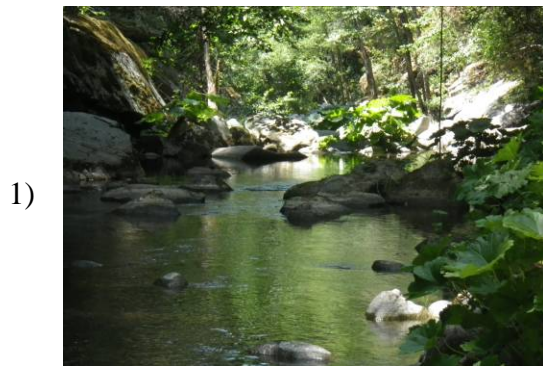
Mollusks surveys were conducted in New Bullard's Bar Reservoir on July 17 and 19, 2012. No mollusks were observed. The sites were characterized with loose unconsolidated substrates on very steep shorelines. Reservoir elevations during the survey were at 1,928.7 feet (sites 1 and 3) and 1,926.1 feet (site 2) (CDWR 2012a), or approximately 30 feet below normal maximum water surface elevations of 1,956 feet. Site 1 contained areas of larger substrates (e.g., bedrock, boulder and cobble) and mixed sand and gravel. The average width of the survey area (out to 60 cm depth) ranged from 60 to 120 cm. The water was typically turbid and visibility was poor; water velocity was zero. Occasional woody debris and a small patch of vegetation was observed and examined closely, loose substrates were sieved and explored by hand but no aquatic mollusks or other invertebrates were observed. Figure 3.0-1 shows photographs of the sites.



**Figure 3.0-1. Photographs of reservoir survey sites on New Bullard's Bar Reservoir. These photographs represent the range in habitat from: 1) site 1 rocky shoreline; 2) site 1 mixed rock and sand; 3) site 2 inner cove with woody debris and cold water tributary; 4) site 2 steep sandy shoreline; 5) site 3 steep sandy shoreline with cold seep; and 6) site 3 moderate slope shoreline with scattered vegetation.**

Mollusks surveys in Oregon Creek and Middle Yuba River were conducted and on July 18, 2012. The weather was sunny and warm, water was clear and stream flows were low - 9 cfs for Oregon Creek (CDWR 2012b) and 36 cfs for the Middle Yuba River (CDWR 2012c). The entire wetted stream bed of Oregon Creek was accessible and visible for survey. Aquatic habitat at this site consists of boulder and bedrock riffles alternating with pools. Water velocities varied with habitat from less than 0.3 meters per second (mps) in pool habitat and microhabitats around boulders/bedrock near the stream edges to 1.2 mps in high gradient riffles. Canopy cover was abundant and woody debris was scattered throughout the stream.

The Middle Yuba River site was wider, more open, and with lower gradient. Most of the Middle Yuba River survey area would be characterized as a low-gradient riffle. The upstream end of the survey area consisted of pool habitat. Water depths averaged approximately 0.5 meters in the riffle section while the pool habitat had depths reaching 2 meters. Water velocities varied with habitat from less than 0.3 mps in pool habitat and microhabitats around boulders/bedrock near the stream edges to 0.9 – 1.2 mps in higher gradient riffle areas. Photographs of the two stream survey sites are presented in Figure 3.0-2.

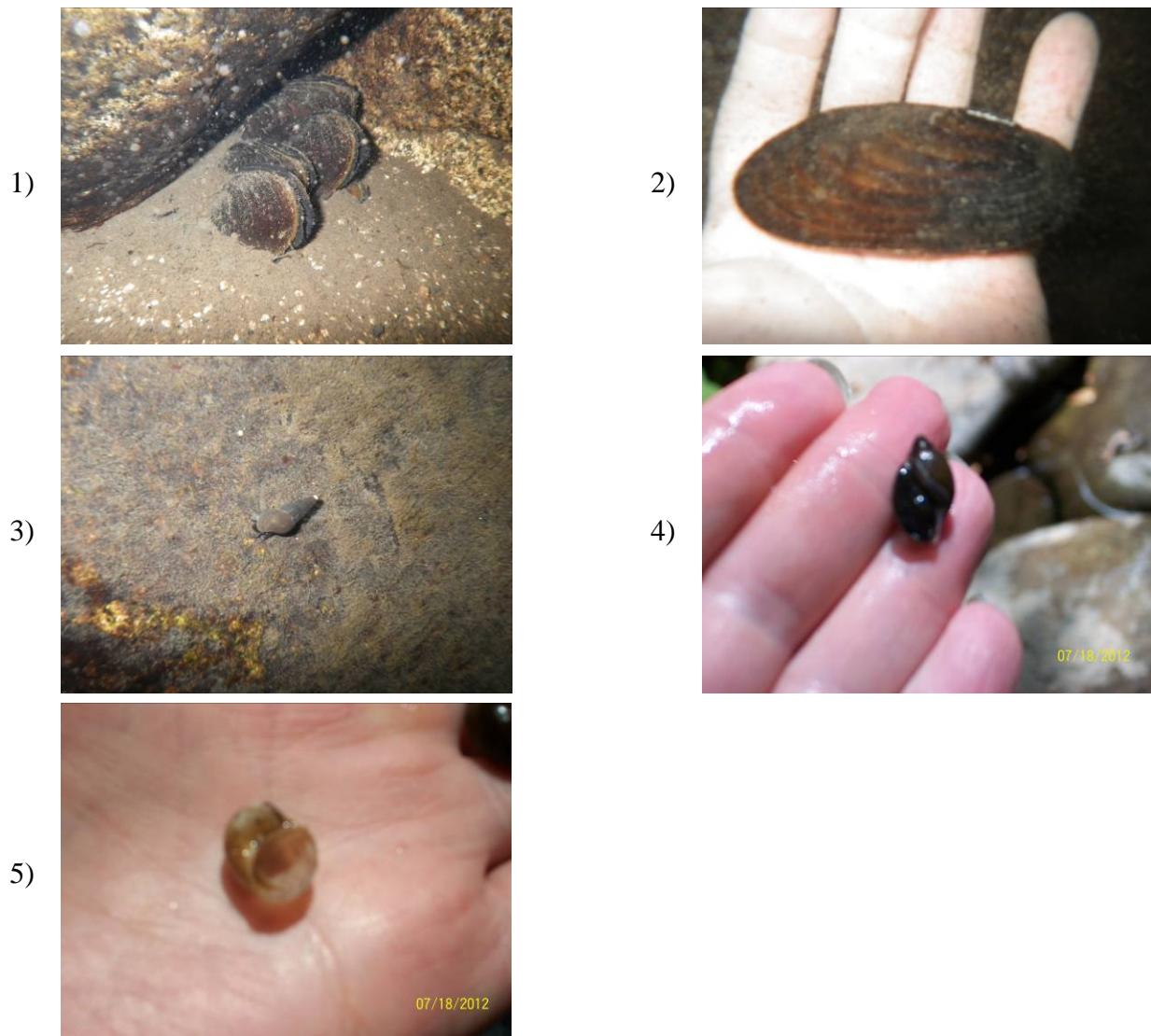


**Figure 3.0-2. Photographs of stream survey sites: 1) Oregon Creek; 2) Middle Yuba River survey start looking upstream; and 3) Middle Yuba River pool habitat at upstream end of survey area.**

Several different families of non special-status aquatic mollusks were observed at both stream sites (Table 3.0-1). The western pearlshell mussel, (*Margaritifera falcata*) was typically found grouped in pockets near boulders, especially near the stream edges, where they were protected from high velocity water. Live specimens of two gastropod families, Pleuroceridae and



Physidae, were found scattered over rocks of different sizes but were most common on boulders and bedrock outcrops, but out of the highest velocity areas. The specimens of Pleuroceridae were identified as *Juga* sp. based on Burch (1989) but were not either of the two special-status *Juga* species based on descriptions by Frest and Johannes (1999). The specimens found in Oregon Creek were typically large (up to 29 mm), with a smooth dark shell lacking any sculpturing, and no obvious banding. Other gastropods observed at the Oregon Creek site included three live specimens of the family Physidae and a single shell of the family Lymnaeidae. Photographs of the aquatic mollusks observed during the survey are presented in Figure 3.0-3.



**Figure 3.0-3. Non special-status aquatic mollusks observed in Oregon Creek and Middle Yuba River in 2012 include: 1) the western pearlshell mussel *Margaritifera falcata* in situ; 2) *M. falcata* full length, gastropods; 3) *Juga* sp. on a boulder; 4) Physidae specimen; and 5) shell of Lymnaeidae. [Sources used for identification: Nedeau et al. 2009, Frest and Johannes 1999, McMahon 1991, Burch 1989.]**

No invasive mollusk species observed.

## **4.0            Discussion**

Based on a review of available distributional data for mollusk species, there are no previous records of special-status aquatic mollusks found in the vicinity of the Project.

The Forest Service identified seven FSS mollusk species with the potential to occur within river reaches affected by the Project. Of these, the Great Basin rams-horn is the only one known to occur in the TNF, but not in the vicinity of the Project; it has only been reported in drainages on the east side of the Sierra Nevada. California floaters (*Anodonta californiensis*) were once widespread throughout California; however, now they are believed extirpated from the entire Sacramento River basin, downstream of Shasta Dam. The nearest recorded occurrence is in the Pit River (Taylor 1981).

## **5.0            Study-Specific Consultation**

The FERC-approved study required two study-specific consultations, each of which is described below.

### **5.1            Collaborative Selection of Sampling Sites**

The FERC-approved study states:

YCWA will invite interested and available Relicensing Participants into the field to comment on the selected Forest Sensitive mollusk sampling sites.

The sites were collaboratively agreed upon in the field on during the week of November 7-11, 2011.

### **5.2            Status of Forest Sensitive Species**

The FERC-approved study states:

*YCWA will consult with the Forest Service prior to initiating fieldwork and final report preparation to confirm the status of the 10 target species (listed in Table 3.0-2).*

Prior to the field survey, the Forest Service was contacted by e-mail on July 9, 2012 to request an update on the status of the 10 target species recently proposed as Forest Service Sensitive species (Table 3.0-2 of Study 3.3). The Forest Service responded via email on July 11, 2012 that the R5 Sensitive mollusk species list provided was complete. The Forest Service e-mail further recommended consideration of *Anodonta californiensis*, which has been recommended for addition to the R5 Sensitive mollusk species list in October 2012. This species was already on

the target species list (Table 2.2-1) as a Forest Sensitive species and therefore was a target species for the study. Further, all species of freshwater mussels observed during the field surveys were identified and recorded on field data sheets.

## **6.0            Variances from FERC-Approved Study**

This study was conducted according to the FERC-approved Special-Status Mollusks Study; no variances occurred.

## **7.0            Attachments to This Technical Memorandum**

There are no attachments to this technical memorandum.

## **8.0            References Cited**

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