

3.3.5 Threatened and Endangered Species

This section discusses species listed as threatened or endangered under the ESA, and refers to those species as ESA-listed. The discussion is divided into six sections. First, and immediately below, is a list and status of the studies YCWA conducted regarding threatened and endangered species. Second, Section 3.3.5.1 describes YCWA's actions to identify threatened and endangered species and their designated Critical Habitats that could potentially be affected by the proposed Project. Section 3.3.5.2 describes YCWA's consultation with USFWS, NMFS and other Relicensing Participants regarding ESA-listed species. Section 3.3.5.3 describes the affected environment for the identified species. Section 3.3.5.4 discusses the potential effects of the Project on the identified species. Section 3.3.5.5 discusses proposed protection, mitigation and enhancement measures. Unavoidable adverse impacts, if any, are addressed in Section 3.3.5.6.

To supplement the information in YCWA's PAD, YCWA conducted 11 studies to determine the potential effects of the Project on ESA-listed species: 1) Study 7.1, *ESA-Listed Plants*; 2) Study 7.2, *Narrows 2 Powerhouse Intake Extension*; 3) Study 7.3, *ESA-Listed Amphibians – California Red-Legged Frog*; 4) Study 7.4, *ESA-Listed Wildlife – Valley Elderberry Longhorn Beetle*; 5) Study 7.8, *ESA- and California ESA-Listed Salmonids Downstream of Englebright Dam*; 6) Study 7.9, *Green Sturgeon Downstream of Englebright Dam*; 7) Study 7.10, *Instream Flow Downstream of Englebright Dam*; 8) Study 7.11, *Fish Behavior and Hydraulics Near Narrows 2 Powerhouse*; 9) Study 7.11a, *Radio Telemetry Study of Spring- and Fall-run Chinook Salmon Downstream of Narrows 2 Powerhouse*; 10) Study 7.12, *Evaluation of Project Effects on Daguerre Point Dam and Hallwood-Cordua Fish Facilities*; and 11) Study 7.13, *Fish Stranding Associated with Shutdown of Narrows 2 Powerhouse Partial Bypass*. All but two of these studies are complete, and technical memoranda providing the study results are included in Appendix E6 (Table 1.4-5). The status of the two in-progress studies is provided below.

- Study 7.11, *Fish Behavior and Hydraulics Near Narrows 2 Powerhouse*. The study required YCWA to perform: 1) observations of fish behavior, including from onshore, snorkeling and using DIDSON, during changes in operations of the Narrows 2 Powerhouse; 2) pressure calculations at the Narrows 2 Powerhouse outlet; and 3) velocity measurements at a range of flows downstream of the powerhouse. YCWA has completed all the tasks for Study 7.11 and posted to the relicensing Website on March 3, 2014 an interim technical memorandum that was combined with the interim technical memorandum for Study 7.11a. Work to be completed includes all remaining aspects of Study 7-11a as described below. YCWA anticipates the study will be complete by March 31, 2016 when YCWA files with FERC, as directed by FERC, a final technical memorandum for Studies 7.11 and 7.11a.
- Study 7.11a, *Radio Telemetry Study of Spring- and Fall-run Chinook Salmon Downstream of Narrows 2 Powerhouse*. The study requires YCWA to: 1) consult with Relicensing Participants regarding appropriate equipment to track Chinook salmon (*Oncorhynchus tshawytscha*) near Narrows 2 Powerhouse and test up to three types of equipment; and 2) capture, tag and track Chinook salmon movement near Narrows 2

Powerhouse. YCWA has completed the first task and posted to the relicensing Website on March 3, 2014 an interim technical memorandum that is combined with the interim technical memorandum for Study 7.11. The interim technical memorandum provides the results of the collaboration on which equipment would be tested and the testing. Work to be completed includes the second task – capturing, tagging and tracking Chinook salmon movement near Narrows 2 Powerhouse. The task was originally scheduled to occur in 2014 but due to an anomalous dry water year in 2014, YCWA was granted by FERC in a letter dated March 5, 2014 a 1 year extension to complete the study. The task will now occur in 2015, contingent on receiving the necessary agency permits. YCWA anticipates the study will be complete by March 31, 2016 when YCWA files with FERC a final technical memorandum for Studies 7.11 and 7.11a.

3.3.5.1 Identification of Potentially-Affected ESA-listed Species and Critical Habitat

YCWA identified ESA-listed species and Critical Habitat that could be affected by the Project in two screening steps that occurred at different times in the relicensing process. Each of these screening steps and the final list of ESA-listed species and Critical Habitats are described below.

3.3.5.1.1 Initial Screening for Potentially-Affected ESA-listed Species

YCWA generated official lists of ESA-listed and candidate species for the Project Vicinity, which includes eight 7.5-minute USGS topographic quadrangles¹ using the on-line request service available at USFWS' website (http://www.fws.gov/sacramento/es/spp_lists/auto_list_form.cfm). The official list included nine species, one DPS and two ESUs. The species included one plant, two invertebrates, one amphibian, one reptile and four fishes.

- ESA Endangered Species:
 - Sacramento River winter-run Chinook salmon ESU

- ESA Threatened Species:
 - Layne's ragwort (*Packera layneae*)
 - Valley elderberry longhorn beetle (*Desmocerus californicus dimorphus*)
 - Vernal pool fairy shrimp (*Branchinecta lynchi*)
 - California red-legged frog (*Rana draytonii*) and Critical Habitat
 - Giant garter snake (*Thamnophis gigas*)
 - California Central Valley steelhead (*Oncorhynchus mykiss irideus*) DPS and Critical Habitat²

¹ The Project Vicinity is encapsulated by the following USGS quadrangles: Challenge, Camptonville, French Corral, Smartsville, Clipper Mills, Strawberry Valley, Pike and Oregon House.

² The ESU for Central Valley spring-run Chinook salmon is defined as all naturally spawned populations of spring-run Chinook salmon in the Sacramento River and its tributaries, including the Feather River Fish Hatchery population. On the Yuba River, Critical Habitat for spring-run Chinook salmon extends from the confluence with the Feather River upstream to Englebright Dam.

- Central Valley spring-run Chinook salmon ESU and Critical Habitat³
- Delta smelt (*Hypomesus transpacificus*)

YCWA eliminated from further consideration Delta smelt, Sacramento River Chinook salmon winter-run and giant garter snake because these species are not known to occur in the Project Vicinity.

YCWA searched several sources to compile the following for each of the ESA-listed species: 1) a description of the species' habitat requirements; 2) any known occurrences of the species in the Project Vicinity, and 3) references to any recovery plans or status reports pertaining to that species. The information sources included Cal Fish and Wildlife's CNDDDB, Forest Service's species occurrence database for the TNF (Forest Service 2009b), and USFWS' and NMFS' online database and recovery plans. For plants, the sources also included in the United States Department of Agriculture's PLANTS database and the CNPS' database, which were queried for the Project Vicinity, plus an additional buffer of one USGS topographic quadrangle.

Based on these searches, YCWA added five additional species to the list of ESA-listed species that could potentially be affected by continued Project O&M: three plants, one invertebrate and one fish:

- ESA Endangered Species:
 - Stebbins' morning-glory (*Calystegia stebbinsii*)
 - Pine Hill flannelbush (*Fremontodendron decumbens*)
 - Hartweg's golden sunburst (*Pseudobahia bahiifolia*)
 - Vernal pool tadpole shrimp (*Lepidurus packardi*)
- ESA Threatened Species:
 - North American green sturgeon (*Acipenser medirostris*), southern DPS and Critical Habitat⁴

The results of YCWA's search are shown in Table 3.3.5-1.

³ The DPS for Central Valley steelhead includes all naturally-spawned populations of steelhead below natural and human-made impassable barriers in the Sacramento and San Joaquin rivers and their tributaries, excluding steelhead from San Francisco and San Pablo bays and their tributaries. On the Yuba River, Critical Habitat for Central Valley steelhead extends from the confluence with the Feather River upstream to Englebright Dam.

⁴ The Southern DPS of North American green sturgeon includes the green sturgeon population spawning in the Sacramento River and utilizing the Sacramento-San Joaquin River Delta and San Francisco Estuary. On the Yuba River, Critical Habitat extends from the confluence with the Feather River upstream to Daguerre Point Dam.

Table 3.3.5-1. ESA-listed species occurring or potentially occurring in the Project Vicinity.

Species		Suitable Habitat Type	Known Occurrence in Project Vicinity	Status ²	Status Reports and Recovery Plans Relevant to Project Vicinity
Common Name ¹	Scientific Name				
PLANTS					
Pine Hill flannelbush	<i>Fremontodendron californicum</i> ssp. <i>decumbens</i>	Chaparral, cismontane woodland/gabbroic or serpentinite, rocky (CNPS 2010).	Unknown in Project Vicinity.	FE	Recovery Plan (USFWS 2002a)
Layne's ragwort	<i>Packera layneae</i>	Chaparral, cismontane woodland, gabbro, serpentinite (CNPS 2010).	Four occurrences recorded with CNDDDB in Project Vicinity; two occurrences are within the Challenge quad and two occurrences are within the Clipper Mills quad (CDFG 2012).	FT	Recovery Plan (USFWS 2002a)
Stebbins' morning-glory	<i>Calystegia stebbinsii</i>	Chaparral, cismontane woodland (CNPS 2010).	Not known in Project Vicinity, occurs within Nevada County (CNPS 2010).	FE	Recovery Plan (USFWS 2002a)
Hartweg's golden sunburst	<i>Pseudobahia bahiifolia</i>	Valley and foothill grassland, cismontane woodland (CNPS 2010).	Unknown in Project Vicinity.	FE	None
INVERTEBRATES					
Valley elderberry longhorn beetle	<i>Desmocerus californicus dimorphus</i>	Occurs only in the Central Valley and adjacent foothills up to 3,000 feet (ft) elevation in association with blue elderberry (<i>Sambucus nigra</i> ssp. <i>caerulea</i>) (CDFG 2012).	Reported on the USFWS species list for Project Vicinity quads and counties (USFWS 2010c). Seven occurrences recorded with CNDDDB near Project Vicinity within Browns Valley quad (CDFG 2012).	FT	Recovery Plan (USFWS 1984)
Vernal pool fairy shrimp	<i>Branchinecta lynchi</i>	Endemic to grasslands of the Central Valley, Central Coast Mountains, and South Coast Mountains, in rain-filled pools (CDFG 2012).	Reported on the USFWS species list for Project Vicinity quads and counties (USFWS 2010c). One occurrence recorded with CNDDDB near Project Vicinity within Browns Valley quad at Beale Air Force Base (CDFG 2012).	FT	Recovery Plan (USFWS 2005a)
Vernal pool tadpole shrimp	<i>Lepidurus packardi</i>	Inhabits vernal pools and swales in the Sacramento Valley containing clear to highly turbid water (CDFG 2012).	Four occurrences recorded with CNDDDB near Project Vicinity within Browns Valley quad (CDFG 2012); three occurrences at Beale Air Force Base, and one occurrence at Western Aggregates Gravel Mine on Hammonton Road in Yuba County.	FE	Recovery Plan (USFWS 2005a)
AMPHIBIANS					
California red-legged frog	<i>Rana draytonii</i>	Suitable habitat is located in deep (>0.7 meter), still or slow-moving water within dense, shrubby riparian and upland habitats (Jennings and Hayes, 1994).	Reported on the USFWS species list for Project Vicinity quads and counties (USFWS 2010d). One occurrence recorded with CNDDDB within Challenge quad (CDFG 2012).	FT	Recovery Plan (USFWS 2002b)

Table 3.3.5-1. (continued)

Species		Suitable Habitat Type	Known Occurrence in Project Vicinity	Status ²	Status Reports and Recovery Plans Relevant to Project Vicinity
Common Name ¹	Scientific Name				
FISH					
Steelhead, California Central Valley DPS	<i>Oncorhynchus mykiss irideus</i>	Spawning occurs within the Sacramento and San Joaquin rivers and their tributaries (NatureServe 2008). Naturally-spawning populations that support anadromy have been found in the Yuba River below USACE's Englebright Dam (McEwen 2001).	Reported on the USFWS species list for Project Vicinity quads and counties (USFWS 2010c). No known occurrences recorded by CNDDDB in the Project Vicinity.	FT	Status Report (Busby et al. 1996; Ford 2011; Good et al. 2005; NMFS 1997; NMFS 1998a) Restoration and Management Plan (CDFG 1991; CDFG 1993b; CDFG 1996a) Recovery Plan (Draft) (NMFS 2009)
Chinook salmon, Central Valley spring-run ESU	<i>Oncorhynchus tshawytscha</i>	Spawning occurs within the Sacramento River and its tributaries (NatureServe 2008). Naturally-spawning anadromous Chinook salmon expressing the phenotypic characteristics of spring-run have been observed in the lower Yuba River below USACE's Englebright Dam (McEwen 2001).	Reported on the USFWS species list for Project Vicinity quads and counties (USFWS 2010c). One occurrence recorded by CNDDDB within the Smartsville quad; Yuba River from Highway 20 Bridge upstream to USACE's Englebright Dam (CDFG 2012).	FT	Status Report (CDFG 1996b; CDFG 1998b; Ford 2011; Good et al. 2005; NOAA and NMFS 1998b; NMFS 1999) Restoration and Management Plan (CDFG 1991; CDFG 1993b) Recovery Plan (Draft) (NMFS 2009)
North American green sturgeon, southern DPS	<i>Acipenser medirostris</i>	In the Sacramento river system, spawning occurs predominantly in the upper Sacramento River above Hamilton City and perhaps as far upstream as Keswick Dam (NatureServe 2008).	Only known spawning habitat near the Project Vicinity is on the Sacramento River (YCWA 2007). No known occurrences recorded by CNDDDB or USFWS. Confirmed occurrence of green sturgeon below USACE's Daguerre Point Dam in the lower Yuba River (NMFS 2008, Cramer 2011).	FT	Status Report (Adams et al. 2002; NMFS 2005)

¹ DPS = distinct population segment
ESU = evolutionarily significant units

² Status:
FE = Endangered: Any species that is in danger of extinction throughout all or a significant portion of its range.
FT = Threatened: Any species likely to become endangered within the near future.

3.3.5.1.2 Second Screening for Potentially-Affected ESA-listed Species

On June 6, 2013, YCWA updated the February 24, 2010 official list of ESA-listed species using the USFWS’ website (same USGS topographic quadrangles used in the first screening) and found that the North American green sturgeon, southern DPS was not included on the updated list. Nevertheless, YCWA did not remove North American green sturgeon from its list of potentially-affected ESA-listed species.

3.3.5.1.3 Final List of Potentially-Affected ESA-listed Species

Based on the above screening process, YCWA concluded that 11 ESA-listed species have a potential to be affected by the Project, although the presence of suitable habitat for some of these species had not been confirmed (Table 3.3.5-2).

Table 3.3.5-2. ESA-listed species that have a potential to be affected by the Project.

Species		Potential to be Affected by the Project
Common Name	Scientific Name	
Layne’s ragwort	<i>Packera layneae</i>	Potential, but area is outside of the known range of the species.
Hartweg’s golden sunburst	<i>Pseudobahia bahiifolia</i>	Limited to Mima mounds, which may not be present or affected by the Project.
Pine Hill flannelbush	<i>Fremontodendron californicum</i> ssp. <i>decumbens</i>	Potential, but area is outside of the known range of the species.
Stebbins’ morning-glory	<i>Calystegia stebbinsii</i>	Potential within suitable habitat.
Valley elderberry longhorn beetle	<i>Desmocerus californicus dimorphus</i>	Potential, if the host species (elderberry) is present in areas affected by the Project.
Vernal pool fairy shrimp	<i>Branchinecta lynchi</i>	Potential, but limited to seasonal pools in areas affected by the Project.
Vernal pool tadpole shrimp	<i>Lepidurus packardii</i>	Primarily limited to large vernal pools, which may not be present or affected by the Project.
California red-legged frog	<i>Rana draytonii</i>	Potential, with historical occurrences in Project Vicinity.
Steelhead, California Central Valley distinct population segment (DPS)	<i>Oncorhynchus mykiss irideus</i>	Potential, with current occurrences in Project Vicinity.
Chinook salmon Central Valley spring-run evolutionary significant unit (ESU)	<i>Oncorhynchus tshawytscha</i>	Potential, with current occurrences in Project Vicinity.
North American green sturgeon, southern DPS	<i>Acipenser medirostris</i>	Potential, with current occurrences in Project Vicinity.

3.3.5.2 Consultation with USFWS, NMFS and Other Relicensing Participants

Beginning in July 2009, YCWA began to meet with Relicensing Participants to familiarize them with the Project and its operations, to discuss process, identify issues, and most importantly, to collaboratively develop study proposals, including for ESA-listed species. Since that time, YCWA has held over 150 meetings with Relicensing Participants to discuss process, study methods and results. The USFWS and NMFS were each specifically notified of and invited to each meeting, and both agencies have participated in some of the meetings during which ESA related items were discussed. The following includes YCWA’s record of the consultation process.

- August 31, 2009. Larry Thompson (NMFS) was present for the communication guidelines meeting held by YCWA where agencies and other Relicensing Participants agreed to meeting to discuss relicensing communication guidelines.
- October 1, 2009. YCWA offered a Project Tour to familiarize for agencies, tribes and NGOs with the Project on the ground. Larry Thompson (NMFS) was present for the meeting.
- September 29, 2009. YCWA provided to USFWS and NMFS a Preliminary Information Package.
- November 5, 2010. YCWA provided to USFWS and NMFS a PAD (YCWA 2011), which included a copy of proposed Study 7.1, *ESA-Listed Plants*; Study 7.3, *ESA-Listed Amphibians - California Red-Legged Frog (CRLF)*; Study 7.4, *ESA-Listed Wildlife - Valley Elderberry Longhorn Beetle (VELB)*; Study 7.8, *ESA- and California ESA-Listed Salmonids Downstream of Englebright Dam*, and Study 7.9, *Green Sturgeon Downstream of Englebright Dam*.
- March 7, 2011. USFWS responded to YCWA's November 2010 Proposed Study Plans, but did not make any comments on or suggest modifications to the studies.
- March 7, 2011. NMFS responded to YCWA's November 2010 PAD, but deferred comment on the Proposed Study Plans.
- May 24, 2010. Rick Wantuck (NMFS) attended the third study proposal development meeting regarding anadromous fishes, ESA/CESA Species & non-ESA-listed fish below Englebright Dam.
- May 4, 2011. Larry Thompson and John Wooster (NMFS) participated by phone in the Relicensing Participants meeting regarding the new studies proposed by USFWS and FWN.
- May 11, 2011. Larry Thompson and John Wooster (NMFS) attended the Relicensing Participants meeting regarding FERC required proposed study plan meeting.
- May 19, 2011. Section 7 Consultation Meeting. The following NMFS representatives participated in the meeting with YCWA and FERC: Maria Rea, Rod McInnis, Rick Wantuck, Larry Thompson, Howard Brown, Steve Edmondson, and Gary Sprague.
- June 1, 2011. Gary Sprague (NMFS) attended a NMFS, FERC and YCWA Section 7 informal consultation meeting.
- June 3, 2011. John Wooster (NMFS) was present for the Relicensing Participants Meeting to continue 5/11 discussion of channel morphology study proposals.
- June 6, 2011. Gary Sprague (NMFS) attended a NMFS, FERC and YCWA Section 7 informal consultation meeting.
- June 17, 2011. Gary Sprague, Larry Thompson, Rick Wantuck and John Wooster (NMFS) participated in the Relicensing Participants Meeting to discuss NMFS' Study Requests and FWN's Anadromous Fish Passage Study Request.

- July 12, 2011. Gary Sprague and Rick Wantuck (NMFS) attended a NMFS, FERC and YCWA Section 7 informal consultation meeting.
- July 18, 2011. USFWS submitted comments on Scoping Document 2 and YCWA's Proposed Study Plan and made two suggested modifications to Study 7.3, which were adopted.
- July 18, 2011. NMFS submitted comments on YCWA's Proposed Study Plans, including Study 7.8 and Study 7.9.
- August 5, 2011. NMFS / FERC / YCWA Section 7 Informal Consultation Meeting.
- August 12, 2011. NMFS / FERC / YCWA Section 7 Informal Consultation Meeting.
- September 1, 2011. NMFS responded to YCWA's August 17, 2011 Revised Study Plan, but did not comment on any of the studies.
- September 1, 2011. USFWS responded to YCWA's August 17, 2011 Revised Study Plan and commented on Study 7.8 and 7.9.
- October 20, 2011. NMFS issued a dispute letter to FERC's September 30, 2011 Study Determination.
- December 13, 2011. YCWA participated in a conference with FERC's and NMFS' staffs in an effort to resolve some of the NMFS' disputes.
- April 20, 2012. Gary Sprague and Rick Wantuck (NMFS) attended a NMFS, FERC and YCWA Section 7 informal consultation meeting.
- July 12, 2012. FERC, NMFS and YCWA conducted an additional informal meeting to discuss the BA and EFH assessment.
- October 22, 2012. FERC, USFWS and YCWA met to discuss the potential for Project effects related to ESA-listed plants, CRLF and VELB. USFWS said it believed additional data gathering was not necessary, but would consider and advise YCWA in mid-November 2012.
- November 8, 2012. USFWS advised YCWA that USFWS had not come to a decision regarding potential Project effects on listed plants and amphibians. During this meeting, USFWS advised YCWA that it concluded additional data collection related to VELB was not necessary.
- December 3, 2012. YCWA submitted the Initial Study Report (ISR) for the Project. At the time, only Study 7.4 was complete. YCWA provided interim technical memoranda for all additional FE and FT species' studies.
- December 3, 2012. USFWS said it was in the process of completing its internal review of the September 2012 Interim Technical Memoranda 7.1, *ESA-Listed Plants*, and 7.3, *ESA-Listed Amphibians – CRLF*, and consulting with other agencies. YCWA and USFWS agreed that for the purpose of the FERC-approved study, consultation would be considered complete. However, YCWA and USFWS agreed that consultation would continue under both FERC's Integrated Licensing Process (ILP) and Section 7 of the ESA. Under the ILP, consultation regarding additional data gathering could occur both

formally (i.e., through the ILP ISR process), and informally (i.e., YCWA and USFWS could continue discussions of potential additional data gathering, if the parties believed there was a benefit in doing so).

- January 28, 2013. NMFS issued comments on YCWA's ISR, including comments on studies 7.8 and 7.9.
- January 29, 2013. USFWS issued comments on YCWA's ISR, including comments on studies 7.1, 7.3, and 7.8.
- May 17, 2013. YCWA and USFWS agreed on the next steps in addressing CRLF status in the Project Area, which included a site visit together on July 11, 2013 to view wetland sites in the vicinity of Little Oregon Creek and staging areas for New Bullards Bar Reservoir woody debris disposal near Moran Cove. The field trip was attended by USFWS and Forest Service representatives and included a night survey of a site with previous observations of CRLF. A trip report was provided to FERC. A follow-up meeting was scheduled for September 26. YCWA and USFWS also agreed that Technical Memorandum 7-3, *ESA-Listed Amphibians - CRLF*, can now be considered final.
- July 3, 2013. USFWS filed with FERC a request for a new study in support of YCWA's Yuba River Development Project.
- July 3, 2013. YCWA provided Draft Study 7-11a, Radio Telemetry Study of Spring-and Fall-run Chinook Salmon Migratory Behavior Downstream of Narrows 2 Powerhouse to NMFS, USFWS, and Cal Fish and Wildlife for review and written comment. YCWA received written comments from NMFS and USFWS.
- September 26, 2013. Tom Holley, Larry Thompson and John Wooster (NMFS) were present for the YCWA Relicensing Study 7.11a *Telemetry* Technical Review.
- September 26, 2013. YCWA, USFWS and Forest Service met to discuss CRLF. The agencies discussed woody debris management at New Bullards Bar Reservoir and asked that YCWA provide more details at a future Relicensing Participant meeting, specifically in regards to how debris would be handled if it exceeded the capacity of the current staging site. The agencies also discussed whether additional information is needed on American bullfrog at New Bullards Bar Reservoir.

Based on these meetings, discussions and documents, YCWA concluded that it would prepare for inclusion in the Application of New License an Applicant-Prepared Draft BA addressing steelhead, spring-run Chinook salmon and North American green sturgeon – the ESA-listed species under NMFS' jurisdiction. To reduce duplication, where applicable in this Section 3.3.5, YCWA refers to the Applicant-prepared Draft BA, which is provided in Volume IV of this Application for New License. YCWA concluded that ESA-listed species under USFWS' jurisdiction could be addressed in the Application for New License directly (i.e., a separate Applicant-Prepared Draft BA is not needed for those species).

In addition, YCWA concluded that it would prepare for inclusion in the Application for New License an Applicant Prepared Draft EFH Assessment, which is provided in Volume IV of this Application for New License.

3.3.5.3 Affected Environment

This section describes existing conditions for: 1) ESA-listed plants; 2) VELB; 3) ESA-listed branchiopods (vernal pool fairy shrimp and vernal pool tadpole shrimp); and 4) CRLF. Information regarding current and historical distribution of the species in the region, status and Critical Habitat in the region, and life history is provided. In addition, the results of YCWA’s studies with regard to the presence and distribution of each species and its Critical Habitat, if any, in the area of the Project is also provided below. Existing conditions regarding ESA-listed fish (Central Valley steelhead DPS, Central Valley spring-run Chinook salmon ESU and North American green sturgeon, southern DPS) are addressed in Volume IV of this Application for New License. Information regarding YCWA’s relicensing studies applicable to general discussion of the Affected Environment is presented in Section 3.3.3, *Aquatic Resources*.

3.3.5.3.1 ESA – Listed Plant Species

Based on the reviews discussed above, YCWA identified four ESA-listed plants that have a reasonable potential to occur within the existing FERC Project Boundary: Stebbins’ morning-glory, Pine Hill flannelbush, Layne’s ragwort and Hartweg’s golden sunburst. Pertinent information, including life history information, is briefly summarized for each of the four ESA-listed plant species in Table 3.3.5-3.

Table 3.3.5-3. ESA-listed plant species potentially occurring in the vicinity of YCWA’s Yuba River Development Project.

Species		ESA Status ¹	Flowering Period	Elevation Range (ft)	Habitat Requirements	Occurrence in Project Vicinity ²
Common Name	Scientific Name					
Stebbins’ morning-glory	<i>Calystegia stebbinsii</i>	FE	Apr-Jul	607-2,395	Chaparral, cismontane woodland	Unknown in Project Vicinity; present in Pilot Hill, Grass Valley and Lake Combie quads
Pine Hill flannelbush	<i>Fremontodendron californicum</i> ssp. <i>decumbens</i>	FE	Apr-Jul	1,394-2,493	Chaparral, cismontane woodland/gabbroic or serpentinite, rocky	Unknown in Project Vicinity; present in Grass Valley quad
Layne’s ragwort	<i>Packera layneae</i>	FT	Apr-Aug	656-3,281	Chaparral, cismontane woodland/serpentinite or gabbroic, rocky	Known in Project Vicinity in Challenge and Clipper Mills quad; also present in Pilot Hill and Rackerby quads
Hartweg’s golden sunburst	<i>Pseudobahia bahiifolia</i>	FE	Mar-Apr	50-500	Valley and foothill grassland, cismontane woodland	Unknown in Project Vicinity

¹ Status:

FE = Endangered: Any species that is in danger of extinction throughout all or a significant portion of its range.

FT = Threatened: Any species likely to become endangered within the near future.

² Occurrence in Project Vicinity: Some of the USGS topographic quadrangles are found entirely within the Project Vicinity and some are partially within the Project Vicinity. Results are based on CNPS nine-quadrangle search.

Species Accounts

Stebbins' Morning-Glory⁵

Status and Critical Habitat



On October 18, 1996, the USFWS listed Stebbin's morning-glory as an endangered species under the ESA (Federal Register 61:54346). No Critical Habitat has been designated for this species (USFWS 2002a).

Recovery Plan

USFWS issued a Recovery Plan for Gabbro Soil Plants of the Central Sierra Nevada Foothills for Stebbins' morning-glory and five other plant species that occur exclusively or primarily on gabbro soils in chaparral and woodland in the Central Sierra Nevada foothills in California (USFWS 2002a).

Current and Historical Distribution

Five small occurrences of this plant are known in the Grass Valley quadrangle southwest of Grass Valley - four near McCourtney Road and one near Ponderosa Way (CDFG 2009c). In addition, Wilson (1986) reported other occurrences discontinuously scattered within two population centers in the northern and southern portions of the Pine Hill formation. Both the Grass Valley and Pine Hill occurrences are in gabbro or serpentine soils.

Life History and Habitat Requirements

Stebbins' morning-glory is a leafy herbaceous perennial (i.e., a plant persisting or living for several years with a period of growth each year) with trailing to climbing stems. The leaves of Stebbins' morning-glory are 0.2 – 2 in long and palmately lobed into seven to nine narrow lobes. Its creamy yellow flowers, which are sometimes tinged with pink, are bell shaped and grow up to about 1.5 in long (Brummit 2012). Stebbins' morning-glory occurs in chaparral habitats with gabbro or serpentine soils.

Stressors and Limiting Factors

The USFWS cites habitat loss and fragmentation, and fire suppression as the most significant threats to Stebbins' morning-glory. In addition, a majority of the occurrences are located on private land where the plant is unprotected (USFWS 2002a).

⁵ Photo source: <http://calphotos.berkeley.edu/cgi/img_query?enlarge=0000+0000+0502+0654>.

Pine Hill Flannelbush⁶

Status and Critical Habitat



On October 18, 1996, the USFWS listed Pine Hill flannelbush as an endangered species under the ESA (Federal Register 61:54346). No Critical Habitat has been designated for this species. A 5-year review process was initiated in 2009 (USFWS 2002a).

Recovery Plan

On December 11, 2002, USFWS issued a Recovery Plan for Gabbro Soil Plants of the Central Sierra Nevada Foothills for Pine Hill flannelbush and five other plant species that occur exclusively or primarily on gabbro soils in chaparral and woodland in the Central Sierra Nevada foothills in California (USFWS 2002a).

Current and Historical Distribution

The species is known only from one localized area near Pine Hill in western El Dorado County, scattered within an area of approximately 5,000 acres (ac). Although there are some reports of Pine Hill flannelbush occurring in some small scattered populations in Yuba and Nevada counties, other reports describe these individuals as aberrant California flannelbush (*F. californicum* ssp. *californicum*). Most occurrences of Pine Hill flannelbush are on private land (CDFG 2009c). One occurrence is on public land administered by the Bureau of Land Management (BLM), and one occurrence is on Cal Fish and Wildlife and California Department of Forestry and Fire Protection (CALFIRE) lands (CDFG 2009c). Presently, the majority of the Pine Hill flannelbush individuals are located on the parcel managed by CAL FIRE on Pine Hill and a nearby private parcel (USFWS 2002a).

This plant has not been found within the Project Vicinity. The nearest known population is in Grass Valley (CDFG 2009c).

Life History and Habitat Requirements

Pine Hill flannelbush is a small evergreen shrub less than 3.5 ft in height. The soft to leathery leaves of Pine Hill flannelbush are 0.5 – 2 in long and palmately lobed (lobing radiating from a common point); the orange flowers are 1 – 2 in wide, and the fruits generally require fire to release seeds (Lloyd 2012).

Pine Hill flannelbush occurs on scattered rocky outcrops in chaparral on and in the vicinity of Pine Hill and in the black oak (*Quercus kelloggii*) woodland on Pine Hill (USFWS 2002a). Community associates are ponderosa pine (*Pinus ponderosa*), foothill pine (*P. sabiniana*),

⁶ Photo source: <http://calphotos.berkeley.edu/cgi/img_query?enlarge=0000+0000+0507+0424>.

chamise (*Adenostoma fasciculatum*), toyon (*Heteromeles arbutifolia*) and bigberry manzanita (*Arctostaphylos glauca*) (Kelman 1991; Boyd 1996).

Stressors and Limiting Factors

The USFWS cites habitat loss and fragmentation as the most significant threat to Pine Hill flannelbush. The conversion of wild lands to residential and commercial properties has both fragmented and altered available habitat (USFWS 2002a).

Layne's Ragwort

Status and Critical Habitat



On October 18, 1996, the USFWS listed Layne's ragwort as a threatened species under the ESA (63 Federal Register [FR] 49002). No Critical Habitat has been designated for this species. A 5-year review process was initiated in 2009 (USFWS 2002a).

Recovery Plan

On December 11, 2002, USFWS issued a Recovery Plan for Gabbro Soil Plants of the Central Sierra Nevada Foothills for Layne's ragwort and five other plant species that occur exclusively or primarily on gabbro soils in chaparral and woodland in the Central Sierra Nevada foothills in California (USFWS 2002a).

Current and Historical Distribution

CNDDDB reports Layne's ragwort occurrences within the Project Vicinity in the Rackerby, Challenge and Clipper Mills quads. Known occurrences of Layne's ragwort in the Challenge quadrangle include one population 0.6 miles (mi) west of upper New Bullards Bar Reservoir and one population east of Indian Creek. Known occurrences of Layne's ragwort in the Clipper Mills quadrangle include two populations; one 2 mi northeast of Woodleaf and one 0.7 mi south of Woodleaf (CDFG 2009c).

Historically, Layne's ragwort occurrences are most known within a 40,000-acre area in western El Dorado County that includes the Pine Hill formation and adjacent serpentine. In addition, a few other colonies occur in the Eldorado National Forest in El Dorado County, in the BLM Red Hills Area of Critical Environmental Concern in Tuolumne County, and on BLM managed land in Yuba County (USFWS 2002a).

Life History and Habitat Requirements

Layne's ragwort is a perennial herb of the aster family (*Asteraceae*) and grows to approximately 1 to 3 or more ft tall (Baldwin et. al 2012). It has mostly basal leaves that are 3 to 10 in long and flower heads with a width of 2 to 3 in. The flowers are yellow to orange with each flower head

having five to eight ray flowers (the flowers usually located on the edge of the flower head) and numerous disk flowers (flowers in the center portion of the flower head) (USFWS 2002a).

Layne's ragwort grows in open rocky areas of gabbro and serpentine soils within chaparral plant communities. Gabbro soils originate from volcanic rocks (gabbrodiorite) that are mildly acidic, rich in iron and magnesium, and often contain other heavy metals, such as chromium. Gabbro, a large dark coarse-grained rock, is formed when liquid magma cools slowly underground. A red soil is formed when the rock is exposed and weathers at the earth's surface. These soils are well drained and are underlain by gabbrodiorite rocks at a depth of more than 3 ft. Serpentine-derived soils are formed through a process similar to formation of gabbro soils. Serpentine soils are derived from serpentine, dunite and peridotite. They tend to have high concentrations of magnesium, chromium and nickel, and low concentrations of calcium, nitrogen, potassium and phosphorus. Most plants do not grow well on gabbro or serpentine soils (USFWS 2002a).

Stressors and Limiting Factors

The USFWS cites habitat loss and fragmentation as the most significant threat to Layne's ragwort. Historically, gold rush and agriculture activities reduced and fragmented habitat in western El Dorado County. More recently, commercial and residential development and road construction have increased fragmentation and caused changes to vegetation patterns in Layne's ragwort habitat (USFWS 2002a).

Hartweg's Golden Sunburst⁷

Status and Critical Habitat



On February 6, 1997, the USFWS listed Hartweg's golden sunburst as an endangered species under the ESA (Federal Register 62:5542). No Critical Habitat has been designated for this species. A 5-year review for the species was completed by USFWS in December 2007 with no change in designation recommended (USFWS 2010b).

Recovery Plan

No Recovery Plan for Hartweg's golden sunburst has been developed (USFWS 2010b).

Current and Historical Distribution

This species is found only in the Central Valley of California. Historically, the range of the species may have extended from Yuba County south to Fresno County, a range of 200 mi. Within this range, the species was only locally abundant. Today, there are 16 populations on the eastern edge of the San Joaquin Valley. Remaining populations are concentrated in the Friant

⁷ Photo source: <http://calphotos.berkeley.edu/cgi/img_query?enlarge=0000+0000+1207+0492>.

region of Fresno and Madera counties and the La Grange region in Stanislaus County (USFWS 2001a).

Life History and Habitat Requirements

Hartweg's golden sunburst is an annual herb (i.e. plant surviving for just one growing season) of the aster family. It is a small plant of about 2 to 8 in tall with linear leaves. Like many other asters, it has a sunflower-like flower head with yellow ray and disk flowers (Baldwin et. al 2012).

Hartweg's golden sunburst occurs in open grasslands and grasslands at the margins of blue oak (*Quercus douglasii*) woodland, primarily on shallow, well-drained, fine-textured soils, and nearly always on the north or northeast facing side of Mima mounds. These are mounds of earth roughly 1 to 6 ft high and 10 to 100 ft in diameter at the base, interspersed with basins that may pond water in the rainy season (USFWS 2001a).

Stressors and Limiting Factors

USFWS reports the primary threat to Hartweg's golden sunburst is the conversion of natural habitat to residential and agricultural development (62 FR 5542). In addition, the majority of occurrences are located on private lands where they receive little protection.

YCWA's Relicensing ESA-Listed Plant Study

YCWA performed botanical surveys for the four target ESA-listed plants and other plants within the existing FERC Project Boundary. The surveys began on March 26, 2012 and concluded by July 29, 2012. A total of 1,936 ac was surveyed. In conformance with the FERC-approved study, the surveys followed Cal Fish and Game's *Protocols for Surveying and Evaluating Impacts to Special Status Native Plant Populations and Natural Communities* (CDFG 2009b); they were floristic in nature and conducted by foot and boat.

Although 688 plant species were found during floristic surveys, no occurrences of ESA-listed plants were located. In addition, YCWA's field teams performing other relicensing studies from 2009 through 2013, did not record any incidental observations of ESA-listed plant species.

3.3.5.3.2 ESA-Listed Invertebrates – Valley Elderberry Longhorn Beetle⁸

Status and Critical Habitat

On August 8, 1980, USFWS listed VELB as a threatened species (45 FR 52803). Critical Habitat has been designated for the species, including the American River Parkway and Sacramento Zones. The Yuba River Development Project is outside of the Critical Habitat zones designated by USFWS, but portions of the Project fall within the potential range of the beetle.

⁸ Photo source: <<https://instruct1.cit.cornell.edu/courses/icb344/abstracts/valley-elderberry-beetle.htm>>.



Recovery Plan

The USFWS issued a VELB Recovery Plan on August 28, 1984. On February 14, 2007, the USFWS completed a 5-year review, which resulted in USFWS recommendation that the species be de-listed (USFWS 2006). In October of 2012, the USFWS began the process of reviewing the delisting proposal (USFWS 2012).

Current and Historical Distribution

VELB is one of two subspecies of *Desmocerus californicus*. The other subspecies, the California elderberry longhorn beetle (*Desmocerus californicus californicus*), is found primarily in coastal areas from Mendocino County to San Diego County and in the southern Sierra Nevada range. The range of the VELB extends throughout California's Central Valley and associated foothills from about the 3,000-ft elevation contour on the east and the watershed of the Central Valley on the west. All or portions of 31 counties are included: Alameda, Amador, Butte, Calaveras, Colusa, Contra Costa, El Dorado, Fresno, Glenn, Kern, Kings, Lake, Madera, Mariposa, Merced, Napa, Nevada, Placer, Sacramento, San Benito, San Joaquin, San Luis Obispo, Shasta, Solano, Stanislaus, Sutter, Tehama, Tulare, Tuolumne, Yolo and Yuba (USFWS 1999).

Life History and Habitat Requirements

The VELB is dependent on its host plant, elderberry, which is a common component of riparian corridors and adjacent upland areas in the Central Valley. There are four stages of this species life: egg, larva, pupa and adult. Females deposit eggs on or adjacent to the host elderberry. Egg production varies and females have been observed to lay between 16 and 180 eggs (USFWS 2009a). Eggs hatch within a few days of being deposited and larvae emerge. The larvae bore into the wood of the host plant and create a long feeding gallery in the pith of the elderberry stem. The larvae feed on the pith of the plant for one to two years. When a larva is ready to pupate, it chews an exit hole to the outside of the stem and then plugs it with frass.⁹ The larva then retreats into the feeding gallery and constructs a pupal chamber from wood and frass. The larvae metamorphose between December and April; the pupal stage lasts about a month. The adult remains in the chamber for several weeks after metamorphous, and then emerges from the chamber through the exit hole¹⁰ (USFWS 2009a).



Adults generally emerge from late-March through June and are short-lived; however, most records for adults occur from late-April to mid-May (USFWS 2009a). Adults feed on elderberry leaves and mate within the canopy.

⁹ Frass is the debris or excrement produced by the insect.

¹⁰ Photo source: <http://www.riverpartners.org/news-and-events/newsletters/201009_VELB.html>.

Stressors and Limiting Factors

The USFWS considers VELB, though wide-ranging, to be in long-term decline due to human activities that have resulted in widespread alteration and fragmentation of riparian habitats, and to a lesser extent, upland habitats, which support the beetle. The primary threats to the survival of the beetle include:

- Loss and alteration of habitat by agricultural conversion
- Overgrazing
- Levee construction
- Stream and river channelization
- Removal of riparian vegetation
- Rip-rapping of shoreline
- Non-native animals, such as the Argentine ant (*Linepithema humile*), which may eat the early phases of the beetle
- Recreational, industrial and urban development

Indiscriminant insecticide and herbicide use in agricultural areas and along road right-of-ways may also be factors limiting the beetle's distribution. The age and quality of individual elderberry shrubs/trees and stands may also be a factor in its limited distribution because elderberry leaves and flowers are also the beetle's only food source (USFWS 2009a).

VELB also contend with invasive species, such as the Argentine ant and European earwig (*Forficula auricularia*), as these species prey on VELB larva. Non-native or invasive plant species, such as giant reed (*Arundo donax*), Himalayan blackberry (*Rubus armeniacus*), and fig (*Ficus carica*), may also negatively affect the health and vigor of the host plant for VELB.

YCWA's Relicensing VELB Study

YCWA conducted a pre-literature review prior to field surveys to: 1) identify all possible VELB or VELB habitat in the study area; 2) identify locations where VELB or VELB habitat was previously observed, and 3) gather life history information for VELB.

To identify VELB or VELB habitat in the study area, YCWA searched for recorded occurrences of ESA-listed species using queries of the CNDDDB (CDFG 2012). YCWA found no records of VELB within or adjacent to the study area.

Surveys for elderberry plants followed the Cal Fish and Game's *Protocols for Surveying and Evaluating Impacts to Special Status Native Plant Populations and Natural Communities* (CDFG 2009b). Surveyors examined elderberry plants for evidence of VELB presence. The study included the area surrounding all Project facilities within the FERC Project Boundary.

The field surveys conducted by YCWA located one elderberry plant on land managed by the Sierra Foothill Research and Extension Center, University of California. The elderberry bush was found in a non-riparian community dominated by annual grasses and blue oak. It is approximately 20 ft from the northeast edge of the Narrows 2 Powerhouse access road and separated from the road by a fence. Surveyors reported eight stems, two having a diameter of 3.5 in at the ground and six that were less than 3 in. VELB indicators (i.e., boreholes) were not observed.

3.3.5.3.3 ESA-Listed Branchiopods - Vernal Pool Fairy Shrimp and Vernal Pool Tadpole Shrimp

Status and Critical Habitat^{11,12}



Vernal pool fairy shrimp and vernal pool tadpole shrimp were listed as threatened species under the ESA on September 19, 1994 (59 FR 48136).

Critical Habitat for vernal pool fairy shrimp and vernal pool tadpole shrimp, along with other vernal pool species, was originally designated in final rule on August 6, 2003 (68 FR 46684). The revised final rule for Critical Habitat was published on February 10, 2006, providing 35 Critical Habitat Units for the vernal pool fairy shrimp, totaling 597,821 ac, and 18 Critical Habitat Units for the vernal pool tadpole shrimp, totaling 228,785 ac (71 FR 7118).

A five-year review, initiated in 2006, concluded with a recommendation of no status change for vernal pool fairy shrimp or vernal pool tadpole shrimp (73 FR 11945). Another five-year review was initiated on May 25, 2011 (76 FR 30377).

Recovery Plan

The USFWS issued a Draft Recovery Plan for Vernal Pool Ecosystems of California and Southern Oregon in October 2004 (USFWS 2004c); the recovery plan was finalized on December 15, 2005 (USFWS 2005a).

Current and Historical Distribution

The vernal pool fairy shrimp occurs in California from Shasta County south to Tulare County and in Jackson County, Oregon. Most of the known occurrences are on the eastern side of the Central Valley and in the central Coast Ranges, with disjunct populations in San Luis Obispo County, Santa Barbara County and Riverside County, California, and southern Oregon (Eng et al. 1990, Eriksen and Belk 1999). Although the species has a wide geographic range,

¹¹ Photo source: <http://www.fws.gov/cno/es/images/Graphics/VPFS_5-yr%20review%20CNO%20FINAL%2027Sept07.pdf>.

¹² Photo source: <http://calphotos.berkeley.edu/cgi/img_query?enlarge=0000+0000+0102+0261>.

populations are usually small. Extensive conversion of natural habitats for agriculture, urban development, landfills, and water supply/flood control projects has substantially diminished and fragmented the historical range. The long-term viability of populations may be associated with vernal pool complexes where there are suitable pools under different climatic conditions. The current distribution of the species includes small or isolated populations that are probably not viable.

The vernal pool tadpole shrimp is currently distributed across the Central Valley of California and in the San Francisco Bay area. The species' distribution has been greatly reduced from historical times as a result of widespread destruction and degradation of its vernal pool habitat. Vernal pool habitats in the Central Valley now represent only about 25 percent of their former area, and remaining habitats are considerably more fragmented and isolated than during historical times (Holland 1978). Vernal pool tadpole shrimp are uncommon even where vernal pool habitats occur. Helm (1998) found vernal pool tadpole shrimp in only 17 percent of vernal pools sampled across 27 counties, and Sugnet (1993) found this species at only 11 percent of 3,092 locations. In the Northwestern Sacramento Vernal Pool Region, vernal pool tadpole shrimp are found at the Stillwater Plains and in the vicinity of the City of Redding in Shasta County (USFWS 2005a).

In the Northeastern Sacramento Vernal Pool Region, vernal pool tadpole shrimp have been documented on private land in the vicinity of Chico in Butte County. They have also been documented in Tehama County at the Vina Plains Preserve, the Dales Lake Ecological Reserve and on California Department of Transportation land (USFWS 2005a).

The largest concentration of vernal pool tadpole shrimp occurrences are found in the Southeastern Sacramento Vernal Pool Region, where the species occurs on a number of public and private lands in Sacramento County. Vernal pool tadpole shrimp are also known to occur in a few locations in Yuba and Placer counties, including Beale Air Force Base (USFWS 2005a).

In the Solano-Colusa Vernal Pool Region, the vernal pool tadpole shrimp occurs in the vicinity of Jepson Prairie, Travis Air Force Base, near Montezuma in Solano County and in the Sacramento National Wildlife Refuge in Glenn County. In the San Joaquin Vernal Pool Region, vernal pool tadpole shrimp are known to occur in the Grasslands Ecological Area, on private land in Merced County and in a single location in both Tulare and Kings Counties. In the Southern Sierra Foothills region, the species occurs at the Stone Corral Ecological Preserve in Tulare County, on ranchlands in eastern Merced County, at the Big Table Mountain Preserve in Fresno County and at a few locations in Stanislaus County. In the Central Coast Vernal Pool Region, the vernal pool tadpole shrimp is found on the San Francisco National Wildlife Refuge and private land in Alameda County (USFWS 2005a).

This species was found near the Project Vicinity during the CNDDDB search. All occurrences were found within the Browns Valley quad (CDFG 2012). Three occurrences were found at Beale Air Force Base and one occurrence was found at Western Aggregates Gravel Mine on Hammonton Road in Yuba County, near Beale Air Force Base (CDFG 2012). Beale Air Force Base is within the Project Vicinity. Although Beale Air Force Base is known for its vernal pools, USFWS has excluded it from a Critical Habitat designation (68 FR 46684).

Listed fairy shrimp and tadpole shrimp were included in this section because there were occurrences in or near the Project Vicinity (e.g., Beale Air Force Base). However, there are no vernal pools in the FERC Project Boundary, and no potential for these species to occur where they would be affected by the Project.

Life History and Habitat Requirements

Fairy shrimp are generally restricted to seasonal aquatic habitats where predatory fish do not occur. Female fairy shrimp of all species carry their eggs in a ventral brood sac. The eggs either are dropped to the pool bottom or remain in the brood sac until the mother dies and sinks. When the pool dries, the eggs dry and remain dormant in the dry pool bed until rain and other environmental stimuli cause them to hatch (USFWS 2009b). Resting fairy shrimp eggs are commonly referred to as cysts and capable of withstanding heat, cold and prolonged desiccation. When the pools refill, some, but not all, of the cysts may hatch. The cyst bank in the soil may contain cysts from several years of breeding.

The vernal pool fairy shrimp occupies a variety of different vernal pool habitats, from small, clear, sandstone rock pools to large, turbid, alkaline, grassland valley floor pools (Eng et al. 1990, Helm 1998). Although the vernal pool fairy shrimp has been collected from large vernal pools, including one exceeding 25 ac in area (Eriksen and Belk 1999), it tends to occur primarily in smaller pools (Platenkamp 1998); most frequently found in pools measuring less than 0.05 ac in area (Gallagher 1996, Helm 1998) in grass or mud-bottomed swales or basalt depression pools in grasslands that have not been mowed. The vernal pool fairy shrimp typically occurs at elevations from 30 to 4,000 ft (Eng et al. 1990), although two sites in the Los Padres National Forest have been found to contain the species at an elevation of 5,600 ft. The vernal pool fairy shrimp has been collected at water temperatures as low as 4.5 degrees Celsius (°C) (Eriksen and Belk 1999) and has not been found in water temperatures above about 23°C (Helm 1998, Eriksen and Belk 1999). The species is typically found in pools with low to moderate amounts of salinity or total dissolved solids (Collie and Lathrop 1976, Keeley 1984, Syrdahl 1993). Vernal pools are mostly rain fed, resulting in low nutrient levels and dramatic daily fluctuations in pH, dissolved oxygen and carbon dioxide (Keeley and Zedler 1998). Although there are many observations of the environmental conditions where vernal pool fairy shrimp have been found, there have been no experimental studies investigating the specific habitat requirements of this species. Platenkamp (1998) found no significant differences in vernal pool fairy shrimp distribution between four different geomorphic surfaces studied at Beale Air Force Base.

Although the vernal pool tadpole shrimp is adapted to survive in seasonally available habitat, the species has a relatively long life span, compared to other vernal pool crustaceans. Helm (1998) found that the vernal pool tadpole shrimp lived significantly longer than any other species observed under the same conditions, except for the California fairy shrimp. Vernal pool tadpole shrimp continue growing throughout their lives, periodically molting their shells. These shells can often be found in vernal pools where vernal pool tadpole shrimp occur. Helm (1998) found that vernal pool tadpole shrimp took a minimum of 25 days to mature and the mean age at first reproduction was 54 days.

Stressors and Limiting Factors

The current status and continuing threat to the survival and recovery of vernal pool fairy shrimp and vernal pool tadpole shrimp is attributable to extensive loss of suitable habitat from agricultural conversion, urbanization and surface mining. Habitat loss also occurs as a result of changes to natural hydrology, introduction of invasive species, introduction of incompatible grazing regimes (e.g., insufficient grazing for prolonged periods), infrastructure development projects (e.g., roads, water storage and conveyance, utilities), recreational activities (e.g., off-highway vehicles and hiking), erosion, climatic and environmental change and contamination (USFWS 2009b).

3.3.5.3.4 ESA – Listed Amphibians – California Red-Legged Frog¹³

Status and Critical Habitat



The CRLF was listed as a threatened species on May 23, 1996 (61 FR 25813).

Critical Habitat was originally designated for CRLF on March 13, 2001 and redesignated on April 13, 2006 (71 FR 19244). However, due to court challenges and questions about scientific validity, USFWS made a series of revisions to Critical Habitat for the CRLF. The Final Critical Habitat designation was issued on March 17, 2010 (75 FR 12816).

The criteria for the CRLF Critical Habitat are: a) suitable aquatic habitat; b) associated uplands, and c) suitable dispersal habitat connecting suitable aquatic habitat (Allen and Tennant 2000; USFWS 2001b). At a minimum, this will include two or more suitable breeding locations, one of which must be a permanent water source, associated uplands surrounding these water bodies (extending to 500 ft from the water's edge) all within 1.25 mi of one another and connected by barrier-free dispersal habitat of at least 500 ft in width.

Recovery Plan

A recovery plan has been developed for CRLF (USFWS 2002b). Recovery criteria for this species include protection and management of suitable habitats within core areas, stable populations distributed within viable metapopulations, and reestablishment of at least one population within each core area where CRLF is currently absent.

Current and Historical Distribution

The historical range of the CRLF extends through Pacific slope drainages from Shasta County, California, to Baja California, Mexico, including the Coast Ranges and the west slope of the Sierra Nevada Range at elevations below 4,000 ft. The current range of this species is greatly

¹³ Photo source: <http://calphotos.berkeley.edu/imgs/512x768/0000_0000/1201/0035.jpeg>.

reduced, with most remaining populations occurring along the coast from Marin County to Ventura County. In the Sierra Nevada region, where the species was once widespread, there are only eight known extant populations of CRLF, most of which contain few adults (Shaffer et al. 2004; Tatarian and Tatarian 2010; 71 FR 19244). There is one known CRLF population in Yuba County and one each in the adjacent counties of Butte and Nevada.

According to the CRLF Recovery Plan (USFWS 2002b), factors associated with declining populations of CRLF include degradation and loss of its habitat through: agriculture, urbanization, mining, overgrazing, recreation, timber harvesting, the introduction of non-native plants that affect the frog's habitat, impoundments, water diversions, degraded water quality, use of pesticides, and introduced predators (e.g., American bullfrog [*Lithobates catesbeianus*], crayfish [*Procambarus clarkii* and *Pacifastacus leniusculus*], and non-native predatory fish, such as smallmouth bass [*Micropterus dolomieu*] and mosquitofish [*Gambusia affinis*]). In an experiment, the presence of American bullfrog tadpoles significantly lowered survival of CRLF tadpoles to metamorphosis (Lawler et al. 1999), probably through competition.

Life History and Habitat Requirements

CRLF breeding occurs from late November to late April in ponds or in backwater pools or creeks. Egg masses are attached to emergent vegetation such as cattails (*Typha* spp.) and bulrushes (*Scirpus* spp.). Larvae remain in these aquatic habitats until metamorphosis. Increased siltation during the breeding season can cause asphyxiation of eggs and small larvae. Larvae typically metamorphose between July and September and most likely feed on algae (Jennings and Hayes 1994).

Outside of the breeding season, adults may disperse upstream, downstream, or upslope of breeding habitat to forage and seek sheltering habitat, which may consist of small-mammal burrows, leaf litter, and other moist sites in or near (up to 200 ft from) riparian areas (Jennings and Hayes 1994; 71 FR 19244). During wet periods, long distance dispersal of up to a mile may occur between aquatic habitats, including movement through upland habitats or ephemeral drainages (71 FR 19244). Seeps and springs in open grasslands can function as foraging habitat or refuges for wandering frogs (USFWS 1997).

CRLF is primarily associated with perennial ponds or pools and perennial or seasonal streams where water remains for a minimum of 20 weeks beginning in the spring (i.e., sufficiently long for breeding to occur and larvae to complete development) (Jennings and Hayes 1994, 71 FR 19244). Dense, shrubby riparian vegetation (e.g. willow [*Salix* spp.] and tule [*Schoenoplectus* spp.] species), and bank overhangs are important features of CRLF breeding habitat. Suitable aquatic habitats include natural and manmade ponds, backwaters within streams and creeks, marshes, lagoons and dune ponds. CRLF is not characteristically found in deep lacustrine habitats (e.g. deep lakes and reservoirs). A minimum water depth of 0.66 ft during the entire tadpole rearing season is required. Locations with the highest densities of CRLF exhibit dense emergent or shoreline riparian vegetation closely associated with moderately deep (greater than 2.3 ft), still, or slow-moving water. The types of vegetation that seem to provide the most suitable structure are willows, cattails and bulrushes at or close to the water level, which shade a substantial area of the water (Hayes and Jennings 1988). Another correlate to CRLF occurrence

is the absence or near-absence of introduced predators, such as American bullfrog and predatory fish, particularly Centrarchids (i.e., freshwater sunfishes), which feed on the larvae at higher rates than native predatory species (Hayes and Jennings 1988), and mosquitofish. Hiding cover from predators may be provided by emergent vegetation, undercut banks and semi-submerged root wads (USFWS 2005b). Some habitats that are not suitable for breeding (e.g., shallow or short-seasonal wetlands, pools in intermittent streams, seeps and springs) may constitute habitats for aestivation, shelter, foraging, predator avoidance and juvenile dispersal.

The most comprehensive analysis of CRLF distribution and habitat use in the Sierra Nevada (Barry and Fellers 2013) suggests that historical CRLF habitat in the Sierra Nevada was associated with small, narrow, permanent or nearly permanent creeks near the headwaters, where small populations of CRLF occurred. Current available habitat in the species' range within the Sierra Nevada includes ponds of anthropogenic origin, including small instream impoundments (e.g., abandoned lumber mill ponds), excavated ponds, and mining tailing ponds.

Suitable upland habitat consists of all upland areas (riparian or otherwise) within 500 ft of the water's edge, but not further than the watershed boundary. This upland habitat is important in maintaining the integrity of CRLF aquatic/breeding habitat as land use activities adjacent to and upstream of suitable aquatic habitat greatly affect the quality of aquatic/breeding habitat downstream (Allen and Tennant 2000).

Suitable dispersal habitat consists of all upland and wetland habitat that connect two or more patches of suitable aquatic habitat within 1.25 mi of one another. Dispersal habitat must be at least 500 ft wide and free of barriers, such as heavily traveled roads (roads with more than 30 cars per hour), moderate to high-density urban or industrial developments and large reservoirs (Allen and Tennant 2000). The healthiest CRLF populations persist and flourish where suitable breeding and non-breeding habitats are interspersed throughout the landscape and are interconnected by un-fragmented dispersal habitat (Allen and Tennant 2000).

Stressors and Limiting Factors

CRLF populations declined historically because of over-harvesting for food, loss of habitat and introduction of non-native species that prey upon or compete with CRLF. Loss and degradation of existing habitat from urban development, agriculture, mining and water developments are also on-going threats to recovery. Because CRLF populations have been extirpated from large portions of the species' historical range, the continued survival of isolated populations, some of which are not within dispersal distance of other suitable habitats, is uncertain. Other factors that may limit recovery include contamination from agrochemicals, which may be wind-borne over long distances, and diseases, such as chytrid fungus and ranavirus (Tatarian and Tatarian 2010).

YCWA's Relicensing CRLF Study

In 2011 and 2012, YCWA conducted a data review for recorded occurrences of CRLF, and performed site assessments for this species in the vicinity of the Project. The study covered the area within the FERC Project Boundary and a 1-mi radius of the boundary, as well as an area within 1- mi of streams in which flows may be affected by the Project.

Known CRLF records in the study area were compiled from a review of the following sources: CNDDDB (CDFG 2012); University of California, Berkeley’s Museum of Vertebrate Zoology Data Access (MVZ 2012); California Academy of Sciences online records (CAS 2012); CRLF Recovery Plan (USFWS 2002b); a Geographic Information Systems shapefile of the final Critical Habitat for the CRLF (75 FR 12816), and pertinent written reports (Barry 2000, 2002). In addition, YCWA requested information from the PNF and TNF, and interviewed the District Biologist, Yuba River Ranger District, TNF (M. Tierney, pers. comm., 2011).

YCWA found records of CRLF occurrences in only one part of the study area (Table 3.3.5-4). The records were for occurrences at two small, spring-fed depressions near Oregon Hill Road and Little Oregon Creek, less than one-mile west of New Bullards Bar Reservoir. Little Oregon Creek is a tributary to New Bullards Bar Reservoir and not associated with Oregon Creek, which is a tributary to the Middle Yuba River southeast of New Bullards Bar Reservoir. Proximate to Little Oregon Creek, but with no apparent hydrologic connection, the locations are within an area with evidence of substantial historical mining; including piles of mine tailings, excavations, terracing created by hydraulic mining and resulting surface spring flows. The area surrounding the sites is designated by the USFWS as Critical Habitat for CRLF as Unit YUB-1.

Table 3.3.5-4. Recorded occurrences of CRLF within 1 mile of the Yuba River Development Project FERC Project Boundary and other known occurrences in Yuba, Nevada, Sierra or Butte counties.

Occurrence	Distance from the Project and Other Details of Habitat and Observations of CRLF
Near Little Oregon Creek at Oregon Hill Road, Yuba Co. and associated Critical Habitat Unit YUB-1.	Approximately 0.5 mile west of New Bullards Bar Reservoir. Two small, spring-fed, mine-tailing wetlands in the area that burned in 1999. ¹
	Total of six adults from the two wetlands, 2000. Population presumed to be extant by CNDDDB (CDFG 2012).
	Total of six adults and two tadpoles from the two wetlands, 2001 (Barry 2002).
	Total of eight adults from the two wetlands, 2004. From transcribed notes received from M. Tierney (2009).
	One adult, 2005. From transcribed notes received from M. Tierney (2009).

¹ This occurrence consists of two small, spring-fed wetlands, which are referred to as assessment site LO21 and LO28 in the YCWA Relicensing study. The wetlands are approximately 230 ft apart and are treated as one location in the detailed information in this table.

To qualify as potentially suitable CRLF breeding habitat, the aquatic habitat sites needed to meet USFWS criterion for essential aquatic habitat - low-gradient fresh water bodies capable of holding water for a minimum of 20 weeks in all but the driest of years (i.e., the period required for CRLF to go from egg stage to metamorphosis). Site assessments included characterizing potential aquatic breeding habitats and adjacent upland habitat, including dispersal habitat. Habitat locations that were accessible on-site or viewable from an adjacent public road were assessed in the field. Locations not accessible or viewable in the field were evaluated from aerial imagery.

YCWA identified 274 aquatic habitat locations for site assessments. A majority of the sites (n=164) were within a mile of the FERC Project Boundary and 110 were within a mile of stream reaches in which flows may be affected by the Project, but are more than a mile from the existing Project Boundary.

Of the 164 sites within a mile of the FERC Project Boundary, 91 were classified as meeting the minimum criterion of 20-week persistence of standing or slow-moving water; six sites did not meet the criterion because of insufficient persistence, and the available information was inconclusive for the other 67 sites. Most of the sites meeting the criterion were streams (n=58) or stream impoundments (n=9). Seasonal streams in areas that could not be field assessed constituted most of the sites (n=62) for which no determination was made. Perennial streams that were not field-assessed were assumed to meet the criterion, including high-gradient streams where standing or slow-moving water would likely be limited to plunge pools. Other types of aquatic habitats that were determined to meet the 20-week criterion included excavated ponds (n=24 sites) and depressional wetlands associated with old mining excavations or mine tailings (n=7 sites). Two of these mining legacy sites have recorded occurrences of CRLF, as described above. The CRLF population at the sites is presumed to be extant. No CRLF were observed here, or at other locations during the performance of this study or incidentally during the performance of other Relicensing studies to date.

Of the 110 sites within a mile of Project-affected stream reaches, 91 met the minimum 20-week criterion for persistence of standing or slow-moving water, two did not meet the criterion, and there was insufficient information to make a determination for 17 sites. Most of the sites that met the criterion were excavated ponds (n=56), mining legacy water bodies (n=12), or impoundments of small tributaries to the Yuba River (n=12). Mining legacy included the Yuba Goldfields, which were represented by a single assessment site comprised of a complex of more than 36 separate National Wetland Inventory-mapped wetlands, mostly classified as palustrine open water features. Only four of the sites within a mile of Project-affected stream reaches were free-flowing streams, all of which met the criterion. None of the Project-affected streams represent potential CRLF breeding habitat.

The three Project impoundments were included in this assessment. New Bullards Bar Reservoir and Our House Diversion Dam impoundment on the Middle Yuba River do not represent potential breeding habitats for CRLF, and Log Cabin Diversion Dam impoundment on Oregon Creek is also unlikely to be used. New Bullards Bar Reservoir is a deep reservoir with mostly steeply-sloped banks and supports a recreational fishery. The two diversion impoundments are situated on streams with seasonal high flows driven by snow-melt runoff occurring in most years, conditions incompatible with CRLF breeding.

There are no other known current or historical occurrences of CRLF in or near the study area. Documented occurrences in Nevada County (Sailor Flat, Critical Habitat Unit NEV-1) and Butte County (Hughes Place Pond, Critical Habitat Unit BUT-1) are 6.2 and 21.7 mi, respectively, from the nearest site and designated Critical Habitat.

Critical Habitat Unit YUB-1 has been designated for 2,558 hectares (6,322 ac) surrounding the documented occurrence near Little Oregon Creek. Special management considerations or protection for this unit may be required, associated with wildland fire suppression, timber harvest activities, and controlling predation by non-native species (75 FR 12816). Forest Service biologists on the Plumas National Forest have been intermittently monitoring the two locations with historical observations of CRLF since the species was initially found, with additional

monitoring of other locations within Critical Habitat Unit YUB-1 for the past two years, during which time there have been no CRLF sightings (M. Cisneros, pers. comm. 2013).

3.3.5.3.5 ESA – Listed Fisheries

The status, critical habitat, life history, distribution, threats, and stressors of steelhead DPS, the Central Valley spring-run Chinook salmon ESU, and the North American green sturgeon southern DPS are discussed in detail in the Applicant-prepared Draft BA, which is included in Volume IV of this Application for New License. Information describing YCWA's relicensing studies pertinent to the Affected Environment is presented in Section 3.3.3, *Aquatic Resources*.

3.3.5.4 Environmental Effects

This section presents a description of the anticipated effects of YCWA's proposed Project on ESA-listed species.

3.3.5.4.1 Effects from Project Operations and Maintenance

ESA-Listed Plants

Project O&M activities that have a potential to affect ESA-listed plants include ground-disturbing activities, recreation and vegetation control, including the application of pesticides.

As described above, YCWA studies did not find ESA-listed plants in the proposed FERC project Boundary.

In addition, YCWA's field teams performing other relicensing studies from 2009 through 2013 did not record any incidental observations of ESA-listed plant species.

Of the four potentially occurring ESA-listed plants on the Project, none are likely to colonize within the proposed Project Boundary. Pine Hill flannelbush has been identified exclusively on the Pine Hill formation and is therefore, unlikely to colonize the Project. Layne's ragwort and Stebbins' morning-glory both grow primarily on gabbro or serpentine soils; neither was found on the Project so they are also unlikely to colonize the Project. Finally, Hartweg's golden sunburst grows on Mima mounds, which are also not present within the proposed Project Boundary. The proposed Project would, therefore, have no effect on ESA-listed plants.

ESA-Listed Invertebrates – Valley Elderberry Longhorn Beetle

Project O&M activities that have a potential to affect VELB include ground-disturbing activities, recreation and vegetation control, including the application of pesticides.

Field surveys conducted by YCWA located one elderberry plant on land managed by the Sierra Foothill Research and Extension Center, University of California. The elderberry bush that was found is in a non-riparian community, dominated by annual grasses and blue oak. It is approximately 20 ft from the northeast edge of the Narrows 2 Powerhouse access road and

separated from the road by a fence. Surveyors reported eight stems, two having a diameter of 3.5 in at the ground and six at less than 3 in. VELB indicators (i.e., boreholes) were not observed.

No recreation, Project O&M or other Project-related activities occur in the area, which is fenced.

The proposed Project would, therefore, have no effect on VELB.

ESA-Listed Branchiopods - Vernal Pool Fairy Shrimp and Vernal Pool Tadpole Shrimp

Project O&M activities that have a potential to affect vernal pool fairy shrimp and vernal pool tadpole shrimp include ground-disturbing activities, recreation and vegetation control, including the application of pesticides, in areas where these species could occur. However, no suitable habitat for vernal pool fairy shrimp or vernal pool tadpole shrimp exists within the proposed Project Boundary, the area within which these Project O&M activities are confined.

Vernal pool fairy shrimp and vernal pool tadpole shrimp do not occur in streams and therefore have no potential to occur in stream reaches that may be affected by Project flows. These species could potentially occur in habitats proximate to stream reaches that may be affected by Project flows, but where hydrology is governed by direct precipitation with seasonal drying.

The proposed Project would, therefore, have no effect on vernal pool fairy shrimp and vernal pool tadpole shrimp.

ESA-Listed Amphibians – California red-legged Frog

Project O&M activities that have a potential to affect CRLF and its Critical Habitat include ground-disturbing activities, recreation and vegetation control, including the application of pesticides, in aquatic or terrestrial habitats where this species may occur. There is a low potential for Project flows to affect CRLF use of stream reaches, which could represent non-breeding or dispersal habitat. Seasonally low water surface elevation at the mouths of certain tributaries on New Bullards Bar Reservoir could indirectly affect CRLF if these conditions are beneficial to American bullfrog.

No CRLF were observed during the performance of this study or incidentally during the performance of other relicensing studies. Habitats at New Bullards Bar Reservoir are unlikely to attract or support CRLF. Accordingly, operations of New Bullards Bar Reservoir, a storage reservoir, are unlikely to directly affect CRLF.

The two diversion impoundments are situated on streams with seasonal high flows driven by snow-melt runoff occurring in most years, conditions that are incompatible with CRLF breeding.

YCWA is unaware of any study or report that shows that CRLF breeds in large, perennial streams comparable to those that may be affected by Project flows, and specifically in Sierra Nevada streams of this kind where the hydrology is governed by snow-melt runoff. The TNF LRMP (Forest Service 1990), as amended, defines potential CRLF breeding habitat as “*aquatic habitats that contain water through July 31 (such as lakes, ponds, and water holes, and low*

gradient [$<4\%$] stream habitats lacking spring flushing flows) located below 5,000 ft.” Barry and Fellers (2013) indicate that historical CRLF habitat in the Sierra Nevada was associated with small, narrow, permanent or nearly permanent creeks near the headwaters, and report no evidence of historical or current breeding populations on large streams in the Sierra Nevada. Under both unimpaired hydrology and current conditions, high spring flows often occur in streams downstream of the Project that are incompatible with CRLF breeding habitat. In addition, these streams do not exhibit the vegetation and substrate conditions characteristic of CRLF habitat. Introduced predatory fish, including smallmouth bass, are also well established.

New Bullards Bar Reservoir is less than approximately 1-mi from an area near Oregon Hill Road and Little Oregon Creek with known recorded occurrences of CRLF, a population which is presumed extant, although there have been no confirmed sightings in several years. The Critical Habitat Unit YUB-1 has been designated for 2,558 hectares (6,322 ac) surrounding these occurrences (CDFG 2012; 75 FR 12816). The sites with documented occurrences of CRLF and other similar, mining legacy sites in the same general vicinity that appear to be suitable habitat are 0.12 to 0.45 mi from New Bullards Bar Reservoir and are not connected to Little Oregon Creek, a fish-bearing tributary of the reservoir. Project O&M activities do not occur at any of these mining legacy sites and no recreational activity associated the Project occurs at these sites. Some of the sites are located near Oregon Hill Road, on which road traffic appears to be low. Moran Road has a seasonal closure designed to minimize potential for road traffic to affect CRLF making overland movements (YCWA 1993).

There have been no recorded observations of CRLF in Little Oregon Creek itself, or other tributaries. Site assessment results and earlier observations by Barry (2002) suggest that tributaries of New Bullards Bar Reservoir are, at best, marginal habitat for CRLF, but could represent seasonal, non-breeding aquatic habitat.

Mining legacy wetlands in the Little Oregon Creek area are unlikely to support American bullfrog breeding, because these are relatively small sites (i.e., 0.003-0.20 ac) and some do not hold water for a sufficient period. However, a juvenile American bullfrog was observed at one of the wetlands on July 11, 2013 and juveniles were sighted earlier in 2013 by Forest Service at another wetland and in Little Oregon Creek (M. Cisneros, pers. comm. 2013). Juvenile American bullfrogs, which may have originated at Moran Cove on New Bullards Bar Reservoir or may have originated elsewhere, could prey on smaller juvenile CRLF. USFWS identified controlling predation by non-native species, such as American bullfrog, as a special management consideration for Critical Habitat Unit YUB-1, in addition to wildland fire suppression and management of timber harvest activities (75 FR 12816). As such, the Forest Service is considering efforts to remove juvenile American bullfrogs from regularly monitored mining legacy sites within the Critical Habitat Unit (M. Cisneros, pers. comm. 2013).

A USFWS BO dated February 4, 2004 (USFWS 2004c) addressed the effects of a variety of management activities at New Bullards Bar Reservoir on CRLF and other listed species. The proposed actions consisted of removal and disposal of hazardous, floating woody debris at New Bullards Bar Reservoir; hazard tree removal; vegetation management of campgrounds, day-use areas, and Forest Service facilities around the reservoir; and other associated management

activities described in the *Draft New Bullards Bar Fish and Wildlife Management Plan* (Forest Service 2002b).

Prior to the USFWS BO and in consultation with Forest Service, YCWA relocated the hazardous woody debris disposal area away from Moran Cove to the west bank of Garden Point, because of potential conflicts with bald eagle and CRLF. The Forest Service and YCWA identified three sites, all on Garden Point peninsula, for the collection and burning on floating material. The Primary and Secondary burning sites were designated as the preferred locations and first to be used each year, whereas the Tertiary Burn Site was only to be used for additional storage and burning if needed. In the event that there is excess floating woody debris that cannot be accommodated at the three sites, additional storage or disposal sites may be needed and YCWA and the Forest Service agreed emergency consultation with USFWS may be required.

YCWA's proposed Project includes YCWA proposed Condition GS4, Implement New Bullards Bar Reservoir Floating Material Management Plan. The plan provides that floating material will be stored and burned in the Primary and Secondary burn sites. However, because YCWA has found that the Tertiary Burn Site is too steep to be safely used, the plan provides that in emergencies, material may be stored for short periods and burned in part of Moran Cove. YCWA will endeavor to dispose of the material at the Moran Cove site within the same year (i.e., no later than November 14 of that year). If the woody debris cannot be disposed of in that time period, a qualified biologist will survey the site for YCWA to assess whether the condition of the site has enhanced conditions for American bullfrog, which may necessitate bullfrog control efforts. This is consistent with the *Draft New Bullards Bar Fish and Wildlife Management Plan* (Forest Service 2002b), which states that if specific areas within the management area are identified as having large numbers of American bullfrogs or other non-native predatory species, a predator control plan should be developed and efforts made to remove these species.

The terms and conditions of USFWS' BO included a requirement that prior to removal of any hazard tree in the Moran Cove area, a biologist will check the area for CRLF. In the event that personnel engaged in hazard tree removal or the other proposed actions observes frogs larger than 2 inches (i.e., any species other than Sierran treefrog, the most commonly observed species, which does not exceed 2 inches body length), a Forest Service biologist will review the site before activities continue. YCWA's proposed Condition TR1 includes implementing an Integrated Vegetation Management Plan. The plan specifies among other things that prior to removing any hazard trees in the Moran Cove area, YCWA will consult with the Forest Service to survey the proposed work area for CRLF.

In addition, YCWA proposed Project includes Conditions GEN1 that require YCWA consult with the agencies and Indian tribes annually. YCWA notes that, under federal and state laws, YCWA would need to consult with all appropriate agencies as well as obtain FERC's approval prior to constructing new Project facilities.

With the terms and conditions, the BO concluded that the proposed actions (i.e., removal and disposal of hazardous, floating woody debris at New Bullards Bar Reservoir; hazard tree removal; vegetation management of campgrounds, day-use areas, and Forest Service facilities

around the reservoir; and other associated management activities) were unlikely to have an adverse effect on CRLF.

With implementation of the conditions proposed by YCWA, the proposed Project is not likely to adversely affect CRLF or its Critical Habitat.

ESA-Listed Fish

Project effects on the Central Valley steelhead DPS, the Central Valley spring-run Chinook salmon ESU, and the North American green sturgeon southern DPS are discussed in detail in the Applicant-Prepared Draft BA, which is included in Volume IV of this Application for New License.

3.3.5.4.2 Cumulative Effects

Cumulative effects on steelhead DPS, the Central Valley spring-run Chinook salmon ESU, and the North American green sturgeon southern DPS are discussed in detail in the Applicant-Prepared Draft, which is included in Volume IV of this Application for New License.

3.3.5.5 Proposed Conditions

3.3.5.5.1 Conditions Recommended by YCWA

As described above, YCWA's proposed Project includes three conditions that, in part, apply to ESA-listed species, and four conditions that are specific to ESA-listed species:

- Condition GEN1 – Meet with Agencies and Indian Tribes Annually
- Condition GS4 – Implement New Bullards Bar Reservoir Floating Material Management Plan¹⁴
- Condition TR1 – Implement Integrated Vegetation Management Plan¹⁴
- Condition TE1 – Monitor Water Temperature Downstream of Narrows 2 Powerhouse
- Condition TE2 – Monitor Chinook Salmon Downstream of Narrows 2 Powerhouse
- Condition TE3 – Establish Lower Yuba River Anadromous Fish Ecological Group
- Condition TE4 – Control Project Ramping and Flow Fluctuations Downstream of Englebright Dam

These conditions are provided in full in Appendix E2.

¹⁴ Plan included in Appendix E3 of Exhibit E of Application for New License.

3.3.5.5.2 Proposed Measures Recommended by Agencies or Other Relicensing Participants That Were Not Adopted by YCWA

Nine comment letters were filed with FERC regarding YCWA's DLA. YCWA reviewed each letter and, with regards to ESA-Listed Species, identified 17 individual proposals to modify a YCWA proposed condition or add a new condition. One of the proposals by the USFWS to modify YCWA's proposed Condition TE1, installation of two additional temperature recorders in the Feather River, was adopted without modification. YCWA's proposed Condition TE3 was modified to further define and clarify the role of the Lower Yuba River Anadromous Fish Group (Group), but in general TE3 was not modified as recommended by commenters. Provided below is YCWA's rationale for not adopting the recommendations or adopting the recommendations with modification. The recommendations have been organized by subject to facilitate replies.

Add Conditions to Assess Project Effects on VELB and CRLF

In its March 3, 2014 letter, USFWS recommended a condition "*to address Project effects to ESA-listed species,*" with the following specific reference to CRLF and VELB:

Missing from these proposed license conditions is consideration of Project effects on the California red-legged frog and valley elderberry longhorn beetle. The USFWS recommends that a condition be included to address Project effects to ESA-listed species. Comments addressing effects to the California red-legged frog are addressed above. In addition, the host plant (*Sambucus* spp.) for the threatened valley elderberry longhorn beetle (*Desmocerus californicus dimorphus*) occurs within the FERC boundary and the area affected by the Project. Informal consultation with the USFWS regarding protection of the valley elderberry longhorn beetle is needed. A condition to address future Project effects to valley elderberry longhorn beetle should be developed and included in the final license application. (p. 15)

Both a bullfrog management plan and an LWM management plan should be integrated with threatened and endangered species monitoring, because they are plans that are intended to mitigate Project effects while conserving threatened and endangered species. The issue of LWM in New Bullards Bar Reservoir impacting California red-legged frogs and their critical habitat, coupled with the scarcity of LWM downstream of both New Bullards Bar and Englebright dams, indicates that the problems and issues associated with too much wood at one location and not enough wood at other locations can be best addressed through integrated planning. (pp. 15-16)

YCWA did not adopt this recommendation because the conditions proposed by YCWA are adequate to address potential effects on ESA-listed species. In addition, the recommendation implies that "species monitoring" should be included in the new condition, but does not state where or when such monitoring should occur. YCWA's relicensing surveys found little potential

for the Project to affect VELB, based on the near absence of elderberry. YCWA included as part of the Integrated Vegetation Management Plan provisions to address potential occurrence of VELB or other ESA-listed species in areas that might be affected by vegetation maintenance.

New Bullards Bar Reservoir is less than approximately 1 mi from an area near Oregon Hill Road and Little Oregon Creek with known recorded occurrences of CRLF, a population which is presumed extant, although there have been no confirmed sightings in several years. Condition GS4 includes specific provisions to avoid and minimize potential direct effects on CRLF or indirect effects that could be associated with American bullfrog if floating material must be stockpiled on an emergency basis at Moran Cove. Additional measures are not warranted.

Expand Monitoring for Chinook Salmon and Steelhead Downstream of Englebright Dam

In its March 3, 2014 letter, NMFS recommended:

This proposal does not include adequate monitoring in the area directly downstream of Englebright Dam and the Narrows 2 Development facilities. Please see NMFS comments regarding Chinook salmon stranding filed February 12, 2014 and the monitoring requirements we propose therein (which are far greater in scope and detail than those proposed by the Licensee)...While NMFS agrees that monitoring of adult Chinook salmon and *O. mykiss* immigration/escapement to the Yuba River is important, as well as adult spawning, more juvenile fish monitoring seems warranted. (pp. 13, 14)

YCWA's letter dated March 31, 2014 addressed NMFS' concerns related to the potential for stranding downstream of the Narrows 2 facilities, and therefore, YCWA has not made any changes to Proposed Condition TE2. NMFS' March 3, 2014 letter also mentions that more juvenile fish monitoring seems warranted, but does not provide specific detail on monitoring measures or their intended purpose in evaluating potential effects of the Project.

In its March 3, 2014 letter, USFWS suggests additional long-term monitoring of aquatic resources in the Yuba River downstream from Englebright Dam, including the additions of rotary screw trap (RST) monitoring, redd surveys and carcass sampling upstream of Daguerre Point Dam. FWN's March 3, 2014 letter provides similar comments, suggesting that TE2 should include monitoring for a variety of different fish in the lower Yuba River and assess Project effects on juvenile salmonid production over the long-term.

USFWS recommended:

In order to have an industry standard to evaluate the success of the CVPIA AFRP, the USFWS developed protocols for data collection and reporting (Montgomery Watson et al. 1997). Rotary screw traps are an accepted standard for estimating production of juvenile Chinook salmon (USFWS 2008), but they are not currently used in the Yuba River. The USFWS specifically recommends that rotary screw traps be used to study the

effects of Yuba Accord flow schedules on salmonids and for long-term monitoring of Project conditions. (p. 7)

and

...carcass sampling continue upstream of Daguerre Point Dam in order to collect biological data and recover coded-wire tags, and (2) redd surveys. (p. 16)

and

Targeted monitoring should be implemented for both steelhead and juvenile salmonids. (p. 16)

and

For juveniles, the USFWS requests that rotary screw trapping and turbidity monitoring be added to this measure. The proposed Yuba River Anadromous Fish Ecological Group (TE3) should be tasked with development of appropriate monitoring programs for steelhead and juvenile salmonids. The USFWS further requests that the monitoring effort be conducted by biologists that are approved by the USFWS, CDFW, and NMFS. Rotary screw traps are not currently used in the Yuba River, even though they are an accepted standard for estimating production of juvenile Chinook salmon. The USFWS requests that established protocols be used in this license, specifically: The 1997 USFWS Comprehensive Assessment and Monitoring Program (CAMP) Implementation Plan; the USFWS 2008 Draft Rotary Screw Trap Protocol for Estimating Production of Juvenile Chinook Salmon; and the CDFW 2010 Comprehensive Monitoring Plan for Steelhead in the California Central Valley. (p. 17)

FWN recommended:

Licensee's proposed measure should include monitoring for a variety of different fish in the lower Yuba River and should be re-titled "Monitor Fish Populations" to accurately reflect its scope. In addition to Chinook salmon, Licensee should monitor rainbow trout or steelhead populations and green sturgeon. Use of rotary screw traps to monitor juvenile salmonid fitness, production and outmigration is not mentioned in the measure but should be considered. This measure should be clearly linked to the Anadromous Fish Ecological Group as it can function as the advisory group for assessing and informing monitoring projects. (p. 12)

YCWA did not incorporate these recommendations for several reasons. Comprehensive RST surveys and redd surveys have already been conducted on the Yuba River downstream of Englebright Dam. Both RST operations and comprehensive redd surveys are tremendously labor intensive and expensive. YCWA (prior to 2006), and the RMT (from 2006 – 2009) operated an RST program on the Yuba River downstream of Englebright Dam. The RMT conducted Chinook salmon and steelhead redd surveys during the 2009 – 2011 spawning seasons on the Yuba River. Data collection efforts associated with both the RST surveys and redd surveys compiled useful and robust data sets. These efforts were not renewed by the RMT due to the cost and declining value of additional years of similar data.

The RST surveys have provided sufficient information such that the RMT has identified lifestage-specific periodicities in the Yuba River for spring-run Chinook salmon fry rearing, juvenile rearing and downstream movement, and smolt outmigration, for fall-run Chinook salmon fry rearing, and juvenile rearing and downstream movement, and for steelhead fry rearing, juvenile rearing and downstream movement, and smolt outmigration. The RMT also has recently conducted juvenile snorkeling surveys to identify physical and hydrologic habitat preferences of juvenile salmonids and other fish species in the Yuba River.

USFWS does not sufficiently demonstrate how additional RST surveys would provide useful information beyond the data that have already been collected during previous survey years.

In addition, USFWS has not provided rationale for how additional RST surveys would assist in evaluating potential effects of Project operations. USFWS provides the following rationale for conducting RST surveys in the Yuba River on page 7 of its comment letter:

Data generated on the Yuba River typically does not have a counterpart or comparable data set outside of the Yuba River and does not allow comparisons between Yuba River salmonid populations and other populations that are exposed to similar out-of-basin influences.

However, there is no nexus between the Project and “out-of-basin influences” on Yuba River salmonid populations. Project operations do not affect stressors to Yuba River salmonid populations that occur outside of the Yuba River Basin. Therefore, YCWA is not proposing to conduct monitoring activities for the purposes of monitoring out-of-basin influences, or the effects of out-of-basin influences on salmonid populations in the Yuba River and other Central Valley rivers.

By contrast to USFWS’ comments, continual RST monitoring is not widely undertaken on a widespread basis in the Central Valley. The Cal Fish and Wildlife *2010 Comprehensive Monitoring Plan for Steelhead in the California Central Valley* does not recommend redd or RST monitoring for the Yuba River (Cal Fish and Wildlife at pp. 39 and 40).

In regards to USFWS’ request for turbidity monitoring, no rationale or explanation is provided for how turbidity monitoring would assist in evaluating potential effects of the Project. USFWS also does not provide rationale regarding how potential effects of the Project on turbidity would be separated from turbidity associated with natural environmental

conditions. Therefore, YCWA is not proposing any turbidity monitoring in the Yuba River downstream of Englebright Dam.

In addition to RST surveys, USFWS recommended:

...carcass sampling continue upstream of Daguerre Point Dam in order to collect biological data and recover coded-wire tags, and (2) redd surveys. (p. 16)

USFWS does not specify the biological data to be collected, or its use. As proposed in TE2, YCWA will continue to recover coded-wire tags during carcass surveys downstream of Daguerre Dam, which can be the basis for a statistical extrapolation of coded wire tag results upstream of Daguerre Dam.

The previously conducted Chinook salmon and steelhead redd surveys, in conjunction with additional fisheries studies conducted by the RMT (e.g., acoustic tagging, carcass surveys, and operation of Vaki Riverwatcher systems), have allowed the RMT to develop lifestage-specific periodicities for spring-run Chinook salmon, fall-run Chinook salmon and steelhead spawning in the Yuba River. The redd survey data also have allowed for identifying morphological unit-specific spatial distributions, as well as depth distributions, for both Chinook salmon and steelhead spawning throughout the Yuba River. These spatial and depth distributions have allowed for analyzing differences in potential redd dewatering of spring-run Chinook salmon, fall-run Chinook salmon, and steelhead associated with evaluating simulated hydrologic scenarios in the Yuba River. The spatial and depth distributions also have allowed for the development of more protective flow fluctuation criteria at the Narrows 2 Development for the proposed license to minimize the potential for Chinook salmon and steelhead redd dewatering. USFWS has not provided rationale for how additional redd and carcass surveys, beyond the surveys that are already proposed, would provide additional useful information regarding potential effects of the Project.

USFWS also recommended that: “*Targeted monitoring should be implemented for both steelhead and juvenile salmonids*” (p. 16). As described above, sufficient studies have already been undertaken to understand anadromous salmonid (including steelhead) life history and habitat requirements in the Yuba River. USFWS does not provide any additional information on what types of monitoring should be conducting beyond the requests previously discussed above, nor does USFWS provide rationale regarding how additional steelhead and juvenile salmonid monitoring would assist in evaluating potential effects of the Project.

Clarify Role of Lower Yuba River Anadromous Fish Ecological Group

Several commenters recommended additional detail or clarity as to the role and function of the Lower Yuba River Anadromous Fish Ecological Group.

In its March 3, 2014 letter, NMFS recommended:

...obtaining independent expert review of experimental designs currently used in the M&E Program, and the use of outside experts could be extended to new study designs discussed by the proposed Lower Yuba River Anadromous Fish Ecological Group (proposed Condition TE3). (p 14)

In its February 28, 2014 letter, USFS recommended:

This measure should provide more details and definition on the purpose of the group, its structure, and its role in decision making. (p. 28)

In its March 3, 2014 letter, USFWS recommended:

...a process similar to the Narrows 1 Mitigation Fund (FERC P-1403) be implemented. (p. 17)

In its February 28, 2014 letter, SWRCB recommended:

...YCWA clarify the management structure of the Group and how final decisions will be made and executed... (p. 3);

In its March 3, 2014 letter, BLM recommended:

BLM would like to be included in the group. (p. 7)

In its March 3, 2014 letter, FWN recommended:

...that Licensee include NGO and/or public representatives in this group. In addition, we recommend that Licensees work with relicensing participants to further refine its scope of duties and decision-making process. (p. 13)

YCWA's has expanded YCWA's proposed Condition TE3 to further define and clarify the role of the Lower Yuba River Anadromous Fish Ecological Group and has added BLM to the Group. However, it should be clear that the Group is primarily an advisory body. FERC and each of the jurisdictional resource agency Group members will retain their regulatory authority. It is not anticipated that the resource agency group members would delegate or cede their authority to the Group.

YCWA does not believe that the Narrows 1 Mitigation Fund process is applicable for this Group; the Narrows 1 license includes a monetary fund to be disbursed subject to a consultation and voting protocol, no such disbursement of funds is included in YCWA's proposed Condition TE3.

Additionally, expanding the size and membership of the Group beyond the suggested membership of resource agencies with specific jurisdiction over resources present in the reach

downstream of Englebright Dam would present numerous challenges as to size, membership credentials, or ability to join, and would potentially substantially dilute the utility of the Group.

Commenters also recommended expansion of the purview of the Group as described below.

USFS recommended:

...other special status species and project-affected stream reaches upstream of Englebright. Alternatively a new measure for an upstream group could be developed. (p. 30)

Cal Fish and Wildlife recommended:

...YCWA consider including a measure for a consultation group that would cover the portion of the Project upstream of Englebright Dam Reservoir. (p. 40)

FWN recommended:

Licensee should expand the geographic scope of the group to include the Upper Yuba River and Middle Yuba River operations (or create a similar separate group). (p. 13)

YCWA has added to its proposed Conditions GEN1, Meet with Agencies and Indian Tribes Annually. The meeting would be open to the public. YCWA believes these annual meetings are adequate to keep agencies and interested parties apprised of Project activities.

YCWA does not propose to form a formal group regarding issues upstream of Englebright Dam. No party has proposed the role of such a group.

Further, YCWA believes the Lower Yuba River Anadromous Fish Ecological Group should focus on only the Yuba River downstream of Englebright Dam. The composition, species, issues and geography of the aquatic resources in this section of river are quite different than those upstream of the dam, and warrant the formation of an advisory group.

3.3.5.6 Unavoidable Adverse Effects

Because YCWA's proposed Project would not affect ESA-listed plant, insects or shrimp, and is not likely to adversely affect ESA-listed amphibians, the proposed Project would not create any significant, unavoidable, adverse effects on ESA-listed species.

Refer to YCWA's Applicant-Prepared Draft in Volume IV of this Application for New License for discussions of whether the Project would have any unavoidable adverse effects on steelhead DPS, Central Valley spring-run Chinook salmon ESU, and North American green sturgeon southern DPS.

Page Left Blank