3.3.5 Threatened and Endangered Species

This section discusses species listed as threatened or endangered species under the ESA. First, and immediately below, is a list of ESA-related terms used in this section. Section 3.3.5.1 describes SSWD's informal consultation with USFWS and NMFS regarding ESA-listed species. Section 3.3.5.2 describes SSWD's actions to identify threatened and endangered species and their designated Critical Habitats that could potentially be affected by the Proposed Project. In addition, this section includes a life history of each ESA-listed species addressed in this Exhibit E, including: 1) status and critical habitat; 2) discussion of the recovery plan for the species, if one has been issued; 3) current and historical distribution; 4) life history and habitat requirements; 5) stressors and limiting factors, if known; 6) the results of any species-specific relicensing studies performed by SSWD; and 7) known occurrence in the Action Area. Section 3.3.5.2 describes the Environmental Baseline for ESA-listed species under USFWS' jurisdiction (i.e., plant, invertebrate and amphibian species). Section 3.3.5.3 addresses Project effects on ESA-listed species under NMFS' and USFWS' jurisdiction, and cumulative effects on ESA-listed species are discussed in Section 3.3.5.4 Section 3.3.5.5 describes measures recommended by agencies and other interested parties in written comments on SSWD's DLA that were not adopt by SSWD.

SSWD augmented existing, relevant, and reasonably available information regarding ESA-listed species with information from seven studies: 1) Study 2.2, *Water Temperature Modeling*; 2) Study 3.1, *Salmonid Redd Study*; 3) Study 3.2, *Stream Fish Study*; 4) Study 3.3, *Instream Flow Study*; 5) Study 5.1, *ESA-Listed Plants Study*; 6) Study 5.2, *ESA-Listed Wildlife – VELB Study*; and 7) Study 5.3, *ESA Listed Amphibians – California Red-legged Frog Study*. These studies are complete and the information is discussed below or in other sections of this document. All data collected during these studies is provided in Appendix E1.

ESA-related terms used in this section are:

- Action Agency. For the purpose of ESA, FERC is considered the Action Agency.
- Non-Federal Representative. On May 13, 2016, FERC designated SSWD as its non-federal representatives for purposes of informal consultation under Section 7 of the ESA.[1]
- Consultation. On May 13, 2016, FERC initiated informal consultation with the USFWS and NMFS.[1]
- Proposed Action. For the purpose of ESA, the Proposed Action includes issuance by FERC of a new license to SSWD for the Proposed Project, as described in this Application for New License.
- Action Area. Under ESA, an action area is defined as "all areas to be affected directly or indirectly by the Federal action and not merely the immediate area involved in the action" (50 C.F.R. § 402.02). Direct effects are defined as "the direct or immediate effects of the project on the species or its habitat" (USFWS and NMFS 1998). Indirect effects are defined as "those that are caused by the Proposed Action and are later in time, but still are reasonably certain to occur" (50 C.F.R. § 402.02). The downstream extent of the action

[1] FERC Accession Number 20160513-3015

area is defined as the point where effects to river flow and habitat availability associated with the Proposed Action are no longer measurable (NMFS 2012). The Action Area for this Proposed Action is the proposed FERC Project Boundary for ESA-listed plants, insects, and amphibians. The Action Area for this Proposed Action is the confluence of the Bear and Feather rivers when considering ESA-listed anadromous fish and habitats.

- Environmental Baseline. For the purpose of ESA, the Environmental Baseline includes the past and present impacts of all federal, state, or private activities, and other human activities in the action area, as well as the anticipated impacts of all proposed federal projects in the Action Area that have already undergone formal or early ESA Section 7 consultation, and the impacts of state or private actions that are contemporaneous with the consultation in process (50 C.F.R. § 402.02). The Environmental Baseline includes effects attributable to the existence of dams or diversions over which the Action Agency (i.e., FERC) has no discretion, and non-discretionary operations and maintenance. This Environmental Baseline includes the continued operation and maintenance of the non-Project diversion dam, approximately 1-mi downstream of Camp Far West Dam.

- Effects. Under Section 7(a)(2) of the ESA, the federal action agency that permits, licenses, funds, or otherwise authorizes an action must consult with the NMFS and the USFWS, as appropriate, to ensure that the action will not jeopardize the continued existence of any ESA-listed species or adversely modify ESA-designated critical habitat, unless the federal action agency determines the action will have no effect on ESA-listed species (16 U.S.C. § 1536(c)).

  Under the aggregate effects assessment approach used in this section, the environmental baseline and the status of the species establish the context for determining the ability of each listed species to withstand additional stressors or the exacerbation of existing stressors that may be caused by the Proposed Action. As the NMFS (1999) policy document states: "[i]f the species' status is poor and the baseline is degraded at the time of consultation, it is more likely that any additional adverse effects caused by the proposed or continuing action will be significant". The effects analysis is conducted to assist USFWS and NMFS in determining whether the Proposed Action will cause "…some deterioration in the species' pre-action condition" (National Wildlife Federation v. NMFS, 524 F.3d 917, 930 (9th Cir. 2008). As the court stated in that decision, "…an agency only 'jeopardize[s]' a species if it causes some new jeopardy." (Ibid.) The effects analysis also considers the guidance provided by this Ninth Circuit decision that states "…an agency may not take action that will tip a species from a state of precarious survival into a state of likely extinction. Likewise, even where baseline conditions already jeopardize a species, an agency may not take action that deepens the jeopardy by causing additional harm." (Ibid.)

  If the federal agency determines the action may affect ESA-listed species or designated critical habitat, it is required to prepare a BA for the Section 7 process to determine whether the action is likely to: 1) adversely affect listed species or designated critical habitat; 2) jeopardize the continued existence of species that are proposed for listing;[2] or 3) adversely modify proposed critical habitat. After reviewing the BA, NMFS or

[2] "Jeopardize the continued existence of" under the ESA is defined as "to engage in an action that reasonably would be expected, directly or indirectly, to reduce appreciably the likelihood of both the survival and recovery of a listed species in the wild by reducing the reproduction, numbers, or distribution of the species." (50 C.F.R. § 402.02)

USFWS determines whether formal consultation or a conference is necessary (50 C.F.R. § 402.02, 50 C.F.R. § 402.12).

When a federal action agency determines, through a BA or other review, that its action is not likely to adversely affect a listed species or designated critical habitat, the action agency must request NMFS' or the USFWS', as appropriate, concurrence on its determination. A not likely to adversely affect determination is appropriate and warranted when the action agency concludes that all of the effects of the action on the species and its critical habitat are expected to be "insignificant," "discountable" or "completely beneficial." According to the USFWS' and NMFS' Endangered Species Consultation Handbook, Procedures for Conducting Consultation and Conference Activities Under Section 7 of the Endangered Species Act (USFWS and NMFS 1998):

> [i]nsignificant effects relate to the size of the impact and should never reach the scale where take occurs. Discountable effects are those extremely unlikely to occur. Based on best judgment, a person would not: (1) be able to meaningfully measure, detect, or evaluate insignificant effects; or (2) expect discountable effects to occur.

Further, page 4-32 of the ESA Consultation Handbook states that:

> The Services can evaluate only the Federal action proposed, not the action as the Services would like to see that action modified.

If NMFS or USFWS, as appropriate, does not concur with the action agency's determination of "not likely to adversely effect," the action agency must request formal consultation or a conference. Similarly, when the action agency determines, through a BA or other review, that its action is "likely to adversely affect" a listed species or designated critical habitat, the action agency must submit a request for formal consultation to the NMFS or the USFWS, as appropriate.

There is a designated 90-day period for formal consultation to take place and, after that, another 45-day period for NMFS or USFWS, as appropriate, to prepare a biological opinion (i.e., a BO, also referred to at times as a BiOp). The ESA does not allow extension of the consultation period beyond 150 days without the applicant's[3] consent (16 U.S.C. § 1536(b)(1)(B)).

The BO presents NMFS' or USFWS', as appropriate, determination as to whether or not the proposed action would be likely to jeopardize the species or adversely modify its critical habitat. If NMFS or USFWS, as appropriate, issues either a no jeopardy opinion or a jeopardy opinion that contains Reasonable and Prudent Alternatives (RPA), the BO may include an incidental take[4] statement. NMFS or USFWS, as appropriate, must anticipate the quantity of take that may result from the action and authorize such take with a statement that the ESA-listed species described in the incidental take statement will not be jeopardized. The incidental take statement must contain clear terms and

[3] For this Project, the "applicant" is SSWD. For consultation regarding the DEIS or BA, the "applicant" is FERC.

[4] "Take" is defined under the ESA to mean "harass, harm, pursue, hunt, shoot would, kill, trap, capture or collect, or attempt to engage in any such conduct." (16 U.S.C. § 1532). "Harm" in the definition of "take" as used in the ESA means an act which actually kills or injures fish or wildlife. Such an act may include significant habitat modification or degradation which actually kills or injures fish or wildlife by significantly impairing essential behavioral patterns, including, breeding, spawning, rearing, migrating, feeding or sheltering (16 U.S.C. § 222.102).

conditions designed to reduce the effect of the anticipated take; these terms are binding on the action agency.

- Cumulative Effects. Cumulative effects are defined by federal regulations as "…those effects of future State or private activities, not involving Federal activities, that are reasonably certain to occur within the action area of the Federal action subject to consultation" (50 C.F.R. §402.02). Cumulative effects must be considered in the analysis of the effects of the Proposed Action (50 C.F.R. §402.12(f)(4)).

- Interrelated and Interdependent Actions. Interrelated actions are actions that are part of a larger action and depend on the larger action for their justification. Interdependent actions are actions having no independent utility apart from the proposed action. (50 C.F.R. § 402.02.) If a particular activity would not occur "*but for*" the occurrence of the proposed federal action, the effects of that action are interdependent and interrelated to the federal action, and the effects of that action are attributable to the federal action for consultation purposes. To the contrary, activities that would occur anyway, with or without the occurrence of the federal action at issue, are not interdependent or interrelated to the proposed federal action. The ESA Consultation Handbook (USFWS and NMFS 1998) further clarifies that if a project would exist independently of a proposed action, it cannot be considered "*interrelated*" or "*interdependent*," even if the proposed action is required to bring the existing facility into compliance with federal law. SSWD would continue to utilize Camp Far West Reservoir and dam to provide water storage and irrigation deliveries if there was no hydroelectric generation, so those activities and the existence of those facilities are independent of the Proposed Action.

3.3.5.1 Informal Consultation with USFWS and NMFS

Beginning in early 2008, over 10 months prior to filing its NOI and PAD, SSWD began to meet with Relicensing Participants to familiarize them with the Project and its operations, discuss process, identify issues, and, most importantly, to collaboratively develop study proposals, including for species listed as threatened and endangered under the ESA. Since that time, SSWD has held numerous meetings to discuss process and study methods and results. 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. NMFS indicated it views such meetings as "technical advisory meetings."

The following provides a summary of SSWD's informal consultation with NMFS and USFWS regarding ESA-listed species.

- Pre-Initiation of Informal Consultation under Section 7 of ESA
  - May 7, 2015. SSWD mailed to NMFS a PAD information questionnaire requesting existing, relevant and reasonably available information in NMFS's possession regarding the Project and potentially affected resources.
  - May 13, 2015. SSWD mailed to USFWS a PAD information questionnaire requesting existing, relevant and reasonably available information in NMFS's possession regarding the Project and potentially affected resources.
  - March 13, 2016. SSWD filed with FERC and distributed to NMFS and USFWS its

NOI and PAD. The PAD described existing, relevant and reasonably available information regarding ESA-listed species and other potentially affected resources.

- Post-Initiation of Informal Consultation under Section 7 of ESA
  - May 13, 2016. FERC initiated informal consultation with the USFWS and NMFS under Section 7 of ESA, and designated SSWD as its non-federal representatives for purposes of informal consultation under Section 7.
  - June 27, 2016. SSWD hosted a Project site visit. All agencies were invited. USFWS participated.
  - June 27, 2016. SSWD held a joint agency and public meeting to provide agencies, Indian tribes and members of the public an opportunity to discuss the information in the PAD, discuss data and studies to be developed by SSWD, and express their views regarding resource issues that should be addressed in SSWD's application for new license. Both USFWS and NMFS participated.
  - August 25, 2016. USFWS requested a 60-day extension from the NOI/PAD comment filing deadline of August 27, 2016. FERC and SSWD agreed with the extension.
  - August 25, 2016. NMFS filed with FERC comments on SSWD's PAD, including SSWD's proposed studies. With regards to ESA-listed species under NMFS's jurisdiction, NMFS requested that SSWD add sturgeon spp. to the list of species that could potentially occur in the Action Area and that SSWD address green sturgeon in its application. Further, NMFS requested that SSWD conduct two new studies: one related to fluvial processes and channel morphology for anadromous fishes and one related to exploring the feasibility of new coldwater delivery systems for anadromous fishes.
  - September 7, 2016. USFWS filed with FERC comments on SSWD's PAD, including SSWD's proposed studies. With regards to ESA-listed species under USFWS's jurisdiction, USFWS requested that SSWD add CRLF to the list of species that could potentially occur in the Action Area, and recommended an alternative CRLF study to the one proposed by SSWD.
  - October 12, 2016. SSWD filed with FERC a letter that provided: 1) SSWD's rationale for adopting, adopting with modification, or not adopting requested study modifications and new studies; and 2) detailed plans for each of the 14 studies that SSWD now proposed to conduct.
  - November 21, 2016. To resolve any remaining disagreements on studies, SSWD invited NMFS, USFWS and other agencies, and NGOs to meet. USFWS participated. At the conclusion of the meeting, SSWD agreed to modify its October 12, 2016, study plans. SSWD understood that these agreements resolved any outstanding study disagreements with those parties, including USFWS that attend the November 21 meeting.
  - December 20, 2016. NMFS filed a letter with FERC commenting on SSWD's October 12, 2016, letter and requesting a meeting with FERC "*to discuss ESA consultation procedures including developing a shared understanding of the*

environmental baseline, including related structures such as CFW diversion dam in the analysis of the Project's effects."

- January 9, 2017. SSWD commented on NMFS's letter stating it would be pleased to meet with NMFS at its convenience.
- January 9, 2017. SSWD filed a letter with FERC with each of the 16 study plans, including those agreed to at the November 21, 2016 meeting, and advised FERC that SSWD was undertaking these studies to support the relicensing. Each study plan is posted on SSWD's Camp Far West Relicensing Website at www.sswdrelicensing.com. The studies included: 1) 2.1, Water Temperature Monitoring; 2) 2.2, Water Temperature Modeling; 3) 2.3, Water Quality; 4) 3.1, Salmonid Redd; 5) 3.2, Stream Fish Populations; 6) 3.3, Instream Flow; 7) 3.4, Benthic Macroinvertebrates; 8) 4.1, Special-status Plants and Non-native Invasive Plants; 9) 4.2, Special-status Wildlife – Raptors; 10) 4.3, Special-status Wildlife – Bats; 11) 5.1, ESA-listed Plants; 12) 5.2, ESA-listed Wildlife – Valley Elderberry Longhorn Beetle; 13) 5.3, ESA-listed Amphibians – California Red-legged Frog; 14) 6.1, Recreation Use and Visitor Survey Study; 15) 10.1, Cultural Resources; and 16) 11.1, Tribal Interests.
- January 24, 2017. FERC responded to NMFS's letter stating that FERC does not participate in pre-filing activities under the TLP, and that NMFS may file a formal dispute regarding SSWD's proposed studies if NMFS "sees fit to do so." NMFS did not file a formal dispute.
- 2017 and 2018. SSWD conducted the relicensing studies. Beginning in April 2018, SSWD made the data and results from the relicensing studies available on SSWD's relicensing website. As new study results became available, SSWD alerted NMFS, USFWS, other agencies and other interested parties of the new information via email.
- June 5, July 16, July 23, September 20, October 18, and November 15, 2018. SSWD met with agencies and other interested parties to discuss relicensing study results, Project operations, water temperature and instream flow models, and lower Bear River aquatic resources. USFWS participated in most of the meetings; NMFS participated in only the September 20 meeting.
- August 16 and November 9, 2018. SSWD met with agencies and other interested parties to discuss vegetation management, wildlife, and recreation. USFWS participated in the meetings.
- December 31, 2018. SSWD distributed its draft Application for New License to USFWS, NMFS, and other agencies for review and comment.
- January 8, 2019. SSWD met with agencies and other interested parties to discuss flow-related and other PM&E measures for inclusion in SSWD's FLA. USFWS participated in the meeting.
- January 25, 2019. SSWD met with agencies and other interested parties to discuss flow-related and other PM&E measures for inclusion in SSWD's FLA. USFWS participated in the meeting.

- February 12, 2019. SSWD met with agencies and other interested parties to discuss flow-related and other PM&E measures for inclusion in SSWD's FLA. USFWS participated in the meeting.
- March 1, 2019. SSWD met with agencies and other interested parties to discuss flow-related and other PM&E measures for inclusion in SSWD's FLA. USFWS participated in the meeting.
- March 12, 2019. SSWD met with agencies and other interested parties to discuss flow-related and other PM&E measures for inclusion in SSWD's FLA. USFWS participated in the meeting.
- April 26, 2019. SSWD met with agencies and other interested parties to discuss flow-related and other PM&E measures for inclusion in SSWD's FLA. USFWS participated in the meeting.
- May 6, 2019. SSWD met with agencies and other interested parties to discuss flow-related and other PM&E measures for inclusion in SSWD's FLA. USFWS and NMFS participated in the meeting.
- May 13, 2019. SSWD met with agencies and other interested parties to resolve written comments on SSWD's DLA. USFWS and NMFS participated in the meeting.
- May 24, 2019. SSWD met with agencies and other interested parties to discuss flow-related and other PM&E measures for inclusion in SSWD's FLA. USFWS participated in the meeting.
- June 4, 2019. SSWD met with agencies and other interested parties to discuss flow-related and other PM&E measures for inclusion in SSWD's FLA. USFWS participated in the meeting.

3.3.5.2 ESA-listed Species and Critical Habitats Considered

3.3.5.2.1 Screening for Potentially-Affected ESA-listed Species

On August 25, 2015, SSWD generated a list of ESA-listed species by using USFWS' on-line IPaC (USFWS 2015). The IPaC query included a user-defined polygon that encompassed the existing FERC Project Boundary plus the reach of the Bear River that extends from Camp Far West Dam downstream to the Feather River confluence, and a 1-mi wide buffer around this entire area.

The resulting list included 11 species, with two listed as endangered and nine listed as threatened under ESA: four invertebrates; one amphibian; one reptile; four fishes; and one bird. These were:

- Endangered:
  - Conservancy fairy shrimp (*Branchinecta conservatio*)
  - Vernal pool tadpole shrimp (*Lepidurus packardi*) and Critical Habitat

- Threatened:
  - Vernal pool fairy shrimp (*Branchinecta lynchi*) and Critical Habitat
  - California red-legged frog (*Rana draytonii*) and Critical Habitat
  - Western yellow-billed cuckoo (*Coccyzus americanus occidentalis*), Western U.S. Distinct Population Segment (DPS)
  - Steelhead (*Oncorhynchus mykiss*), California Central Valley (CV) DPS and Critical Habitat
  - Delta smelt (*Hypomesus transpacificus*)
  - Valley elderberry longhorn beetle (*Desmocerus californicus dimorphus*)
  - Giant garter snake (*Thamnophis gigas*)
  - Chinook salmon (*O. tshawytscha*), CV spring-run Evolutionarily Significant Unit (ESU) and Critical Habitat.
  - Green sturgeon (*Acipenser medirostris)*, North American Southern DPS

No candidate species or species proposed for listing were identified in this query result. An updated IPaC review on March 1, 2018, and on April 30, 2019, generated no additional species to the list (Attachment 3.3.5A).

Following its IPaC query, SSWD searched several additional sources to identify other ESA-listed species that are known or have the potential to occur within the Project Vicinity. For fish and wildlife, the information sources included CDFW's California Natural Diversity Database (CNDDB, CDFW 2018a), the California Wildlife Habitat Relationships (CWHR, CDFW 2014), Camp Far West Biological Assessment (Sycamore Environmental 2013) and NMFS' and USFWS' recovery plans. For plants, CNPS' Inventory of Rare Plants (CNPS 2018) was also queried for the Project Vicinity plus an additional buffer of one USGS quadrangle. SSWD also searched for and reviewed relevant and readily available reports (e.g., BAs, EIRs and EISs) and Critical Habitat designations that pertain to the Project Vicinity.

These additional searched identified four ESA-listed plant species with the potential to occur in the Project Vicinity. These are:

- Endangered:
  - Hartweg's golden sunburst (*Pseudobahia bahiifolia*)
  - Pine Hill flannelbush (*Fremontodendron decumbens*)
  - Stebbins' morning-glory (*Calystegia stebbinsii*)
- Threatened:
  - Layne's ragwort (*Packera layneae*)

No candidate species or species proposed for listing were identified in this additional search.

SSWD eliminated 7 of the 15 species from further analysis. These species and the rationale for exclusion are described below.

- Delta smelt
- Pine Hill flannelbush
- Stebbins' morning-glory
- Layne's ragwort
- Conservancy fairy shrimp
- Giant garter snake
- Western yellow-billed cuckoo

SSWD eliminated from further consideration the Delta smelt because this species does not occur in or near the Project Vicinity. The species is endemic to the Sacramento-San Joaquin estuary and historically was documented to only occur in the Sacramento River upstream to the vicinity of Knights Landing (USFWS 2016).

Due to the soil characteristics of the Project site, SSWD eliminated from further consideration Pine Hill flannelbush, Stebbins' morning-glory and Layne's ragwort due to the complete lack of required clay, gabbro, or serpentine soils for these species. Additionally, Layne's ragwort is found at elevations of approximately 1,000 ft and above (Jepson Interchange 2018), while the Project's maximum elevation is 320 ft. The nearest known population of Stebbin's morning-glory to the Project is 11 mi away. The nearest known population of Pine Hill flannelbush and Layne's ragwort are more than 20 mi away from the Project (CDFW 2018a).

Effects on Conservancy fairy shrimp were not analyzed due to the lack of playa-like large vernal pools, which are their sole known habitat, within the Proposed Project Boundary.

Effects on giant garter snake were not analyzed because the Project is outside the known range for this species, as defined by the recovery units outlined in the USFWS' (2017a) *Recovery Plan for the Giant Garter Snake (Thamnophis gigas).*

Finally, the western yellow-billed cuckoo was not analyzed because the Project is located approximately 10 mi east of the USFWS' defined range for this species (USFWS 2018a).

Based on SSWD's searches, a total of eight species, two endangered and six threatened, could potentially be affected by the Proposed Action. No candidate or proposed for listing species are potentially affected. Table 3.3.5-1 describes for each of these ESA-listed species: 1) a description of the species' habitat requirements; 2) known or potential occurrences in the Project Vicinity; and 3) references to any recovery plans or status reports pertaining to that species.

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

Common Name (Scientific Name)	Suitable Habitat Type	Known or Potential Occurrence in Project Vicinity	Status[1]	Status Reports and Recovery Plans Relevant to Project Vicinity
PLANTS				
Hartweg's golden sunburst (*Pseudobahia bahiifolia*)	Valley and foothill grassland, cismontane woodland (CNPS 2018).	Present in quads (Knights Ferry and Yuba City) adjacent to the Project Vicinity, (CNPS 2018).	FE, SE & CRPR 1B.1	None
INVERTEBRATES				
Valley elderberry longhorn beetle (*Desmocerus californicus dimorphus*)	Occurs only in the Central Valley and adjacent foothills up to 3,000 ft elevation in association with blue elderberry (*Sambucus* spp.) (USFWS 2017b).	Fourteen occurrences found on CNDDB near Project Vicinity; four occurrences within Sheridan quad, seven within the Browns Valley quad, two in Lake Combie quad, and one in Wheatland quad (CDFW 2018a).	FT	Recovery Plan (USFWS 1984)
Vernal pool fairy shrimp (*Branchinecta lynchi*)	Endemic to grasslands of the Central Valley, Central Coast Mountains, and South Coast Mountains, in rain-filled pools (CDFW 2014).	Reported on the USFWS IPaC Trust Report (USFWS 2018b)	FT	Recovery Plan (USFWS 2005a)
Vernal pool tadpole shrimp (*Lepidurus packardi*)	Inhabits vernal pools and swales in the Sacramento Valley containing clear to highly turbid water (CDFW 2014).	Reported on the USFWS IPaC Trust Report (USFWS 2018b)	FE	Recovery Plan (USFWS 2005a)
AMPHIBIANS				
California red-legged frog (*Rana draytonii*)	Suitable habitat is located in deep (>0.7 m), still or slow-moving water within dense, shrubby riparian and upland habitats (Jennings and Hayes 1994).	Reported on the USFWS IPaC Trust Report (USFWS 2018b)	FT	Recovery Plan (USFWS 2002)
FISH				
Steelhead, California Central Valley DPS (*Oncorhynchus mykiss*)	Spawning occurs within the Sacramento and San Joaquin rivers and their tributaries (NatureServe 2017). Habitat conditions are not suitable to support a self-sustaining population in the Bear River; intermittent spawning may occur during high flow years (NMFS 2014).	Reported on the USFWS IPac Trust Report (USFWS 2018b). Critical Habitat designated in lower Bear River up to the Camp Far West Diversion Dam (70 FR 52488)	FT	Status Report (Busby et al. 1996; Good et al. 2005; NMFS 1997, 1998) Restoration and Management Plan (CDFG 1991, 1993; 1996a) Recovery Plan (NMFS 2014)
Chinook salmon, Central Valley spring-run ESU (*Oncorhynchus tshawytscha*)	Spawning occurs within the Sacramento River and its tributaries. Habitat conditions in the Bear River are not suitable for Chinook salmon spawning (PFMC 2014).	Occurs in the Feather River. Critical Habitat designated in the lower ~5 mi of the Bear River for intermittent non-natal juvenile rearing (70 FR 52488).	FT & ST	Status Report (CDFG 1996b, 1998; Good et al. 2005; NMFS 1999) Restoration and Management Plan (CDFG 1991, 1993) Recovery Plan (NMFS 2014)

Table 3.3.5-1. (continued)

Common Name (Scientific Name)	Suitable Habitat Type	Known or Potential Occurrence in Project Vicinity	Status[1]	Status Reports and Recovery Plans Relevant to Project Vicinity
Green sturgeon, North American Southern DPS (*Acipenser medirostris*)	The Sacramento and Feather rivers currently host the only known spawning populations of the Southern DPS of North American green sturgeon (Poytress et al. 2010; Seezholtz et al. 2014).	NMFS (2009a) designated the lower Feather River critical habitat for the Southern DPS of North American green sturgeon. USFWS (1995) and Beamesderfer et al. (2004) state that green sturgeon have been recorded in the Bear River.	FT & ST	Recovery Plan (NMFS 2018) Status Report (NMFS 2015)

[1] Status Codes:
CRPR California Rare Plant Rank; 1B: Species considered rare, threatened or endangered in California and elsewhere.
1: Species seriously threatened in California
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.
SE Endangered: Listed as endangered under CESA.
ST Threatened: Listed as threatened under CESA.

As shown in Table 3.2.5-1, two of the ESA-listed species are also listed under the CESA: Hartweg's golden sunburst (SE); and CV spring-run Chinook salmon ESU (ST).

3.3.5.2.2 ESA Listed Species Life Histories

Hartweg's Golden Sunburst (FE)

Status and Critical Habitat
On February 6, 1997, USFWS listed Hartweg's golden sunburst as an endangered species under the ESA (62 FR 5542). No Critical Habitat has been designated for this species.

Recovery Plan
No Recovery Plan for Hartweg's golden sunburst has been developed. On May 27, 2011, USFWS began a 5-year review of this species, which has not been completed (USFWS 2018c).

Current and Historical Distribution
This species is found only in the Central Valley of California, though the historic range may have gone from Yuba County south to Fresno County. However, the species was always restricted to local abundance. All of the 19 known remaining populations are located in the Friant region of Fresno and Madera counties and the La Grange region in Stanislaus County (USFWS 2010).

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 grows on grasslands, but almost always on the north/northeast side of Mima mounds, 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. Soils are primarily shallow, well-drained, fine-textured soils (USFWS 2010).

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.

SSWD's Relicensing Study

SSWD conducted the *ESA-listed Plants Study* within a designated study area inside the existing FERC project Boundary, including background literature reviews, desktop analyses, and field investigations. The study area consisted of four specific areas: 1) the North Shore Recreation Area (NSRA); 2) the South Shore Recreation Area (SSRA); 3) the Camp Far West Dam and associated dikes and Spillway; and 4) the Camp Far West Powerhouse, for a total of 505 ac. These are the areas where SSWD's Project O&M activities or Project-related recreation have a potential to effect ESA-listed plant species if the species occurs there.

This study was conducted in conjunction with SSWD's *Special-Status Plants and Non-Native Invasive Plant Study*, and *ESA-Listed Wildlife – Valley Elderberry Longhorn Beetle Study.* Additional information describing Valley Elderberry Longhorn beetle surveys and results is provided below in Section 3.3.5.2.2.

Field surveys were conducted from April 2017 through July 2017. Survey timing was planned based on known bloom times and herbarium collection dates. SSWD's surveyors conducted special-status plant surveys and NNIP surveys as outlined in the "Botanical Survey" section of the CDFW's *Protocols for Surveying and Evaluating Impacts to Special Status Native Plant Populations and Natural Communities* (CDFG 2009). Surveys were comprehensive over the entire study area, except for areas deemed to be unsafe (e.g., due to steep, unstable terrain) by the field team, using systematic field techniques to ensure thorough coverage, with additional efforts focused in habitats with a higher probability of supporting special-status plants (e.g., serpentine outcrops) and NNIP. Surveys were floristic in nature, documenting all species observed; taxonomy and nomenclature were based on *The Jepson Manual* (Baldwin et al. 2012).

Although 206 plant species were identified during floristic surveys (see Attachment 3.3.4A), no occurrences of Hartweg's golden sunburst were located.

Known Occurrences in Action Area

Hartweg's golden sunburst was not found in the Action Area during SSWD's studies, and SSWD is unaware of any recorded occurrence in the Action Area. Critical Habitat does not occur in the Action Area. No potential habitat (i.e., Mima mounds) for Hartweg's golden sunburst was observed during SSWD's relicensing surveys.

Valley Elderberry Longhorn Beetle (FT)

Status and Critical Habitat

On August 8, 1980, USFWS listed Valley Elderberry Longhorn Beetle (VELB) as a threatened species (45 FR 52803). On February 14, 2007, the USFWS completed a 5-year review, which

resulted in USFWS' recommendation that the species be de-listed. In October of 2012, USFWS began the process of reviewing the de-listing proposal, but it was withdrawn in September 2014 (USFWS 2018d).

Critical Habitat has been designated for the species, including the American River Parkway and Sacramento zones. The Project is outside of the Critical Habitat zones designated by USFWS, but portions of the Project fall within the potential range of the beetle (45 FR 52803). According to the USFWS Critical Habitat Mapper, the closest Critical Habitat designation lies 29.2 mi south of Camp Far West Reservoir along the American River (USFWS 2018d).

Recovery Plan

The USFWS issued a VELB Recovery Plan on August 28, 1984 (USFWS 1984). In 2017, USFWS published the Framework for Assessing Impacts to the Valley Elderberry Longhorn Beetle (*Desmocerus californicus dimorphus*) (USFWS 2017b). There is nothing specific in the VELB Recovery Plan (USFWS 1984) relating to the Project or the lower Bear River.

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 from the valley floor to the lower foothills. Most of the recorded occurrences occur in suitable habitat below 500 ft in elevation. Historically, VELB ranged wherever the host plant, elderberry (*Sambucus* spp.), were present in Central valley riparian areas and some uplands (USFWS 2017b).

In the CNDDB search, VELB was found near the Project Vicinity in the Sheridan, Browns Valley, Lake Combie, and Wheatland quad. The nearest occurrence is approximately 10 mi southwest along the Bear River, downstream of Camp Far West Dam (CDFW 2018a).

Life History and Habitat Requirements

The VELB is dependent on its host plant, elderberry plants, which is a common component of riparian corridors and adjacent upland areas in the Central Valley (USFWS 2017b). 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. 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 1 to 2 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.[5] 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 hole (USFWS 2018d).

[5] Frass is the debris or excrement produced by the insect.

Adults generally emerge from late-March through June and are short-lived; however, most records for adults occur from late-April to mid-May. Adults feed on elderberry leaves and mate within the canopy (USFWS 2018d).

Stressors and Limiting Factors

The USFWS considers VELB, although 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
- 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

Indiscriminant insecticide and herbicide use in agricultural areas and along road rights-of-way 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 2018d).

SSWD's Relicensing Studies

SSWD conducted the *ESA-Listed Wildlife – Valley Elderberry Longhorn Beetle Study* within a designated study area inside the existing FERC project Boundary, including background literature reviews, desktop analyses, and field investigations. The study area consisted of four specific areas: 1) the NSRA; 2) the SSRA; 3) the Camp Far West Dam and associated dikes and Spillway; and 4) the Camp Far West Dam Powerhouse, for a total of 505 ac. These are the areas where SSWD's Project O&M activities or Project-related recreation could affect ESA-listed plant species. The study was conducted in conjunction with SSWD's *Special-Status Plants and Non-Native Invasive Plant Study* and *ESA-Listed Plants Study*. The 5-ft band around the reservoir (i.e., elevation 300 ft to 305 ft) that would be impacted by the Pool Raise was surveyed for elderberry and VELB indicators in 2013, so the majority of those areas were not resurveyed (Sycamore Environmental 2013).

Before starting field surveys, SWWD found there were no known occurrences of VELB or elderberry shrubs, other than those recorded by Sycamore Environmental, within the study area. Field surveys were conducted from April 2017 through July 2017. Survey timing was planned based on known bloom times and herbarium collection dates. SSWD's surveyors conducted special-status plant surveys and NNIP surveys as outlined in the "Botanical Survey" section of the CDFW's *Protocols for Surveying and Evaluating Impacts to Special Status Native Plant Populations and Natural Communities* (CDFG 2009). Surveys were comprehensive over the entire study area, except for areas deemed to be unsafe (e.g., due to steep, unstable terrain) by the field team, using systematic field techniques to ensure thorough coverage, with additional efforts focused in habitats with a higher probability of supporting special-status plants (e.g., serpentine outcrops) and NNIP. Surveys were floristic in nature, documenting all species observed; taxonomy and nomenclature were based on *The Jepson Manual* (Baldwin et al. 2012).

One elderberry shrub with two stems greater than one inch in diameter at ground height was identified during surveys in the area east of the dam face, on the shore of the reservoir (Figure 3.3.5-1). The largest stem was 15.2 in. at ground height, while the other was 1.8 in. at ground height. No VELB-sized exit holes were observed on the stems of the shrub, although there were holes in the stems (CDFW 2002). No VELB were observed at the time of the survey. A non-Project building is located approximately 20 ft upslope from the elderberry shrub. There was evidence of recreation in the area of the elderberry shrub, including pedestrian trails and litter. Recreationists were observed during relicensing studies fishing in the area. No Project O&M is conducted in the vicinity of the shrubs.

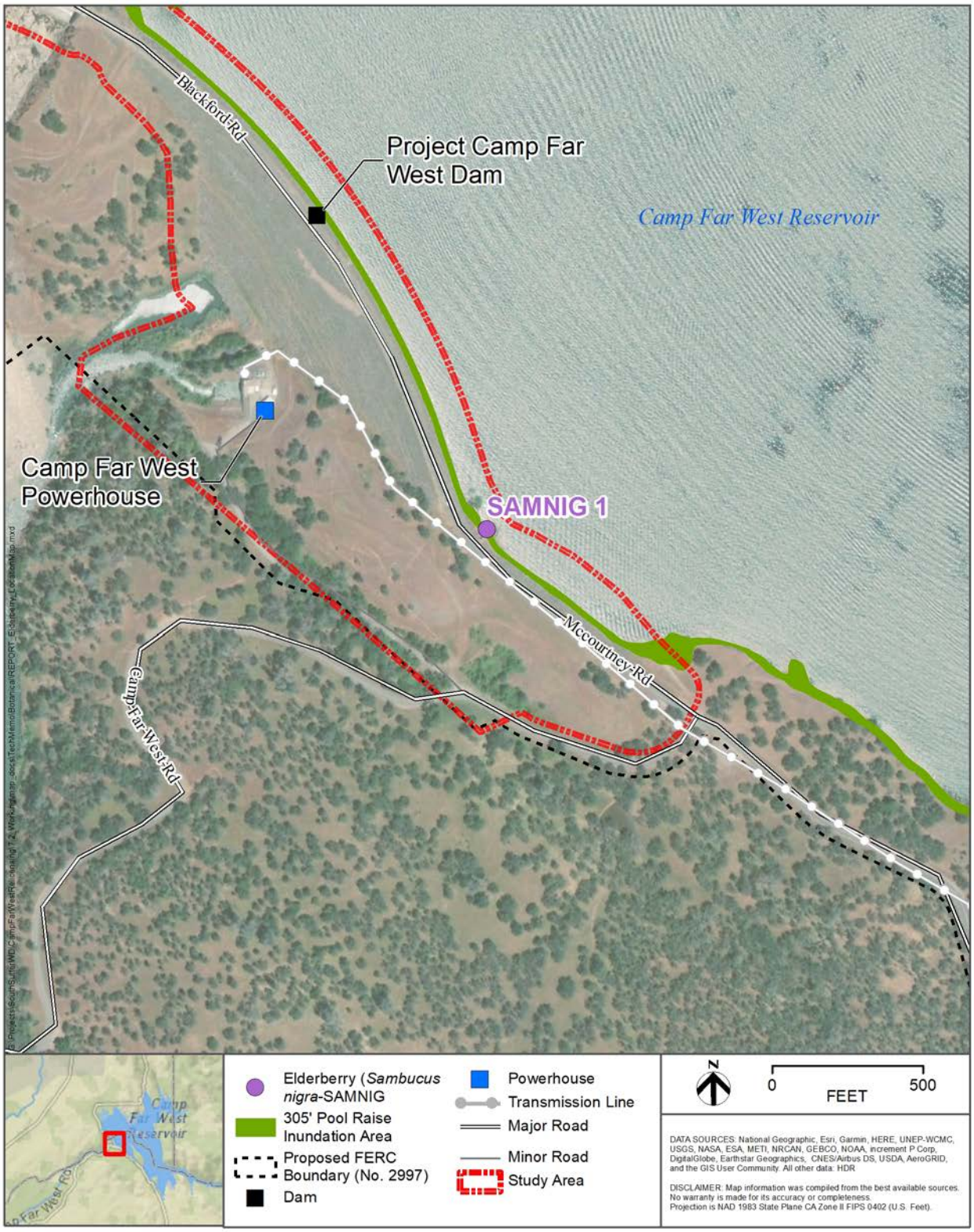

Figure 3.3.5-1. Location of elderberry occurrence within the study area.

Known Occurrences in Action Area

As described above, one elderberry shrub, with holes, was found in the Action Area during SSWD's relicensing studies. Additionally, two elderberry shrubs (EB 1 & EB2) were observed around the section of the reservoir that will be inundated by the Pool Raise (Sycamore Environmental 2013). Both elderberry shrubs were located in upland vegetative communities near the margin of the Camp Far West Reservoir. Both shrubs are not considered riparian as they historically would have been far above the Bear River and currently do not occur within a riparian community. No exit holes were observed on either shrub. According to the BA, EB2 will not be affected by Project activities, but EB1 is expected to be seasonally inundated by the Project (Sycamore Environmental 2013). Critical Habitat for VELB does not occur in the Action Area. SSWD is unaware of any historical records of VELB or elderberry plant in the Action Area.

Vernal Pool Fairy Shrimp (FT) and Vernal Pool Tadpole Shrimp (FE)

Status and Critical Habitat

Vernal pool fairy shrimp and vernal pool tadpole shrimp were listed 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 a 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 acres, and 18 Critical Habitat units for the vernal pool tadpole shrimp, totaling 228,785 acres (71 FR 7118). The closest units to the Project are approximately 4.3 mi away, just outside of Lincoln's Regional Airport for vernal pool fairy shrimp only, and 7.5 mi away, just outside of Beale Air Force Base for both species (USFWS 2018e).

Recovery Plan

The USFWS issued a Draft Recovery Plan for Vernal Pool Ecosystems of California and Southern Oregon in October 2004; the recovery plan was finalized on December 15, 2005 (USFWS 2005a). One of the objectives of the recovery plan is to delist the vernal pool fairy shrimp and vernal pool tadpole shrimp, primarily through habitat protection. Core areas of vernal pools were identified, including in Southwestern Sacramento Valley. These areas coincide with Critical Habitat for both species, with the closest core area to the Project approximately 4.3 mi away, just outside of Lincoln's Regional Airport. There is nothing specified for Project or the lower Bear River in the recovery plan (USFWS 2005a).

A 5-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 5-year review was initiated on May 25, 2011 (76 FR 30377).

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, 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 (USFWS 2005a).

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 1998). 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).

According to Placer County Natural Resources Report, the closest occurrence of the vernal pool fairy shrimp is approximately 5 mi southeast of Camp Far West Reservoir (Placer County 2004). However, the CNDDB search resulted in a total of 33 occurrences within the Project Vicinity. The closest occurrence is within 1 mi of the Bear River and approximately 1.6 mi to the west of

the reservoir, just west of Camp Far West Road. This occurrence includes a series of vernal pools that provide suitable habitat for this species (CDFW 2018a).

The CNDDB search revealed a total of nine occurrences of vernal pool tadpole shrimp within the Project Vicinity. The closest of these is located approximately 4.8 mi northeast of Camp Far West Reservoir within Beale Air Force Base. Vernal pool tadpole shrimp was found in the Browns Valley, Sheridan, and Wheatland quadrangles (CDFW 2018a).

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. 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 (USFWS 2005a).

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°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 2005a).

SSWD's Relicensing Study

There were no specific studies done for vernal pool fairy shrimp and vernal pool tadpole shrimp. The BA done in 2013 for the Pool Raise identified no suitable habitat in the area to be inundated by the Pool Raise (Sycamore Environmental 2013).

An aquatic resources delineation was performed for the north western portion of the existing FERC Project Boundary in February 2018 for the Spillway Modification (SSWD 2018). A total of 83 aquatic features, comprising 4.40 ac (3.35 ac are within the Proposed Project Boundary), were detected during the delineation, all on private land. Of the 3.35 ac in the proposed boundary, 0.95 ac were identified as vernal pools (8 distinct pools) that could provide suitable habitat for vernal pool crustaceans, specifically vernal pool tadpole shrimp and vernal pool fairy shrimp. There was no sign of disturbance to the vernal pools from Project O&M or recreation. Cattle graze throughout the area where the delineation was performed, and a section of barbed wire fence runs through one vernal pool near Camp Far West Road.

Figure 3.3.5-2 includes representative photos of the eight vernal pools, taken on February 19, 2018, while Figure 3.3.5-3 shows the location of aquatic resource features within the Proposed Project Boundary mapped during the February 2018 delineation.

Figure 3.3.5-2. Photographs of the eight distinct vernal pools identified during the February 2018 delineation.

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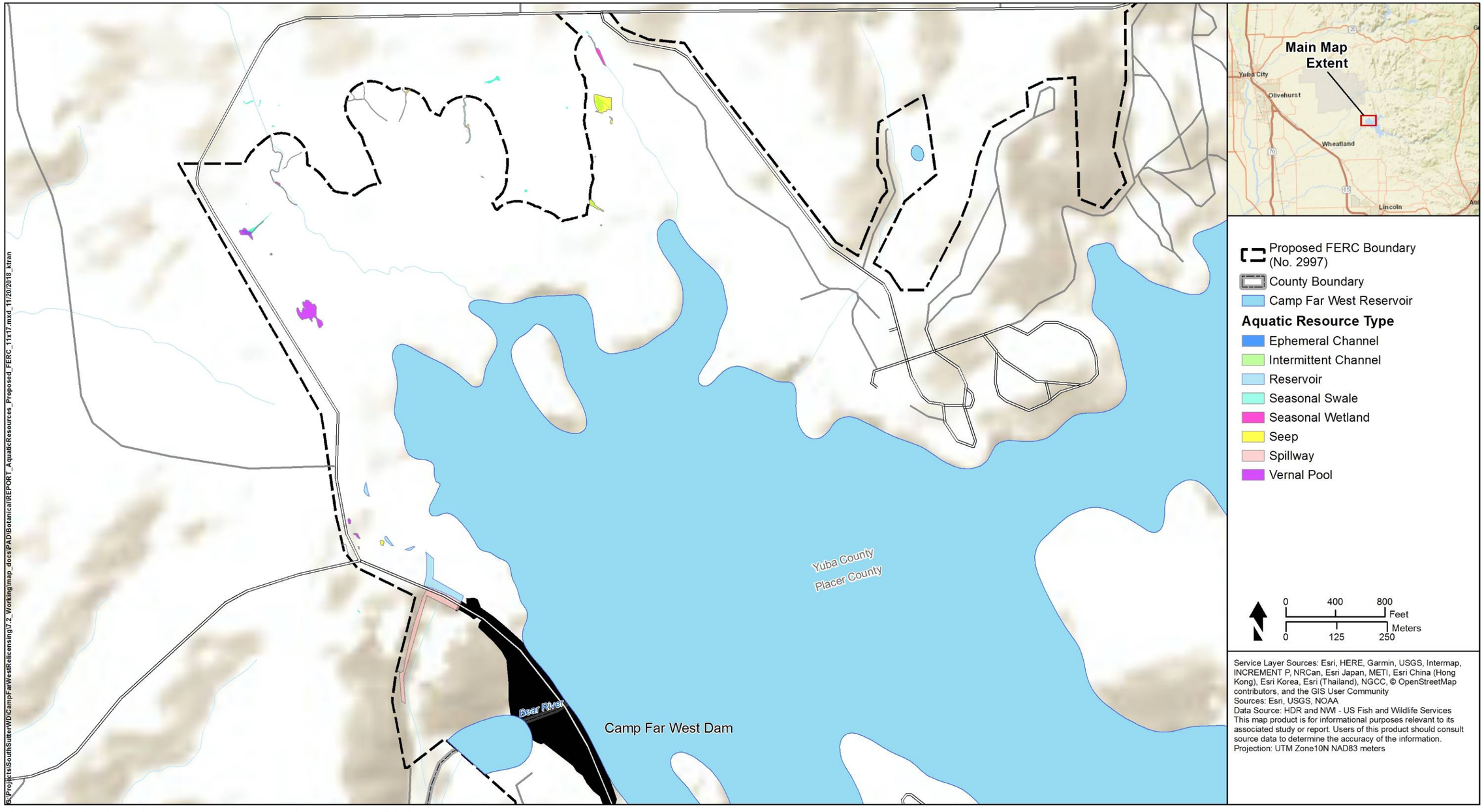

Figure 3.3.5-3. Aquatic resources located during February 2018 delineation.

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Known Occurrences in Action Area
Neither vernal pool fairy shrimp nor vernal pool tadpole shrimp have been reported to occur in the Action Area. Critical Habitat does not occur in the Action Area. However, 0.95 ac of vernal pools occur in the Action Area.

California Red-Legged Frog (FT)

Status and Critical Habitat
The California red-legged frog (CRLF) was listed as threatened on May 23, 1996 (61 FR 25813).

Critical habitat was originally designated for CRLF on March 13, 2001 and re-designated 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: 1) suitable aquatic breeding habitat that holds water for a minimum of 20 weeks in all but the driest of years; 2) suitable aquatic non-breeding habitat that may not stay inundated as long as breeding habitat but provides shelter, foraging, predator avoidance, and aquatic dispersal of juvenile and adults; 3) upland habitat adjacent to or surrounding breeding and non-breeding aquatic and riparian habitat within 1 mi; and 4) dispersal habitat within and between occupied location within a minimum of 1 mi of each other (75 FR 12816). The closest Critical Habitat to the Project is approximately 24 mi away, just outside of Foresthill near Lake Clementine (USFWS 2018e).

Recovery Plan
A recovery plan has been developed for CRLF. Recovery criteria for this species include protection and management of suitable habitats within core areas, stable populations distributed within viable metapopulations, and re-establishment of at least one population within each core area where CRLF is currently absent (USFWS 2002). The nearest core area is Unit 2: Yuba River – South Fork Feather River Unit which is located approximately 23 mi to the north of the Project.

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 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, one in Nevada County and one in the adjacent County of Butte (CDFW 2018a).

There are no known recent verified or historical accounts of CRLF from the Project Vicinity. The nearest occurrence is located approximately 24.5 mi to the northeast of the Project in

Nevada County. The second closest is located approximately 26 mi north of the Project in Placer County (CDFW 2018a).

An initial query of the CNDDB indicated no records of CRLF in the Project Vicinity. However, in February 2018, SSWD found the following statement in an unrelated FERC filing: "In 2017, the USFWS found a California red-legged frog within 30 feet of a sewage pond at Camp Far West (FERC No. 2997) in Northern California and 3 potential California red-legged frogs in that pond."[6] Upon further research, SSWD determined that there is an unprocessed data submission to CNDDB for CRLF from the Project area dated May 20, 2017. Although this record is noted as "unprocessed" by CNDDB, it is available on the CNDDB website. The record was reported by USFWS and indicates USFWS staff found an adult CRLF in a small, seasonal impoundment (i.e., non-Project stock pond) on a drainage adjacent to the sewage treatment pond in the NSRA. The California Native Species Field Survey Form submitted to the CNDDB states that this was a "single, confirmed CRLF at edge of stock pond," and provides no other details describing the frog, and no information regarding that frog or the three potential CRLFs is provided in the "Determination" section. The sighting occurred during a night-time site visit accompanied by SSWD's consultant, who was briefly separate and witnessed only the leap of an unidentified frog as the observer's light was turned in its direction. There was no discussion among the participants during the site visit that a CRLF detection had occurred. Two subsequent daytime site visits were conducted by USFWS and SSWD biologists at the sewage pond and adjacent non-Project stock pond on February 15, 2018, and March 25, 2019. The non-Project stock pond was carefully examined during each of these subsequent site visits, whereas the sewage pond was observed with binoculars at several locations from behind the surrounding fence. SSWD's biologists accompanied USFWS on each of the three visits and did not observe any CRLF during the visits.

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 (i.e., up to 200 ft) from riparian areas (Jennings and Hayes 1994; 71 FR 19244). During wet periods, long distance dispersal of up to 1-mi 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

[6] FERC Accession Number 20180129-5298

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 typically 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, 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 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. 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

According to the CRLF Recovery Plan (USFWS 2002), 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, crayfish [*Procambarus clarkii*

and *Pacifastacus leniusculus*], and non-native predatory fish, such as smallmouth bass and mosquitofish). In an experiment, the presence of American bullfrog tadpoles significantly lowered survival of CRLF tadpoles to metamorphosis (Lawler et al. 1999), probably through competition.

SSWD's Relicensing Studies

To supplement existing information regarding CRLF within the Project Vicinity, SSWD conducted the *ESA Listed Amphibians – California Red-legged Frog Study*. SSWD conducted a desktop analysis site assessment of the area within 1-mi of the Project Boundary.

A total of 134 aquatic habitat locations potentially suitable for CRLF were identified and mapped within 1 mi of the Project Boundary using existing, publically available ESRI aerial imagery, reviewed at a scale of 1:1000 and compared to Google Earth imagery (dated May 17, 2017) (Figure 3.3.5-4). One additional feature, a seasonal stock pond located near the NSRA sewage pond, was identified after the study and is included as location 135 in the Figure. Most of these features (i.e., 123 of the total) are constructed impoundments along drainages, or excavated ponds used to support livestock, hold irrigation water, or for undetermined purposes on private property. Based on available aerial imagery, 52 of these constructed ponds were classified as seasonal and 71 as semi-permanent to permanently flooded. Another 10 aquatic habitat locations were categorized as seasonal emergent wetlands that were generally located on drainages supported by irrigation water but without an apparent constructed dam or excavated basin. Aquatic habitat locations are largely concentrated northwest, east, and south of Camp Far West Reservoir. On the basis of apparently suitability hydrology, many of the aquatic habitats, particularly where supplemented by irrigation water, are evidently suitable habitat for CRLF as well as American bullfrog and, in most areas, there are multiple suitable sites that would facilitate dispersal of either species. The aerial imagery indicates that vegetation characteristics of the sites ranges from those with no apparent aquatic, emergent, or riparian vegetation to sites with dense areas of cattail and patches of riparian willows. The surrounding uplands include grazed annual grasslands and oak woodland, with low rolling hills, unlikely to pose a dispersal barrier.

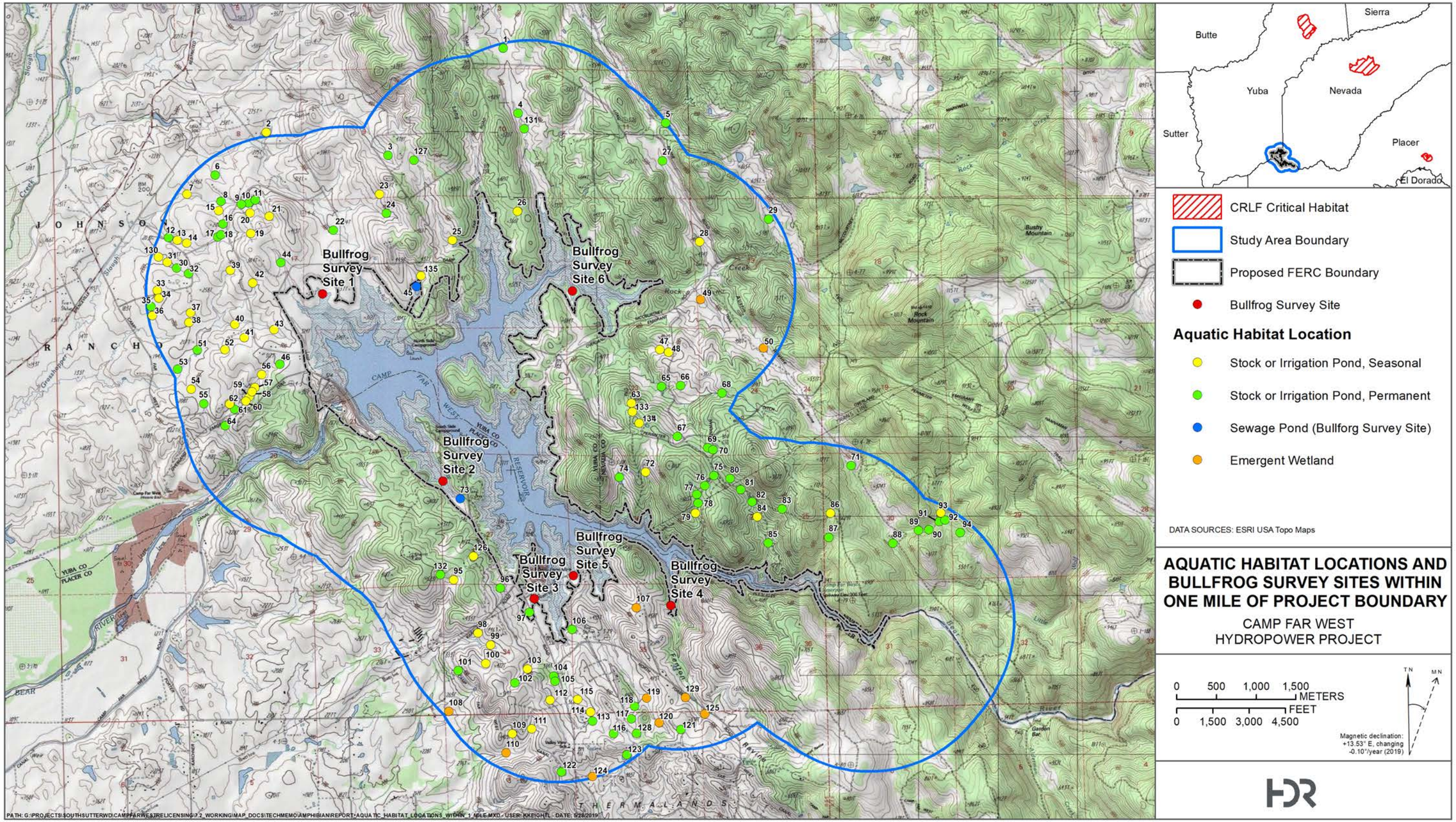

Figure 3.3.5-4. Aquatic habitat locations identified and characterized within one mile of the Proposed Project Boundary, and American bullfrog survey sites.

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Additional information was gathered by field reconnaissance and supplemental surveys for American bullfrogs within the Project Boundary. Field reconnaissance was completed on June 29, 2017, at two sewage ponds associated with the NSRA and the SSRA, respectively, in accordance with USFWS (2005b) CRLF site assessment guidelines, and included completion of Habitat Site Assessment Data Sheets. Both ponds are perennial, have steeply sloped sides and undetermined depth, little or no associated emergent or overhanging vegetation, but a dense cover of duckweed (*Lemna* sp.) over part of each pond.

Surveys to listen for calls of American bullfrogs were completed at the two sewage ponds, followed by a walk around the perimeter of each pond and visual scan during which all adult and juvenile bullfrogs heard or seen were noted. These daytime surveys were completed on June 29, 2017, July 25, 2017, and August 3, 2017. Juvenile American bullfrogs were detected in numbers ranging from 24 to 39 at the SSRA sewage pond, but only 1 was detected at the NSRA sewage pond. On two of the surveys, adult male American bullfrogs (2 and 3, respectively) were heard at the NSRA sewage pond. No adult American bullfrogs were heard at the SSRA sewage pond during any of the surveys. In addition to these surveys, an informal nighttime survey looking for reflected eyeshine was conducted at the NSRA sewage pond on May 20, 2017 by USFWS and SSWD biologists. A total of 96 juvenile American bullfrogs were identified within the sewage pond, as well as three frogs that differed in eyeshine color. Because, in SSWD's opinion, these frogs were located too far from the observers to be otherwise illuminated, they are regarded by SSWD as unidentified.

Auditory surveys for American bullfrog were also performed at six locations in coves or "arms" of the reservoir on Camp Far West Reservoir on the same dates (Figure 3.3.5-4). No bullfrog calls were heard at any of the six survey locations on Camp Far West Reservoir.

As described above, SSWD also accompanied USFWS biologists during its daytime site visits to the NSRA on February 15, 2018 and March 25, 2019. On February 15, 2018, one Sierran chorus frog (*Pseudacris sierra*) was observed in the seasonal stock pond (i.e., location 135 in Figure 3.35-4); no other frogs were observed by SSWD biologists. No frogs were observed by SSWD biologists during the 2019 site visit.

Based on numerous aquatic habitats within 1-mi of the Project that meet the minimum criteria for CRLF breeding habitat and without the results of protocol level CRLF survey at all of these sites, most of which are on private land, CRLF must be assumed to occur within this area, regardless of the probability of an undiscovered population. The habitat assessment conducted by SSWD also indicates that sites suitable for American bullfrog are widespread and that this invasive species is almost certainly well established in the area. Aquatic habitats within the Project Boundary, which are limited to Camp Far West Reservoir itself, the two sewage ponds, and small, seasonal water bodies that do not meet the 20-week minimum criteria, are unlikely to support CRLF breeding. Non-breeding habitat use, such as during overland dispersal, is possible. High numbers of American bullfrogs within the sewage ponds may limit the use of these ponds for breeding and larval/ juvenile development due to predation and competition. The stock pond located near the NSRA may provide habitat for CRLF; however, due to the proximity of the sewage pond, it is likely that American bullfrogs utilize this stock pond as dispersal habitat and seasonal aquatic use. The stock pond is also seasonal which may impact its

availability for both CRLF and American bullfrog habitat (Figure 3.3.5-5). Cattle grazing may cause direct effects to CRLF through crushing and/ or disturbing egg masses, a reduction in emergent and riparian vegetation, and increased erosion within the watershed, resulting in the filling of pools suitable for CRLF breeding and aquatic habitat (USFWS 2002). However, cattle grazing has been shown to positively affect CRLF populations through the creation of stock ponds that provide habitat for CRLF where it did not occur previously (USFWS 2002). In such ponded habitat, grazing may help maintain habitat suitability by keeping ponds clear of emergent vegetation that may otherwise fill the ponds and make them unsuitable for CRLF (USFWS 2002).

Figure 3.3.5-5. Stock pond (location 135) near the North Shore Recreation Area sewage pond as shown when dry during an October 2017 site visit and when wet during a February 2018 site visit.

Known Occurrences in Action Area

SSWD is unaware of any fully documented and verified accounts of CRLF occurring in the Action Area. However, SSWD acknowledges the reports by USFWS staff of a CRLF observation at the non-Project stock pond. Critical Habitat for CRLF does not occur in the Action Area

Steelhead, California Central Valley DPS (FT)

Status and Critical Habitat

On March 19, 1998 (63 FR 13347) NMFS listed the Central Valley DPS of steelhead as threatened, concluding that the risks to Central Valley (CV) steelhead had diminished since the completion of the 1996 status review based on a review of existing and recently implemented State conservation efforts and federal management programs (e.g., Central Valley Project Improvement Act Anadromous Fish Restoration Plan, CALFED Bay-Delta Program) that address key factors for the decline of this species. On January 5, 2006, NMFS reaffirmed the threatened status of the CV steelhead DPS (71 FR 834) and applied the DPS policy to the species because the resident and anadromous life forms of steelhead remain "markedly separated" as a consequence of physical, ecological and behavioral factors, and may therefore warrant delineation as a separate DPS (71 FR 834).

The DPS includes all naturally spawned anadromous *O. mykiss* populations below natural and man-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 (63 FR 13347). Two artificial propagation programs are considered to be part of the DPS-the Coleman National Fish Hatchery, and Feather River Fish Hatchery (FRFH) steelhead hatchery programs. NMFS determined that these artificially propagated stocks are no more divergent relative to the local natural populations than what would be expected between closely related natural populations within the DPS (71 FR 834).

On February 16, 2000 (65 FR 7764), NMFS published a final rule designating Critical Habitat for CV steelhead DPS. Critical habitat was designated to include all river reaches accessible to listed steelhead in the Sacramento and San Joaquin rivers and their tributaries in California. NMFS proposed new Critical Habitat for CV steelhead on December 10, 2004 (69 FR 71880) and published a final rule designating Critical Habitat on September 2, 2005 (70 FR 52488). In the Bear River, NMFS designates CV steelhead Critical Habitat to include the area defined in the CALWATER Marysville Hydrologic Unit 5515 (i) Lower Bear River Hydrologic Sub-area 551510. Outlet(s) = Bear River (39.9398, –121.5790) upstream to endpoint(s) in Bear River (39.0421, –121.3319), which means the upstream extent is at the non-Project diversion dam (70 FR 52488).

During the investigation of whether to include the Bear River as part of the final rule, several statements were made by the Critical Habitat Analytical Review Team (CHART) that highlighted the Bear River was only marginally included as part of critical habitat. The ruling stated:

> The CHART originally evaluated the conservation value of HSA 551510, which contains the lower Bear River, as being low, and it was proposed for exclusion in the proposed critical habitat rule based on the results of the ESA section 4(b)(2) analysis conducted for that rulemaking.
>
> As a result of the revised 4(b)(2) analysis conducted for the final rule, however, this [lower Bear River] HSA watershed was considered to have a medium benefit of designation and a relatively high benefit of exclusion (ie., high cost relative to benefit), making it potentially subject to exclusion from the final designation.

While analyses suggested that the high cost and low benefit of including the Bear River as critical habitat was marginal, the CHART included it because other species (i.e. spring-run Chinook salmon) may use the lower Bear River for non-natal rearing and the overall potential was assumed to justify the high cost.

Recovery Plan

The Recovery Plan for Central Valley (CV) winter-run Chinook salmon (*Oncorhynchus tshawytscha*) Evolutionary Significant Unit (ESU), CV spring-run Chinook salmon (*O. tshawytscha*) ESU and CV steelhead (*O. mykiss*) Distinct Population Segment (DPS) (NMFS 2014) was published as a means to identify the actions that may be needed for the conservation

and survival of these species. The Recovery Plan is a comprehensive document that serves as a road map for species recovery. The purpose of this Recovery Plan is to guide the implementation of species recovery by identifying and correcting threats to the species and ensuring viable CV Chinook salmon ESUs and the CV steelhead DPS.

The plan provides background history on the species, presents and justifies the recommended recovery strategy for each species including specific goals and objectives. Finally, the specific actions that should be taken to achieve recovery are presented. The ultimate goal is the delisting of the CV Chinook salmon ESUs and the CV steelhead DPS.

A key element of the Recovery Plan is the focus of actions on watersheds that can support viable populations of ESA-listed salmonids and contribute to meeting Diversity Group[7] requirements for distribution and redundancy. To assess their potential to contribute to species recovery in the diversity group, the Recovery Plan places watersheds into three categories based on their potential to support populations with low risk of extinction. The three categories are Core 1, Core 2, and Core 3. If the watershed has no potential to support populations with low risk of extinction, it is not placed into one of the three categories. In addition, the Recovery Plan lists stressors to the populations by watershed.

For the CV steelhead DPS, the Recovery Plan classifies the Bear River as a Core 3[8] stream and states that the Bear River does not provide suitable habitat for self-sustaining populations of anadromous salmonids, including CV steelhead DPS, and that any CV steelhead DPS that intermittently spawn in the Bear River during high flow years are likely strays from the FRFH. Moreover, in Appendix B of the Recovery Plan, NMFS (2014) states that: "..warm water temperatures during the summer months likely preclude steelhead juvenile rearing in the Bear River."

The plan lists the following Bear River-specific stressors:[9]

- Water temperature during specific times of the year (primarily during the CV steelhead adult immigration, embryo incubation, and juvenile outmigration periods – spring, summer, and fall)
- Flow conditions during all CV steelhead lifestages because the Bear River is a highly managed river. Flow-dependent habitat availability is a concern during spawning and

[7] The Recovery Plan identifies four diversity groups, which are geographic areas that NMFS believes have supported historical populations of the ESA-listed anadromous salmonid. The Bear River is in the Recovery Plan's Northern Sierra Nevada Diversity Group, which is "composed of streams tributary to the Sacramento River from the east, from Antelope Creek to the Mokelumne River" (NMFS 2014, p. 68).

[8] The Recovery Plan describes a Core 3 stream as in "watersheds [that] have populations that are present on an intermittent basis and require straying from other nearby populations for their existence. These populations likely do not have the potential to meet the abundance criteria for moderate risk of extinction. Core 3 watersheds are important because, like Core 2 watersheds, they support populations that provide increased life history diversity to the ESU/DPS and are likely to buffer against local catastrophic occurrences that could affect other nearby populations. Dispersal connectivity between populations and genetic diversity may be enhanced by working to recover smaller Core 3 populations that serve as stepping stones for dispersal."

[9] The Bear River Watershed Profile in the Recovery Plan begins on Page 49 in Appendix A and the Threats Matrix, which begins on Page C-94, in Attachment C to Appendix B, are the two main locations in the Recovery Plan for Bear River-specific stressors.

juvenile rearing and emigration. Low flows during adult immigration are a concern with respect to attraction and migratory cues.

- Entrainment of CV steelhead at unscreened diversions.
- Physical habitat alteration, which can lead to CV steelhead spawning habitat reduction.
- Loss of natural river morphology as a result of the managed flow regime.
- Loss of riparian habitat and instream cover as a result of the managed flow regime and adjacent agricultural production.
- Poor water quality primarily for CV steelhead embryo incubation and juvenile rearing and outmigration. Of particular concern are mercury from historic gold mining, and diazinon from agricultural runoff.

Additional stressors to the CV steelhead DPS listed in the Recovery Plan that are not specific to the Bear River but apply to the overall Northern Sierra Nevada Diversity Group include loss of floodplain habitat in the San Francisco Bay Delta, flow and water temperature issues in the Feather and Sacramento rivers, hatchery effects on genetic diversity, and predation of juvenile outmigrants.[10]

The Recovery Plan does not identify passage impediments in the Bear River as a stressor of high importance because, according to the Recovery Plan, Camp Far West Dam was constructed at the site of a natural historic barrier.[11]

Current and Historical Distribution

CV steelhead DPS historically ranged throughout accessible tributaries and headwaters of the Sacramento and San Joaquin rivers prior to major dam construction, water development, and other watershed disturbances. In the Bear River, historic population estimates do not exist for steelhead. USFWS (1998) states:

> Historically, the Bear River never supported substantial runs of salmon and steelhead as a consequence of its naturally intermittent hydrology and the occurrence of a natural rock barrier located a short distance upstream from Camp Far West Reservoir. This barrier prevented salmon and steelhead from ascending the Bear River to higher elevations where streamflows and water temperatures were more suitable. Thus, fish were restricted to the Sacramento Valley floor where environmental conditions were not always favorable. In years with favorable flows, the Bear River probably supported small runs of fall-run chinook salmon and steelhead, although run size estimates are not available.

CV steelhead DPS was not reported on the CNDDB search in or near the Project Vicinity (CDFW 2018a).

[10] The Northern Sierra Nevada Diversity Group stressor Matrix Results highlight the highest priority stressors for the Diversity Group that contains the Bear River starts on Page 4-135 in Appendix B of the Recovery Plan.
[11] As stated at page 4-135 in Appendix B, Section 4, of the Recovery Plan.

Life History and Habitat Requirements

"Steelhead" is the name commonly applied to the anadromous form of the biological species *O. mykiss*. Steelhead exhibits perhaps the most complex suite of life-history traits of any species of Pacific salmonid. Members of this species can be anadromous or freshwater residents and, under some circumstances, members of one form can apparently yield offspring of another form.

Due to a lack of documentation of CV steelhead DPS occurring in the Bear River, there is no information on the life history of any CV steelhead DPS that may intermittently spawn there. However, assuming that CV steelhead DPS that may spawn in the Bear River are likely FRFH-origin fish, recent studies in the lower Yuba River, another tributary to the Feather River, are likely representative of general life history conditions for steelhead that would have the potential to spawn in the Bear River, described below.

The Lower Yuba River Accord, River Management Team (RMT 2010; 2013) identified the period extending from August through March as encompassing the majority of the upstream migration and holding of adult CV steelhead DPS in the lower Yuba River. CV steelhead DPS adults typically spawn from December through April with peaks from January through March in small streams and tributaries where cool, well-oxygenated water is available year-round (Hallock et al. 1961; McEwan 2001). Based on all available information collected to date, the RMT (2013) recently identified the CV steelhead DPS spawning period in the lower Yuba River as extending from January through April, with embryo incubation extending into May. Juvenile CV steelhead DPS rearing in the lower Yuba River exhibits a variety of temporal periods. Some juvenile CV steelhead DPS may rear in the lower Yuba River for a short duration (i.e., up to a few months) whereas others may spend from 1 to 3 years rearing in the river. Review of available data indicates that emigration of CV steelhead DPS smolts 1 year old and older (yearling+) may extend from October through mid-April (RMT 2010; 2013).

Table 3.3.5-2. Life stage-specific periodicities for CV steelhead DPS in the Yuba River (shaded boxes indicate temporal utilization of the Yuba River, and assumed in this Exhibit E for the Bear River). Reproduced from Lower Yuba River Accord River Management Team (2013).

Life stage	Jan		Feb		Mar		Apr		May		Jun		Jul		Aug		Sep		Oct		Nov		Dec	
Adult Immigration & Holding																								
Spawning																								
Embryo Incubation																								
Fry Rearing																								
Juvenile Rearing																								
Juvenile Downstream Movement																								
Smolt (Yearling+) Emigration																								

Female steelhead construct redds within a range of depths and velocities in suitable gravels, oftentimes in pool tailouts and heads of riffles. Steelhead eggs incubate in redds for 3 to 14 weeks prior to hatching, depending on water temperatures (Shapovalov and Taft 1954; Barnhart 1991). After hatching, alevins, newly spawned salmon or trout still carrying the yolk, remain in the gravel for an additional 2 to 5 weeks while absorbing their yolk sacs prior to emergence (Barnhart 1991). The entire egg incubation life stage encompasses the time adult CV steelhead DPS select a spawning site through the time when emergent fry exit the gravel (CALFED and YCWA 2005).

In general, it has been reported that after emergence, steelhead fry move to shallow-water, low-velocity habitats, such as stream margins and low gradient riffles, and will forage in open areas lacking instream cover (Hartman 1965; Everest et al. 1986; Fontaine 1988). As fry increase in size and their swimming abilities improve in late summer and fall, juvenile steelhead have been reported to increasingly use areas with cover and show a preference for higher velocity, deeper mid-channel areas near the thalweg (Hartman 1965; Everest and Chapman 1972; Fontaine 1988).

Juvenile steelhead have been reported to occupy a wide range of habitats, preferring deep pools as well as higher velocity rapid and cascade habitats (Bisson et al. 1982, 1988). During the winter period of inactivity, steelhead prefer low velocity pool habitats with large rocky substrate or woody debris for cover (Hartman 1965; Swales et al. 1986; Raleigh et al. 1984; Fontaine 1988). During periods of low temperatures and high flows associated with the winter months, juvenile steelhead seek refuge in interstitial spaces in cobble and boulder substrates (Bustard and Narver 1975; Everest et al. 1986).

Aside from cutthroat trout (*O. clarki*), steelhead is the only anadromous species of the genus *Oncorhynchus* in which adults can survive spawning and return to fresh water to spawn in subsequent years. Individuals that survive spawning return to sea between April and June (Mills and Fisher 1994). The frequency of repeat spawning is higher for females than for males (Ward and Slaney 1988; Meehan and Bjornn 1991; Behnke 1992). In the Sacramento River, Hallock (1989) reported that 14 percent of CV steelhead DPS returned to spawn a second time. In the lower Yuba River, Mitchell (2010) reports that, based on scale analysis, 2 of the 10 wild CV steelhead DPS were on their second spawning migration at the time of capture, as indicated by a spawning check between the first and second ocean growth zones.

Stressors and Limiting Factors

Major modifications to habitat in the Bear River result from water diversions during the irrigation season, historical hydraulic mining, and construction of Rollins Dam which caused a substantial reduction in downstream sediment transport. It is estimated that 125 million cubic meters (160 million cu yds) of mining sediment is stored in the lower Bear River. The high volume of mining sediment, as well as the restricting levees, has resulted in a shallow and deeply incised channel in the lower Bear River (NMFS 2014).

During high flow events, CV steelhead DPS are known to utilize the river for limited spawning. Because CV steelhead DPS spawning likely only occurs during wet years, existing flow conditions are likely adequate to support CV steelhead DPS embryo incubation. However, the current system of diversions in the Bear River watershed results in abnormal flow fluctuations, in contrast to historical natural seasonal flow variations (NMFS 2014).

The Bear River was reviewed for summer baseflows to consider whether additional flows would benefit steelhead and possibly improve water temperature. During a summer water transfer from July 2 to August 28, 2018, flows were increased to over 120 cfs, which is significantly greater than the 10 cfs baseflow. Stream temperature reduced by 2°C for one day and then climbed back to ambient conditions (over 26°C) over the next several days. At the time of the transfer, the Feather River remained over 20 times greater in discharge magnitude, with water temperature that was 5-6°C cooler. The results suggest that steelhead during the summer are able to utilize

the Feather River for holding and that usage of the Bear River, regardless of added flow, is likely opportunistic based on ambient conditions.

SSWD's Relicensing Studies

In 2017, SSWD conducted Environmental DNA (eDNA) sampling at six locations between the non-Project diversion dam and the confluence with the Feather River. The eDNA sampling selectively targeted salmonids and sturgeon species including *O. mykiss*. Eleven of the 49 eDNA samples collected were positive for *O. mykiss*. For further analysis of the study, see Section 3.3.3.1.3 in this Exhibit E.

In April, May and June 2018, SSWD conducted snorkel and seine surveys at three locations on the Bear River. Based on the snorkel surveys, *O. mykiss* represented less than two percent of the estimated total abundance in April and May, and no *O. mykiss* were observed in June. Only one *O. mykiss* parr was captured during all three seining events; in May accounted for 1.69% of the total catch. For further description of these studies, see Section 3.3.3.1.3 in this Exhibit E.

SSWD also conducted an analysis of habitat and water temperature as they pertain to steelhead life stages using output from temperature and Instream Flow Study models developed as part of relicensing studies. This analysis indicates that, while habitat for CV steelhead DPS is available for all life stages, temperatures generally preclude utilization of the available habitat for most months of the year. A detailed discussion of this analysis is provided in Section 3.3.3.1.3 of this Exhibit E. Provided below is a summary of habitat, temperature and flow analyses for CV steelhead DPS by lifestage to address potential conditions by period.

CV Steelhead DPS Adult Immigration and Holding

Adult immigration and staging may occur from August through March. Summer fish observations as part of Water Transfer Monitoring surveys on July 24 through 26 and August 29 through 312018, did not document the presence of adult CV steelhead DPS in the entire lower Bear River. Yuba River Vaki data[12] does not specifically identify CV steelhead DPS, but the generalized life form *O. mykiss*, which can include resident or anadromous life histories. Data from 2017 in the Yuba River did not observe any *O. mykiss* passage event from November 2016 to February 2017, but 2018 data detected passage events March 2017 to September 2018. Again, these data do not corroborate steelhead, but show that *O. mykiss* presence overall can be variable.

Suitable steelhead salmon migration characteristics are not relatively complex to maintain. Primarily, adults need complete access to spawning grounds, without physical impairment due to obstacle or shallow water barrier. The lower Bear River maintains sufficient continuity for adult access to the spawning grounds and no instream barriers or impediments to passage were noted during any SSWD relicensing surveys (e.g., habitat mapping, redd mapping and fisheries sampling). Specific instream habitat models for this life stage were not developed by SSWD

[12] Summarized Vaki data available online at: http://www.yubaaccordrmt.com/RMT%20Data/Forms/AllItems.aspx?RootFolder=%2fRMT%20Data%2fField%20Data%20Collection%20Updates&FolderCTID=&View=%7b1A7D3ED2-7710-46BB-BBAE-266745BCE474%7d

during its relicensing Instream Flow Study because of the general simplistic needs do not require advanced modeling to measure suitability.

The EPA (2003) also provides a temperature guideline, expressed as the 7DADM of 18°C for migrating adult steelhead to ensure that adults are not stressed and any fecund females with potential eggs are not compromised due to excessively warm water. Water temperature analyses in Table 3.3.5-3 show that adults returning from August through September may be exposed to warmer water temperature outside of EPA guidelines, but conditions rapidly improve and are optimal from November through March. Wetter years expand the window of opportunity for returning adults, while drier years limit access due to temperature. These conditions are typical of any small watershed and would occur regardless of the Project.

Table 3.3.5-3. Percent of days per month where the No Action Alternative stream temperature at four locations in the lower Bear River is less than EPA guidelines for specific lifestages of steelhead. Temperatures are output from the water temperature model developed in Study 2.2, and are expressed as the 7-day average of the daily maxima (7DADM) in degrees Celsius. For each lifestage, only months where utilization is expected are shown; lifestage utilization periodicities are derived from steelhead utilization of the Yuba River. The number of days for each month in the period of record from which the temperature model was developed are shown in the bottom row.

Lower Bear River Location	Month											
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
STEELHEAD SPAWNING/INCUBATION/EMERGENCE (EPA GUIDELINE: LESS THAN 13°C 7DADM)												
Below the non-Project diversion dam	100%	100%	80%	45%	19%							
Highway 65	100%	81%	53%	16%	0%							
Pleasant Grove Bridge gage	98%	75%	46%	9%	0%							
Highway 70	94%	69%	38%	7%	0%							
STEELHEAD CORE JUVENILE REARING (EPA GUIDELINE: LESS THAN 16°C 7DADM)												
Below the non-Project diversion dam	100%	100%	99%	99%	85%	34%	0%	3%	19%	23%	83%	100%
Highway 65	100%	98%	78%	63%	14%	0%	0%	0%	0%	8%	90%	100%
Pleasant Grove Bridge gage	100%	97%	75%	57%	7%	0%	0%	0%	0%	8%	89%	100%
Highway 70	100%	96%	72%	54%	4%	0%	0%	0%	0%	8%	90%	100%
STEELHEAD MIGRATION (EPA GUIDELINE: LESS THAN 18°C 7DADM)												
Below the non-Project diversion dam	100%	100%	100%					9%	5%	29%	98%	100%
Highway 65	100%	100%	90%					0%	0%	32%	100%	100%
Pleasant Grove Bridge gage	100%	100%	88%					0%	0%	30%	99%	100%
Highway 70	100%	100%	88%					0%	0%	30%	99%	100%
Number of Days included in Each Month's Analysis (WYs 1976 through 2014)	1,209	1,102	1,209	1,170	1,209	1,170	1,209	1,209	1,170	1,203	1,170	1,209

Key: Blue cells are 100% suitable water temperatures based on EPA guideline; green cells are 80% to 99% suitable; yellow cells are 70% to 79% suitable; orange cells are 60% to 69% suitable; and red cells are less than 60% suitable.

CV Steelhead DPS Spawning

Steelhead spawning can occur in the lower Bear River from January through April. Spawning surveys did not identify a single steelhead redd to further inform periodicity. SSWD's studies did show that the lower Bear River contains good quantities of salmonid spawning substrate and the overall capacity for spawning does not appear to be limited by gravel based on general activity observed of adult Chinook salmon spawners (i.e., opportunistic observation and carcass counts) and related spatial requirements. The EPA (2003) guidelines state that a cool water temperature of 7DADM of 13°C is desired for suitable temperature during spawning. The guideline is relatively cold, especially for early spring in the lower Bear River, which begins to warm due to increased ambient temperatures. The low elevation of the lower Bear River does not benefit from a snowpack to extend cold water temperature and the relatively smaller reservoir is more rapidly warmed due to a lower thermal buffer.

During this period, the existing minimum flow requirement is 10 cfs from January through March and 25 cfs in April. At a flow of 10 cfs and based on the habitat-flow relationship (see Figure 3.3.3-31 in Section 3.3.3.1.3), habitat would range from 2% to 5% of Max WUA, and water temperature would remain within EPA guidelines 94 to 100 percent of the time in January and 69 to 100 percent in February (Table 3.3.5-3). By March, water temperature begins to warm and temperature would remain within guidelines 38 to 80 percent of the time. In April, increased base flow results in habitat improving to a range of 13 to 17 % of Max WUA, but temperature is within guidelines 7 to 45 percent of the time.

Steelhead spawning was not observed during any studies in the Bear River. Given the relatively low frequency of spawning, there does not appear to be any physical constraint of spawning habitat due to competition. Large amounts of spawning gravel occur throughout the lower Bear River. While there is not a large amount of spawning habitat available at minimum required streamflows, the areas that are available are likely viable through early March. Water temperatures become a limiting factor in April and May (Table 3.3.5-3).

CV Steelhead DPS Egg Incubation

Egg incubation immediately follows spawning and generally requires 20 to 30 days to complete (Moyle 2002). Since spawning mainly occurs from January through April, egg incubation can then extend through May. SSWD's studies, as described above, show that steelhead spawning substrate has good permeability for egg incubation and there are extensive quality gravel beds extending throughout the lower reach.

SSWD's *Instream Flow Study* did not include a specific egg incubation model, but is encompassed as part of the overall spawning curve. Assuming that salmon are able to successfully spawn in suitable habitat and that sufficient water stage is maintained for covering redds, then the overall conditions for egg incubation are physically met for velocity, depth, and substrate habitat modeling.

The EPA (2003) guideline similarly maintain that a 7DADM water temperature of 13°C is advised through spawning and egg incubation. This results in a similar scenario to spawning

with generally suitable temperature in January and February, marginal in March (i.e., 38% to 80% of the days suitable), and unsuitable conditions through most of May (i.e., 0 to 19%) (Table 3.3.5-3).

While the early window for egg incubation may be limited in some warmer, drier water years, it is anticipated that cooler, wetter years expand the opportunity for both spawning and incubation. The seasonal opportunity driven by precipitation and cooler weather is a strong factor that persisted prior to the Project and still influences the opportunistic steelhead production levels in the Bear River.

CV Steelhead DPS Fry Rearing

Young fish that have emerged from gravel incubation represent a fry lifestage. Fry rearing may occur April through July. SSWD's studies, as described above, show that the lower Bear River contains good structural habitat for fry rearing. Instream Flow Study modeling differentiates fry from juvenile fishes, because they are not strong swimmers and tend to occupy different habitat when compared to the more mature juvenile counterparts. The existing minimum flow requirement is 25 cfs April to June and 10 cfs all other months. At a flow of 10 cfs and based on the habitat-flow relationship (see Figure 3.3.3-32 in Section 3.3.3.1.3), the existing minimum flow provides 100 percent of Max WUA at each of the Instream Flow Study Upstream and Downstream sites and at the USFWS Site. At 25 cfs, the percent of Max WUA ranges from 89 to 92 percent. Therefore, habitat for fry rearing does not appear to be limited.

The EPA (2003) guidelines do not contain different prescriptions for fry or juvenile developmental stages and only officially identify juvenile rearing. Regardless, the EPA suggests that a water temperature of a 7DADM of 16°C is an appropriate guideline for rearing salmonids of either fry or juvenile. Temperature conditions for fry in the lower Bear River are challenged. April offers the best suitability of 54 to 99 percent, with each month thereafter reducing. At the uppermost habitat below the non-Project diversion dam, temperature is 99 percent suitable in April and 85 percent in May. All other reaches are generally unsuitable from May through July, with minimal suitability at the most upstream habitat. (Table 3.3.5-3.)

The Bear River is a relatively smaller watershed that warms considerably into summer months. While steelhead habitat is excellent for fry rearing, early to mid-summer rearing is constrained by water temperature. Prior to the Project, most of the lower Bear River would have become unsuitable and the only habitat that is suitable in April and May is due to the limited cold tailwater releases caused by impoundments. As described above, steelhead likely did not enter the upper the Bear River.

CV Steelhead DPS Juvenile Rearing

As fry mature, food prey items increase in size, swimming ability improves and the developmental stage transitions to juvenile. Juvenile fish are more robust, can handle quicker water and access a greater range of habitat when compared to fry. Juvenile fish may be present throughout the year. The existing minimum flow requirement from July through March is 10 cfs

and it results in 63 to 88 percent of Max WUA, while the 25 cfs flow requirement April through June provides 78 to 95 percent of Max WUA (see Figure 3.3.3-33 in Section 3.3.3.1.3).

As discussed for fry rearing, the EPA suggests that a 7DADM water temperature of 16°C is an appropriate guideline for rearing salmonids (fry or juvenile developmental stages). Temperature conditions for rearing juveniles are good to excellent from November through March, begin to decline in April and are generally unsuitable June through October. Thermal conditions are not within EPA guidelines for year-round rearing by juveniles (Table 3.3.5-3). A recent study by Verhille et al. (2016) showed that *O. mykiss* can show localized thermal plasticity that may result in viable survival at temperatures of up to 23°C. Regardless, water temperature in the lower Bear River is generally unsuitable for summer rearing based on the EPA (2003) guidelines.

Smoltification

Smoltification is the process of a juvenile freshwater anadromous fish moving into saltwater. The process is a general physiological change that begins in freshwater and requires suitable water temperature to occur. A smolting steelhead generally has reared in freshwater for one or more years. Habitat requirements for fry or juvenile fishes as discussed above address what is needed during rearing, but water temperature during smoltification is suggested to be 14°C by EPA guidelines. Smoltification may occur between November and March, which generally are the cool months in the Bear River. Water temperature is generally greater than 90 percent suitable for all months except for March, which ranges from 88 to 100 percent suitability. The lower Bear River provides both appropriate habitat and temperature for the smoltification process for steelhead.

Known Occurrences in Action Area

SSWD's relicensing studies identified *O. mykiss* in the lower Bear River, but no redds were observed. The Recovery Plan (NMFS 2014) states that the lower Bear River does not provide suitable habitat for steelhead due to warm summer water temperatures and that any CV steelhead DPS that intermittently spawn in the lower Bear River during high flow years are likely strays from the FRFH. Steelhead have been reported to utilize Dry Creek, a tributary entering the Bear River at approximately RM 5 (McEwan 2001, Yoshiyama et al. 2001), but no adult or juvenile steelhead were observed during snorkel surveys conducted in Dry Creek in 2008, 2010, 2011-12, and 2014-15 (Bhate Environmental Associates, Inc. and HDR, Inc. 2016). The lower Bear River from the Feather River to the non-Project diversion dam is designated as Critical Habitat for CV steelhead DPS, while the CHART stated the high cost - low benefit of including the Bear River as Critical Habitat was marginal, and only included because of reported historical presence in the Bear River and Dry Creek, and because other species may use the lower Bear River for non-natal rearing.

To evaluate whether the unsuitable summer temperature conditions in the lower Bear River are related to Project O&M, SSWD conducted further analysis of the Bear River inflow 7DADM temperatures into Camp Far West Reservoir and compared them to 7DADM water temperatures in the lower Bear River downstream of the non-Project diversion dam for three representative years: 1995 (a representative wet water year), 2003 (a representative normal water year), and 2001 (a representative dry water year). The results indicate that under the Environmental

Baseline, Camp Far West Reservoir releases are cooler in the summer months (generally from May or June to November in each of the three representative years) than Bear River inflow temperatures (Figure 3.3.5-6, Figure 3.3.5-7, Figure 3.3.5-8). In the winter and spring, temperatures of Project releases into the lower Bear River are generally similar to reservoir inflows, although fluctuating at times to be warmer or cooler than inflows. Additionally, the results show that during the same time period in the summer, temperatures in the lower Bear River at Highway 65 are more similar to Bear River inflow temperatures than to below the non-Project diversion dam. These results indicate that Project releases of water from Camp Far West Reservoir, while exceeding the EPA guideline temperature for rearing juvenile salmonids, are an improvement to temperature conditions over what would be expected if the Project and Camp Far West Dam were not in place. However, the improvements are spatially ephemeral, as water temperatures below the non-Project diversion dam essentially reach equilibrium with ambient air temperatures by Highway 65.

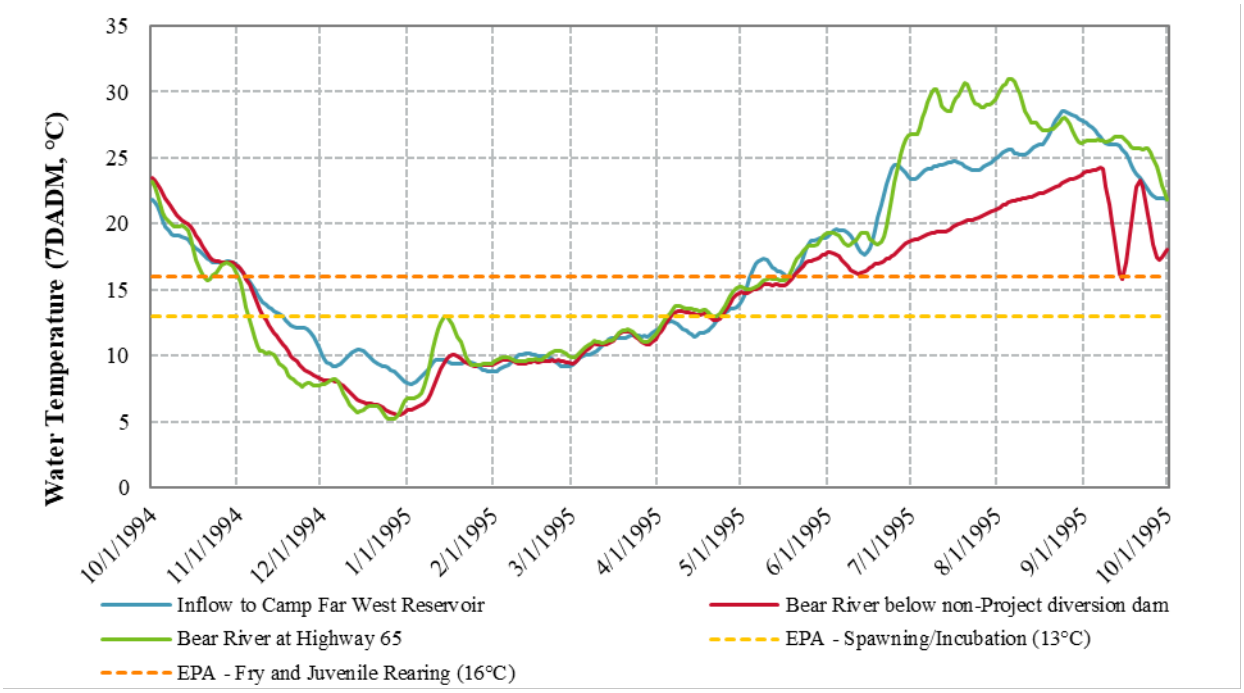

Figure 3.3.5-6. Modeled water temperatures in water year 1995 (a representative wet WY) under the Environmental Baseline.

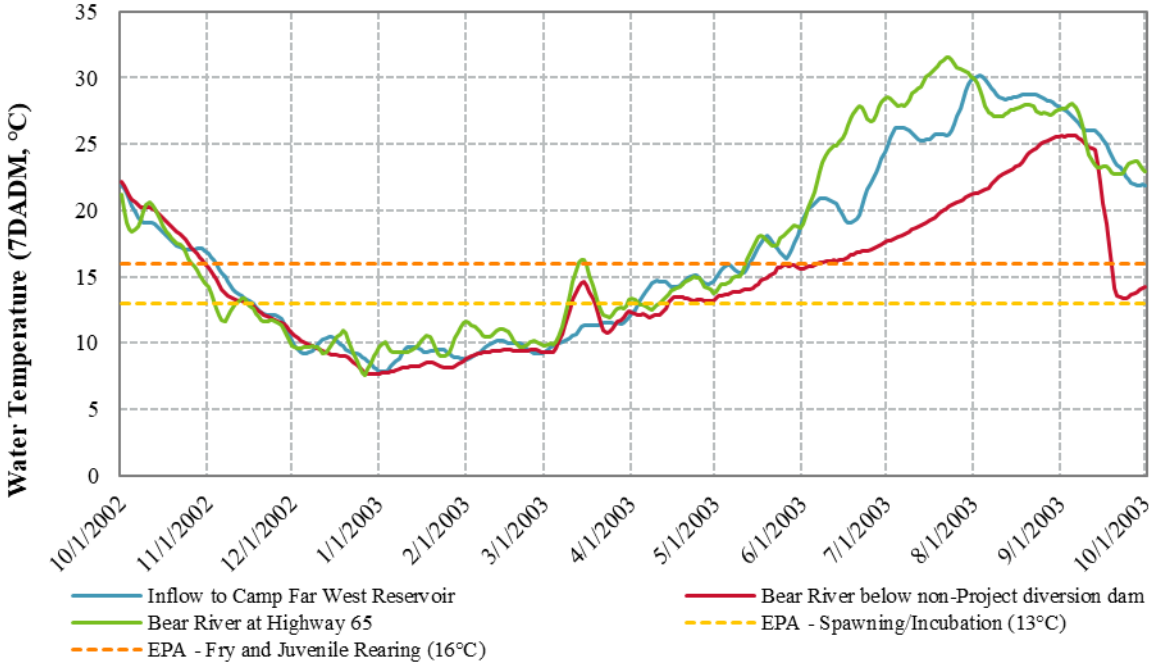

Figure 3.3.5-7. Modeled water temperatures in water year 2003 (a representative <u>normal WY</u>) under the <u>Environmental Baseline</u>.

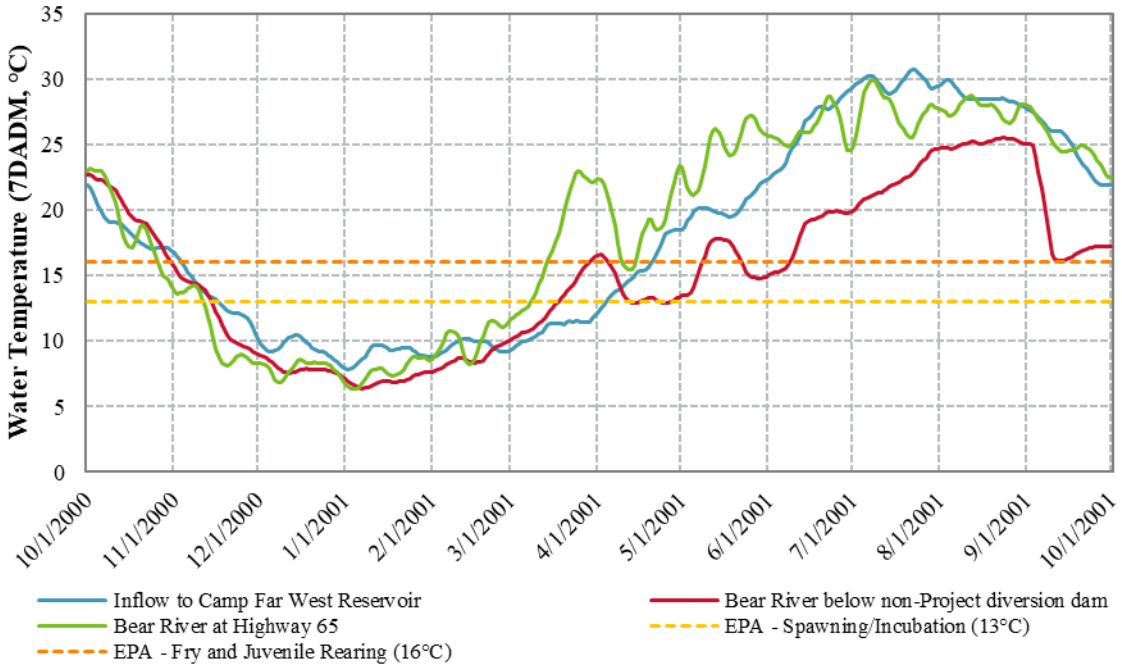

Figure 3.3.5-8. Modeled water temperatures in water year 2001 (a representative <u>dry WY</u>) under the <u>Environmental Baseline</u>.

CV Spring-run Chinook Salmon ESU (FT)

Status and Critical Habitat

On September 16, 1999, NMFS listed the Central Valley ESU of Chinook salmon as threatened (64 FR 50394). On June 14, 2004, following a 5-year species status review, NMFS proposed that CV spring-run Chinook salmon ESU remain a threatened species based on the Biological Review Team's strong majority opinion that the CV spring-run Chinook salmon ESU is ''likely to become endangered within the foreseeable future'' due to the greatly reduced distribution of CV spring-run Chinook salmon ESU and hatchery influences on the natural population. On June 28, 2005, NMFS reaffirmed the threatened status of the CV spring-run Chinook salmon ESU, and included the FRFH spring-run Chinook salmon population as part of the CV spring-run Chinook salmon ESU (70 FR 37160).

Critical Habitat was designated for the CV spring-run Chinook salmon ESU on September 2, 2005 (70 FR 52488). The ESU for CV spring-run Chinook salmon ESU is defined as all naturally spawned populations of spring-run Chinook salmon ESU in the Sacramento River and its tributaries, including the FRFH population. In the Bear River, NMFS designates CV spring-run Chinook salmon ESU Critical Habitat to include the area defined in the CALWATER Marysville HU 5515, Lower Yuba River Hydrologic Sub-area 551510. Outlet(s) = Bear River (38.9398, -121.5790) upstream to endpoint(s) in: Bear River (38.9783, -121.5166), which means the upstream extent is approximately to RM 5 in the Bear River (70 FR 52488).

During the final ruling review, the CHART did not first see the Bear River as occupied habitat for CV spring-run Chinook salmon ESU. The CHART stated:

> The HSA watershed (551510) containing the lower Bear River was originally considered unoccupied by the CHART, and its conservation value was not rated.

The habitat was only included based on commenters suggestions that future habitat restoration may result in usable beneficial habitat. At the time of the ruling, the lower Bear River habitat was only marginal for CV spring-run Chinook salmon ESU, but the CHART determined inclusion of the habitat outweighed exclusion.

Recovery Plan

NMFS's 2014 Recovery Plan for Central Valley (CV) winter-run Chinook salmon (Oncorhynchus tshawytscha) Evolutionary Significant Unit (ESU), CV spring-run Chinook salmon (O. tshawytscha) ESU and CV steelhead (O. mykiss) Distinct Population Segment (DPS) is discussed above under CV steelhead DPS. For the CV winter-run and spring-run Chinook salmon ESUs, the Recovery Plan does not classify the Bear River as a Core 1, 2, or 3, stream, and does not list any Bear River-specific stressors. The Recovery Plan states that the Bear River does not provide suitable habitat for self-sustaining populations of anadromous salmonids. Moreover, USFWS (1998) states that "temperatures are often at or above preferred ranges for Chinook salmon." CV spring-run Chinook salmon ESU use of the lower Bear River is likely

restricted to use by non-natal juveniles originating from the Feather or Yuba rivers during higher flow years.

Current and Historical Distribution

Section 305(b)(2) of the 1996 amendments to the Magnuson-Stevens Fishery Conservation and Management Act (MSFCMA) (16 USC 1801 et seq.) requires the identification of essential fish habitat (EFH) for federally managed fishery species and the implementation of measures to conserve and enhance this habitat. In the Mid-Pacific Region, the Pacific Fisheries Management Council designates EFH and NMFS approves the designation. EFH includes specifically identified waters and substrate necessary for fish spawning, breeding, feeding, or growth to maturity and covers a species' full life cycle (16 USC 1802(10)). EFH only applies to commercial fisheries. Chinook salmon habitat has been identified as Pacific salmon EFH in the Bear River upstream to Camp Far West Dam (PFMC 2014). EFH applies to all runs of Chinook salmon potentially present in the Bear River.

Four distinct runs of Chinook salmon spawn in the Sacramento-San Joaquin River system, with each run named for the season when the majority of the run enters freshwater as adults. Historically, spring-run Chinook salmon occurred in the headwaters of all major river systems in the Central Valley where natural barriers to migration were absent. Beginning in the 1880s, harvest, water development, construction of dams that prevented access to headwater areas, and habitat degradation significantly reduced the number and range of CV spring-run Chinook salmon ESU. Presently, Mill, Deer, and Butte creeks in the Sacramento River system support self-sustaining, persistent populations of CV spring-run Chinook salmon ESU (PFMC 2014).

The upper Sacramento, Yuba, and Feather rivers also are reported to support CV spring-run Chinook salmon ESU. However, these populations may be hybridized to some degree with fall-run Chinook salmon. CV spring-run Chinook salmon ESU acquired and maintained genetic integrity through reproductive (spatial-temporal) isolation from other CV Chinook salmon runs. However, construction of dams has prevented access to headwater areas and much of this historical reproductive isolation has been compromised, resulting in intermixed life history traits in many remaining habitats (PFMC 2014). USFWS (1998) states that historical use of the Bear River by Chinook salmon was limited by a natural barrier in the vicinity of Camp Far West Reservoir to the lower-elevation reaches on the valley floor, where natural regimes of temperature and flow likely restricted their use to years when suitable conditions existed.

Life History and Habitat Requirements

NMFS (2014) reports that the Bear River does not provide adequate physical habitat or suitable flow or water temperature conditions that could support self-sustaining anadromous salmonid populations. CV spring-run Chinook salmon ESU was not identified in NMFS (2014) Recovery Plan as a species that historically or currently exists in the Bear River. However, as previously mentioned, NMFS did designate Critical Habitat for CV spring-run Chinook salmon ESU in the lowest 5 mi of the Bear River for non-natal juvenile rearing (70 FR 52488). NMFS included the lower reach of the Bear River in the Critical Habitat designation, in part, because the habitat may serve as refugia from high water conditions and catastrophic events (70 FR 52488), which suggests that non-natal juvenile CV spring-run Chinook salmon ESU, presumably originating from the Feather River or Yuba River, may utilize the lower Bear River during high flow events.

If non-natal juvenile CV spring-run Chinook salmon ESU primarily access the lower Bear River during high flow years, flow-dependent habitat in the lower Bear River would likely not be limiting during those periods.

CV spring-run Chinook salmon ESU fry generally emerge from the gravel from November to March (Moyle 2002). Most juvenile Chinook salmon emigrate from the lower Feather River within a few months of emergence. However, some CV spring-run Chinook salmon ESU juveniles reportedly rear for up to 15 months prior to emigrating (NMFS 2014). While non-natal juvenile CV spring-run Chinook salmon ESU may rear year-round, based on the generally unsuitable habitat conditions in the lower Bear River during the summer and fall, juveniles would likely only utilize the lower Bear River during the higher flow spring months.

Table 3.3.5-4. CV spring-run Chinook salmon ESU lifestage periodicity based on information presented for the Yuba River. CV spring-run Chinook salmon ESU do not occupy the Bear River, so a nearby surrogate basin was used for discussion.

CV Spring-run Chinook Salmon ESU Lifestage	Jan		Feb		Mar		Apr		May		Jun		Jul		Aug		Sep		Oct		Nov		Dec	
Adult Migration																								
Adult Holding																								
Spawning																								
Embryo Incubation																								
Juvenile Rearing and Downstream Movement																								
Smolt (Yearling+) Emigration																								

The CNDDB had no reports of the CV spring-run Chinook salmon ESU in the Project Vicinity (CDFW 2018a). CV Spring-run Chinook salmon ESU are known to occur in the Feather and Yuba rivers. Adults in the Feather River migrate past the Bear River on return to their natal spawning grounds and juveniles outmigrate past the Bear River confluence as they move to the Delta.

Stressors and Limiting Factors

Although the Bear River historically supported fall-run Chinook salmon, CV spring-run Chinook salmon were apparently not present. This may be in part due to the fact that a natural waterfall blocked Chinook salmon in the vicinity of the present day Camp Far West Reservoir (Yoshiyama et al. 2001), which would have prevented CV spring-run Chinook salmon ESU from immigrating and spawning in their preferred habitats in the higher elevation reaches of Central Valley streams.

The Bear River was described as only marginal for CV spring-run Chinook salmon ESU during consideration of critical habitat designation. The only usage of the Bear River would be for non-natal rearing, which is a small portion of the overall life history of CV spring-run Chinook salmon ESU originating from the Feather or Yuba rivers. Flow in the lower Bear River is

strongly influenced by upstream water released from the Feather and Yuba rivers, so the overall potential to manage or benefit non-natal rearing in the lower Bear River is low.

SSWD's Relicensing Studies

Given the low likelihood of occurrence in the lower Bear River of CV spring-run Chinook salmon ESU identified in the NMFS (2014) Recovery Plan, SSWD conducted no studies specifically focused on CV spring-run Chinook salmon ESU. However, SSWD conducted eDNA sampling in the lower Bear River in 2017, and the sampling targeted Chinook salmon. Chinook salmon were detected at 17 of the 49 samples collected, but eDNA does not allow for identification of run type.

SSWD conducted an analysis of habitat and water temperature as they pertain to fall-run Chinook salmon life stages using output from temperature and Instream Flow Study models developed as part of relicensing studies. Many of the physical requirements for CV spring-run Chinook salmon ESU are similar to fall-run to allow for comparative assessment. Also, EPA water temperature guidelines are generally the same for spring- and fall-run Chinook and steelhead by lifestage, with additional consideration based on differences in periodicity. Analysis indicates that, while habitat for CV spring-run Chinook salmon ESU is available for all life stages, temperatures generally preclude utilization of the available habitat for most months of the year. Provided below is a summary of habitat, temperature and flow analyses for spring-run Chinook salmon ESU by lifestage to address potential conditions by period.

Adult Migration and Holding

CV spring-run Chinook salmon ESU return to their natal streams in spring and hold through the summer months prior to spawning. Their early return and relatively long riverine holding period are unique to the periodicity of this run of fish when compared to other runs like fall-run Chinook that quickly move intro freshwater in the fall (October) and spawn with minimal holding time. The long holding period make spring-run adults conspicuous and easier to view from the water's surface. Large schools of spring-run can be seen in nearby rivers including the Feather and Yuba rivers, where they occupy large stratified pools where deep cool water remains through summer months. Compared to the Feather and Yuba rivers, the lower Bear River is relatively small and does not offer large, deep, thermally stratified pools. Suitable temperature below 18°C may occur November through April, but May through September would generally have unsuitable water temperature.

Historical data did not suggest that CV spring-run Chinook salmon ESU ever occupied the Bear River, which is not surprising based on its size and low elevation. During all of the relicensing studies, there was not a single observation of an adult Chinook salmon between the months of March and August, which would be typical of adult holding. The Water Transfer Survey for fishes on July 24-26 and August 29-31, 2018 did not identify any adult Chinook salmon as well. All historic and recently collected information suggests that adult CV spring-run Chinook salmon ESU does not occupy the Bear River for reproduction.

CV Spring-Run Chinook Salmon ESU Spawning

CV spring-run Chinook salmon ESU spawning generally occurs relatively high in the watershed, near deepwater cold holding areas. Adults' early return in the spring allows for the run to move into the uppermost accessible stream habitat, where cooler water may occur. Then, spawning generally initiates in September through early October. The early potential spawning would be problematic in the lower Bear River where spawning temperature is outside of EPA (2003) guidelines and unsuitable for all of September and October. Table 3.3.5-3 presents information for steelhead spawning, but temperature guidelines are the same for Chinook spawning, although periodicity is different.

Fall-run Chinook salmon often occur in the same watershed as CV spring-run Chinook salmon ESU, but typically spawn in mid-October through November and even into December. Fall-run Chinook salmon gonads are ripe as they enter freshwater making them quick to spawn. They generally do not expend the energy to move higher in the watershed, where CV spring-run Chinook salmon ESU would occur. As a result, there is generally a spatial separation between fall- and spring-runs, even if a small period in October may temporally overlap between fall- and spring-run adult spawning. The separation maintains the genetic integrity of the runs. In the event that CV spring-run Chinook salmon ESU were to occupy and spawn in the lower Bear River, it would likely occur near the non-Project diversion dam, the furthest upstream accessible point in the lower Bear River. Spawning surveys and the results from habitat modeling showed that extensive physical spawning habitat and quality gravel is available throughout the lower Bear River and would not limit spawning. Historical information did not document any spawning and all relicensing studies did not observe any early spawning that would suggest CV spring-run Chinook salmon ESU activity.

CV Spring-Run Chinook Salmon ESU Embryo Incubation

CV spring-run Chinook salmon ESU adult presence or related spawning activity were not observed in the Bear River. As a result, there is little information to present regarding embryo or egg incubation. In the event that CV spring-run Chinook salmon ESU were to attempt spawning in September and October, the resultant embryo would have limited success because water temperature during this period exceed the EPA guidelines for embryo incubation. While temperature would be unsuitable, the presence of extensive spawning gravels with suitable permeability would not be a limiting factor. Regardless, any spawning or incubation is unlikely and any successful egg incubation result is even more unlikely due to unsuitable water temperature.

CV Spring-run Chinook Salmon ESU Rearing (Fry and Juvenile Lifestages)

CV spring-run juvenile Chinook salmon ESU have a complex early life history. Emergent fry are known to quickly begin moving downstream within hours of emergence from the gravel. Others hold for weeks and then begin the process of smoltification, which will result in moving out of their natal river as a subyearling. Finally, a select portion will oversummer for a year and migrate out as larger yearling. Each of these life history strategies spread out the potential risk of mortality and predation by varying the timing of rearing and outmigration. The potential for

each of these life histories is contingent upon a surrounding suitable environment to allow for each option to occur. The lower Bear River does not offer suitable year-round habitat as a result of unsuitable water temperature and would not allow for any long-term rearing.

As fry and juveniles exit their natal streams from the Feather and Yuba rivers, they may move into the mouth of tributaries to hold and feed for relatively brief periods. Tributary confluences can offer slower or slack water for areas to feed and rest. Outmigrating CV spring-run Chinook salmon ESU may occupy these areas, which are classified as non-natal rearing habitat. The lower 5 mi of the Bear River is designated as critical habitat for CV spring-run Chinook salmon ESU for the purpose of non-natal rearing.

During SSWD's Water Transfer Surveys, it was observed that the lower 1 mi of the Bear River may backwater as flow from the Feather River backs incoming flow from the Bear River. The resultant low velocity area may provide a brief, desirable area for juvenile outmigrants to occupy. Water temperature in the lower Bear River during late spring, summer, and fall months is likely too warm for juveniles outside of the mixing area from the cooler Feather River. During winter months, cooler temperature may allow for expanded usage as temperature becomes suitable. Habitat within the Bear River near the confluence of the Feather River is physically suitable for temporary usage by juveniles. The amount of backwatered habitat is primarily influenced by flow from the Feather River and less a result of Bear River flow management. The distant location also cannot be managed for temperature from Project water releases, as ambient temperature overwhelms any potentially cooler Project flow releases. Therefore, there is little management for CV spring-run Chinook salmon ESU that may utilize the confluence for non-natal rearing.

Smoltification

As described for CV steelhead DPS earlier, smoltification is a physiological change that occurs as juvenile salmonids move from freshwater to saltwater. CV spring-run Chinook salmon ESU are not expected to be present during any natal rearing activity, but may occur during non-natal rearing and occupation of the lower Bear River. Smoltification may occur from October through early May and the EPA provides a temperature guideline of 14°C during this period. The lower Bear River temperature is determined by ambient warming year-round and, therefore, may be unsuitable during late spring, summer, and fall months. Water temperature from November through March may be suitable and offer brief periods of usage for non-natal rearing.

Known Occurrences in Action Area

SSWD's relicensing studies identified Chinook salmon in the lower Bear River, but these are the fall-run phenotype. The Recovery Plan states that CV spring-run Chinook salmon ESU use of the lower Bear River is likely restricted to use by non-natal juveniles originating from the Feather or Yuba rivers during higher flow years. The lower 5 mi of the lower Bear River are designated as Critical Habitat for CV spring-run Chinook salmon ESU. As discussed above, the Bear River may provide intermittent habitat for non-natal rearing as is allowed by suitable water temperature dictated by ambient warming. The Bear River cannot manage for this usage through flow releases, but does offer potential opportunistic usage as temperature conditions allow.

North American Green Sturgeon Southern DPS (FT)

Status and Critical Habitat

The Southern DPS of North American green sturgeon was listed as a threatened species on April 7, 2006 (71 FR 17757) and includes the green sturgeon population spawning in the Sacramento River and utilizing the Sacramento-San Joaquin River Delta, and San Francisco Estuary. NMFS (2009b) *Draft Environmental Assessment for the Proposed Application of Protective Regulations Under Section 4(D) of the Endangered Species Act for the Threatened Southern Distinct Population Segment of North American Green Sturgeon* identified the loss of spawning habitat in the upper Sacramento River, and potentially in the Feather and Yuba rivers, due to migration barriers and instream alterations as threats to the survival of the Southern DPS of North American green sturgeon.

In August 2015, NMFS completed the 5-year status review of the Southern DPS of the North American green sturgeon. Based on the evaluation of new information generated since the last status review, NMFS (2015) does not suggest a significant change in the status of Southern DPS green sturgeon and has concluded that the "threatened" status continues to be applicable.

On October 9, 2009, NMFS (74 FR 52300) designated critical habitat for the Southern DPS of North American green sturgeon. In the Central Valley, designated critical habitat for green sturgeon includes the Sacramento River, lower Feather River, lower Yuba River, the Sacramento-San Joaquin River Delta, and San Francisco Estuary. NMFS (74 FR 52300) defined specific habitat areas in the Sacramento, Feather, and Yuba rivers in California to include riverine habitat from each river mouth upstream to and including the furthest known site of historic and/or current sighting or capture of North American green sturgeon, as long as the site is still accessible. No critical habitat for green sturgeon was designated in the Bear River.

Recovery Plan

The NMFS (2018) Recovery Plan focuses recovery efforts on conservation and expansion of freshwater and estuarine spawning and rearing habitats. Additionally, NMFS (2018) states that NMFS may refine the recovery criteria or revise or reprioritize recovery actions. For example, if indices of recruitment to the juvenile life stage do not show a net positive trend within 15 years after restoring adequate habitat in the Sacramento, Feather and Yuba rivers, then additional spawning and rearing habitat may be needed elsewhere or other activities that increase juvenile productivity may be needed. Watersheds that might have once provided spawning habitat based on historical conditions (i.e., Bear River, American River, and Russian River) could be considered. NMFS (2018) states that as a monitoring priority, the use of eDNA or other methods to monitor unoccupied rivers/non-spawning population rivers for the presence of green sturgeon, particularly during summer months, should be implemented. Priority rivers would be those more likely to have Southern DPS populations than Northern DPS populations (i.e., American, Bear, Russian, San Joaquin, Stanislaus, and Tuolumne rivers). NMFS (2018) lists this monitoring as a Priority 2, which is defined as research with potentially high management or recovery value.

Current and Historical Distribution

Green sturgeon exhibit a broad range along the Pacific Coast, and have been documented offshore from Ensenada, Mexico, to the Bering Sea. It is found in rivers from British Columbia

to the Sacramento River (Moyle 2002). The Southern DPS of North American green sturgeon are anadromous, and are considered to be the most marine-oriented of the sturgeon species (Moyle 2002).

Limited data has been collected regarding the historical distribution of green sturgeon in the Sacramento-San Joaquin river basins. However, Adams et al. (2007) summarizes information that suggests that green sturgeon may have been distributed above the locations of present-day dams on the Sacramento and Feather rivers (Mora et al. 2009).

Currently, spawning populations of green sturgeon in North America are found in only three river systems: the Sacramento and Klamath rivers in California and the Rogue River in southern Oregon (NMFS 2009b). Green sturgeon have been intermittently observed in the lower Feather River, a tributary to the Sacramento River (Beamesderfer et al. 2007). According to NMFS (2008), the presence of adult, and possibly sub-adult, green sturgeon within the lower Feather River has been confirmed by photographs, anglers' descriptions of fish catches (CDFG 2002), incidental sightings (DWR 2005), and occasional catches of green sturgeon reported by fishing guides (Beamesderfer et al. 2004).

Although adult green sturgeon occurrence in the Feather River has been previously documented, the use of rotary screw traps, artificial substrates, and larval nets deployed at multiple locations during early spring and through summer had failed to collect larval and juvenile green sturgeon (Seesholtz et al. 2003). Moreover, unspecific past reports of green sturgeon spawning (Wang 1986; USFWS 1995; CDFG 2002) have not been corroborated by observations of young fish or significant numbers of adults in focused sampling efforts (Niggemeyer and Duster 2003; Seesholtz et al. 2003; Beamesderfer et al. 2004). Due to a lack of corroborated documentation, NMFS concluded, in 2006, that an effective population of spawning green sturgeon did not exist in the lower Feather River (71 FR 17757). However, four fertilized green sturgeon eggs were collected near the Thermalito Afterbay Outlet on June 14, 2011, thus providing the first documentation of at least some successful spawning in the Feather River (Seesholtz et al. 2014).

The only historic evidence for the presence of green sturgeon in the lower Bear River is anecdotal and comes from personal communications with a game warden, a CDFG biologist, and a fishing guide (USFWS 1995). Presence of both green and white sturgeon was attributed to accounts of adult sturgeon periodically utilizing pools in the lower Bear River between Highway 70 and Highway 65 between 1989 and 1992, although none of the direct observations included green sturgeon specifically (USFWS 1995).

Recent studies conducted by DWR and utilizing Dual Frequency Identification Sonar (DIDSON) documented sturgeon presence in the lower 1 mi of the Bear River, but DWR was unable to determine species (A. Seesholtz, pers. comm., 2018). On March 28, 2017, DWR biologists reported detecting 24 adult sturgeon while conducting DIDSON surveys in the lower 1 mi of the Bear River. During that same time period, DWR staff reported they received anecdotal reports of anglers landing sturgeon in Wheatland just above the Highway 65 Bridge. On March 19, 2018, DWR repeated the DIDSON survey in the lower Bear River and reported detecting a total of 37 adult sturgeon within 1 mi of the Feather River confluence. During the survey, DWR staff reported watching an angler hook and land four white sturgeon approximately 0.5 mi upstream

from the confluence with the Feather River. Additionally, DWR staff reported that a friend of a DWR biologist hooked and landed an adult white sturgeon on the Bear River on March 18, 2018.

In addition, CDFW recently deployed egg mats to investigate sturgeon spawning on the lower Bear River at eight sites in 2017 and at two sites in 2018 (CDFW 2018b and 2018c). Prior to deployment of the egg mats, CDFW conducted reconnaissance surveys with DIDSON cameras to identify potential spawning or holding locations on the Bear River. No sturgeon were observed during the DIDSON reconnaissance surveys in 2017 or 2018. After identifying suitable locations, two egg mats were deployed at each sampling site. Sampling took place from March 7 through May 9, 2017, and March 27 through May 11, 2018. During the 2018 surveys, a logjam on the Bear River approximately 2.5 mi upstream from the confluence with the Feather River prevented access to six sites where mats were deployed in 2017. CDFW staff checked egg mats 3 to 4 times during the 2017 survey period, depending on accessibility due to flow conditions, and 4 times during the 2018 survey period. No sturgeon eggs were collected or observed on the egg mats in 2017 or 2018.

Life History and Habitat Requirements

Green sturgeon in the Sacramento River have been documented and studied more successfully than they have been on the Feather River. Green sturgeon adults in the Sacramento River begin their upstream spawning migrations into freshwater during late February. Spawning occurs between March and July, with peak spawning believed to occur between April and June (Adams et al. 2002). Poytress et al. (2011) conducted spawning surveys in the upper Sacramento River from early April through mid-June and temperatures ranged from 52.9°F to 60.1°F. Green sturgeon eggs identified on the Feather River in 2011 were collected at temperatures ranging from 60.8°F to 62.6°F (Seesholtz et al. 2014).

NMFS (2009a) reports that in the Sacramento River, adult green sturgeon prefer deep holes (≥ 5m depth) at the mouths of tributary streams, where they spawn and rest on the bottom. After spawning, the adults hold over in the upper Sacramento River between Red Bluff Diversion Dam (RBDD) and the Glen-Colusa Irrigation District (GCID) diversion until November (Klimley et al. 2007). Heublein et al. (2006, 2009) reported the presence of adults in the Sacramento River during the spring through the fall into the early winter months, holding in upstream locations before their emigration from the system later in the year. Green sturgeon downstream migration appears to be triggered by increased flows and decreasing water temperatures, and occurs rapidly once initiated (NMFS 2009a). Some adult green sturgeon leave the system immediately following their suspected spawning activity and re-enter the ocean in early summer (Heublein 2006). NMFS (2009a) states that green sturgeon larvae and juveniles are routinely observed in rotary screw traps at RBDD and the GCID diversion, indicating that spawning occurs upstream of both these sites.

It is believed that adult green sturgeon spawn every 1 to 5 years (Beamesderfer et al. 2007). Upon maturation of their gonadal tissue, but prior to ovulation or spermiation, the adult fish enter freshwater and migrate upriver to their spawning grounds (NMFS 2009a). Heublein et al. (2009) observed that green sturgeon enter San Francisco Bay in March and April and migrate rapidly up the Sacramento River. The fish lingered in the upper Sacramento River at the apex of their

migration for 14 to 51 days, presumably engaged in spawning behavior, before moving back downriver (Heublein et al. 2009).

Green sturgeon spawning habitat preferences and requirements are not well documented. Eggs are likely broadcast and externally fertilized in relatively fast water and probably in depths greater than three meters (Moyle 2002). Preferred spawning substrate is likely large cobble where eggs settle into cracks, but spawning substrate can range from clean sand to bedrock (Moyle 2002). Spawning is believed to occur over substrates ranging from clean sand to bedrock, with preferences for cobble (Emmett et al. 1991; Moyle et al. 1995). Eggs likely adhere to substrates, or settle into crevices between substrates (Van Eenennaam et al. 2001; Deng et al. 2002).

Green sturgeon larvae hatch from fertilized eggs after approximately 169 hours of incubation at a water temperature of 59°F (Van Eenennaam et al. 2001; Deng et al. 2002), which is similar to the sympatric white sturgeon development rate (176 hours). Van Eenennaam et al. (2005) indicated that an optimum range of water temperatures for egg development was between 57.2°F and 62.6°F. Water temperatures over 73.4°F resulted in 100 percent mortality of fertilized eggs before hatching. Water temperatures above 68°F are reportedly lethal to green sturgeon embryos (Cech et al. 2000; Beamesderfer and Webb 2002).

A general timeline of green sturgeon development has been reproduced from NMFS (2016a) and is provided as Table 3.3.5-5. Developmental stage is given by size, and used to infer life-stage through the measured length of the fish. As indicated in the reproduced Table 3.3.5-5, there is considerable variability across categories, such as size or age at maturity (NMFS 2016a).

Table 3.3.5-5. A general timeline of Southern DPS of North American green sturgeon life history, from egg to adult, with length-at-life-stage information provided. Table reproduced from NMFS (2016a).

Timeline	Life-stage, Length-Age Relationship
Fertilization of eggs (spawning)	Spawning occurs primarily in deep water (>5m) pools[1] at very few select sites[2], predominantly in the Sacramento River, predominantly mid-April to mid-June[3].
144–192 hours (6-8 days) after fertilization of eggs	Newly hatched larvae emerge. Larvae are 12.6–14.5 mm long[4].
6 days post hatch	Nocturnal swim up, hide-by-day behavior observed[4].
10 days post hatch (dph)	Exogenous feeding begins around 10 dph[4]. Larvae begin to disperse downstream.
2 weeks old (approx)	Larvae appear in USFWS rotary screw traps at RBDD at lengths of 24–31 mm.
45 days post hatch	Larval to juvenile metamorphosis complete. Begin juvenile lifestage. Juveniles are 63–94 mm long.
45 days to 1.5 years	Juveniles migrate downstream and into the Delta or the estuary and rear to the subadult phase. Juveniles range in size from around 70 mm to 90 cm. Little information available about this lifestage.
1.5 to 4 years	Sometime between the ages of 1.5 to 4 years, juvenile green sturgeon migrate to sea for the first time, thereby entering the subadult phase. Subadults are 107 cm to 174[5] cm.
1.5 years to 15-17 years	After green sturgeon enter the ocean for the first time, they grow and develop, reaching maturity between 15–17 years old.*
15 to 17 years*	Green sturgeon reach sexual maturity and become adults, with males maturing around 120 cm and females maturing around 145 cm[6] (based on Nakamoto's Klamath River studies).

Table 3.3.5-5. (continued)

Timeline	Life-stage, Length-Age Relationship
15 to 50+ years	Green sturgeon have a lifespan that can reach 50 or more years and can grow to a total length of over 2 meters.

[1] Thomas et al. (2013)
[2] Mora (unpub, UC Davis, as cited in NMFS 2016a)
[3] Poytress et al. (2013)
[4] Deng et al. (2002)
[5] Heppell (2007)
[6] Nakamoto et al. (1995) found that green sturgeon in the Klamath River might reach sexual maturity as early as 13 years for females and 9 years for males.
* More research is needed to determine the typical age and size of green sturgeon at maturity (NMFS 2016a).

Stressors and Limiting Factors

The principal factor for the decline of green sturgeon reportedly comes from the reduction of green sturgeon spawning habitat to a limited area of the Sacramento River (70 FR 17391). Loss of historical spawning habitat can be attributed to the construction of migration barriers which block or impede green sturgeon access to spawning grounds. Although existing water storage dams only block access to about 9 percent of historically available green sturgeon habitat, Mora et al. (2009) suggest that the blocked areas historically contained relatively high amounts of spawning habitat because of their upstream position in the river system.

In addition, a substantial amount of what may have been historical spawning and rearing habitat in the Feather River upstream of Oroville Dam has also been lost (70 FR 17386). According to NMFS (2016b), multiple hydroelectric projects upstream of Oroville Reservoir would impede or block access to historical spawning and rearing grounds even if fish passage was provided past the Oroville facilities.

According to NMFS (2016b), water temperatures during the green sturgeon spawning and early juvenile development period are one of the most significant stressors affecting green sturgeon individuals in the lower Feather River. Water temperatures within potential spawning areas are within optimal ranges during a majority of the spawning and early rearing period from March through May, but are warmer in June, exceeding optimal levels that may result in egg and early juvenile mortalities or abnormalities (NMFS 2016a). Although the range of optimal water temperatures varies depending on month and WY type, NMFS determined that there appears to be at least as much suitable spawning habitat now as under pre-dam conditions, and water temperatures appear adequate to support reproduction, especially during wet and above normal WYs when green sturgeon production is known to be highest (NMFS 2016a).

SSWD's Relicensing Studies

In 2017, SSWD collected 50 water samples between the non-Project diversion dam and the confluence with the Feather River to be analyzed for eDNA, including green sturgeon. No green sturgeon were detected in the eDNA analysis. For further analysis of the study, see Section 3.3.3.1.3 in this Exhibit E.

Known Occurrences in Action Area

SSWD did not find any verified occurrences of North American green sturgeon in the Action Area, though general sturgeon observations have been recorded. SSWD's eDNA sampling did

not find green sturgeon, and designated Critical Habitat for North American green sturgeon Southern DPS does not occur in the Action Area.

3.3.5.3 Environmental Effects

This section discusses the potential environmental effects of SSWD's Proposed Project, which as described in Section 2.2 of this Exhibit E, includes a Pool Raise, modifications of existing recreation facilities, and modification of the existing Project Boundary. SSWD developed its Proposed Measures WR1, AR1 and AR2 in collaboration with CDFG and USFWS and are continuing to collaborate with these agencies to refine Measure AR3. These flow measures were developed targeting fall-run Chinook salmon, but would also provide benefit for other anadromous fishes, with the realization that the Project controls a small amount of water and that this water is warm in summer and fall. With that in mind, SSWD and the agencies developed Measure WR1, Implement Water Year Types, so that, when cool water is available in winter and spring, the key periods for fall-run Chinook salmon, in wetter years, the water could be allocated for the benefit of fall-run Chinook salmon. Further emphasis was placed on juvenile rearing (i.e., extending the period of suitable conditions, where possible). Measure AR1, Implement Minimum Streamflows, reflects this emphasis with an increase in winter and spring minimum streamflows from existing minimum flows of between 10 to 115 cfs, depending on month and WY type. Minimum streamflows from June through October are the same, or even slightly less than existing minimum streamflows, recognizing that the water is better used in the winter and spring, and no amount of release is going to substantially improve aquatic habitat over existing conditions in summer and fall, primarily due to ambient warming and the subsequent warm water temperatures. In addition, Measure AR2, Implement Fall and Spring Pulse Flow, would provide a fall pulse flow in Wet, Above Normal, and Below Normal WYs to encourage fall-run Chinook salmon to enter the lower Bear River and spawn, and a spring pulse flow in Below Normal, Dry, and Critically Dry WYs to encourage whatever fall-run Chinook salmon are in the river to outmigrate before conditions in the lower Bear River become unfavorable due to water temperature. Measure AR3, Implement Ramping Rates, would establish ramping rates to protect all fishes and minimize fish stranding. The existing license includes only one WY type and does not include pulse flows or ramping rates.

The section is divided into the following areas: 1) deconstruction of the constituent components of the Proposed Action; 2) effects of continued Project O&M; and 3) effects of construction-related activities.

3.3.5.3.1 Deconstruction of the Constituent Components of the Proposed Action

SSWD's Proposed Project, as described in Section 2.2 of this Exhibit E, includes a Pool Raise, modifications of existing recreation facilities, and modification of the existing Project Boundary. In addition, the Proposed Action includes seven measures which are WY types (WR1), minimum streamflows (AR1), fall and spring pulse flows (AR2), ramping rates (AR3), Bald Eagle Management Plan (TR1), blue heron rookery management (TR2), Recreation Facilities Plan (RR1), and HPMP (CR1). SSWD's proposed measures are described in detail in Appendix E2 to this Exhibit E.

This section clearly identifies and geographically distinguishes the individual constituent components of the Proposed Action distinguishing between: 1) constituent components that will have no effect to ESA-listed species or their critical habitats; and 2) constituent components that may affect ESA-listed species or their critical habitats.

Proposed Action constituent components that would have no effect on ESA-Listed species or their critical habitats are generally legal (e.g., comply with a law) or administrative (e.g., filing of a plan), or require management of a terrestrial species. FERC is not required to consult with USFWS or NMFS under Section 7 of the ESA on Proposed Action constituent components that FERC determines will have no effect.

Proposed Action constituent components that may affect ESA-listed species or their critical habitats are primarily related to flow, ground-disturbing activities, vegetation management, access, recreation, and the Pool Raise. FERC is required to consult with USFWS and NMFS under Section 7 of the ESA on Proposed Action constituent components that FERC determines may affect ESA-listed species. These constituent components are discussed below.

Normal O&M of Dam and Powerhouse, including Access for O&M

Normal O&M of Project facilities would continue to occur, including required O&M access to these facilities by Project personnel. Generally, the potential for normal O&M of such constructed facilities devoid of vegetation to affect ESA-listed species would be limited. O&M-related access on the Project road could be a source of disturbance if ESA-listed species occur near the road, which they do not.

Construction of the Pool Raise

The construction related to the Pool Raise and relocation of associated recreation facilities as part of the Proposed Action would not affect most ESA-listed species. The construction would be short-term and isolated to specific areas near Camp Far West Dam and the recreation facilities where ESA-listed species do not occur or are not known to occur. ESA-listed fish in the lower Bear River would not be affected because minimum instream flows and water quality would not be changed from those in the new license during construction. There are two elderberry shrubs that may be inundated by the pool raise, though they are not confirmed to have VELB present. VELB is the only known species that may be affected, though not adversely affected, by the pool raise.

Vegetation Management

Vegetation management, including control of non-native invasive species and trimming or removing unwanted vegetation around Project facilities, would continue to occur and has the potential to affect ESA-listed plants and terrestrial wildlife, if these species occur in vegetation management locations, which they do not.

Ongoing Recreational Use

Recreational use of Project recreational facilities would continue to occur. Recreational activities include shoreline fishing, hiking and trail use, boating, waterskiing, swimming, picnic day use, trail hiking, and nature/wildlife viewing. Such activities have the potential to affect ESA-listed species by increased human presence (e.g., trampling vegetation) or inadvertent or illegal introduction (e.g., escape of bait fish) of invasive species. General measures to limit impacts of recreational use on sensitive resources (e.g., signage) would be protective of ESA-listed species, if present within the proposed FERC Project Boundary and areas downstream of Camp Far West Dam. The Proposed Action includes measure RR1, implement the *Recreation Facilities Plan.*

Capture of Sediment and Large Woody Material in Camp Far West Reservoir

Camp Far West Dam would continue to store water and capture sediment and large woody material that would otherwise move downstream. The general effects of reduced sediment and large woody debris in streams below other impoundments include changes in instream habitat structure, such as fewer pools and loss of spawning gravel, and indirect effects on riparian vegetation. However SSWD's relicensing studies showed that there is available sediment of suitable size, quality, and quantity for ESA-listed fish spawning and large woody material is present in suitable quantities.

Water Year Types and Streamflow Requirements

The Proposed Action would release minimum instream flows below Camp Far West Dam according to five WY type designations, as described in measures WR1 and AR1. The Proposed Action would provide additional releases of water in the form of fall and spring pulse flows according to WY types, and implementation of ramping rates from November through May, as described in measures AR2 (pulse flows) and AR3 (ramping rates). Minimum flows have the potential to affect ESA-listed fish in the lower Bear River by changing the amount of available habitat and water temperature. However, the minimum streamflow schedules that would be implemented under the Proposed Action are designed to improve or maintain aquatic habitats in the lower Bear River in all WY types.

Additional Protection, Mitigation, and Enhancement Measures

The remaining three measures related to bald eagles, the great blue heron rookery, and the implementation of the HPMP should not affect ESA-listed species in the Action Area. The management activities for bald eagles and blue herons would not occur where ESA-listed species occur or have the potential to occur (i.e., at Project facilities or on Camp Far West Reservoir). Implementation of the HPMP would not likely occur in areas where ESA-listed species occur and, if there was overlap, consideration for the ESA-listed species would be made.

3.3.5.3.1 Effects Analysis

Hartweg's Golden Sunburst

Project O&M activities that would have a potential to affect Hartweg's Golden Sunburst include ground-disturbing activities, recreation, and vegetation control, including the application of herbicides. Construction activities that would have the potential to affect Hartweg's Golden Sunburst include the construction of recreation facilities and the modification of the existing spillway for the Pool Raise. As described above, SSWD studies did not find Hartweg's Golden Sunburst in the proposed FERC Project Boundary. Further, habitat for the Hartweg's Golden Sunburst does not occur in the proposed FERC Project Boundary. Hartweg's golden sunburst grows on Mima mounds, which is not present within the Proposed Project Boundary.

For these reasons, SSWD concludes that the Proposed Action would have no effect on Hartweg's golden sunburst.

VELB

Field surveys conducted by SSWD located one elderberry plant in a non-riparian community, dominated by annual grasses and blue oak, in the area east of the dam face, on the shore of the reservoir (Figure 3.3.5-1). The largest stem was 15.2 inches at ground height, while the other was 1.8 inches at ground height. VELB indicators (i.e., boreholes) were not observed, although larger holes were present in the stems (CDFW 2002). Construction would not result in the loss of VELB habitat because the elderberry occurrence on the edge of the reservoir is not near any of the locations of proposed construction. Recreationists were observed during relicensing studies fishing in the area where the elderberry shrub occurs and this will likely continue with the Proposed Action, and the recreationists' activities may compact the ground and damage the root structure of the plant, and existing condition. The Pool Raise may inundate enough of this plant to drown it. Additionally, surveys conducted by Sycamore Environmental for the BA in 2013 located two additional elderberry shrubs along the shoreline, one of which (EB1) may be inundated by the Pool Raise. No signs of dispersed recreation were described around either of the elderberry shrubs located in 2013. No Project O&M or other Project-related activities occur in the areas where elderberry shrubs were located. The only Project activity that might have an effect on VELB or VELB habitat outside of the FERC Project Boundary is downstream flow. However, the proposed new flows would not substantially differ from the current flows, so there would be no anticipated impact on downstream vegetation, including elderberry. Therefore, there would be no impacts on VELB or its habitat outside of the FERC Project Boundary. There are no conclusive signs that VELB utilize this habitat and two plants represent a *de minimis* portion of potential habitat for the species.

For these reasons, SSWD concludes that the Proposed Action may affect, but is not likely to adversely affect VELB and will have no effect on VELB designated Critical Habitat.

Vernal Pool Fairy Shrimp and Vernal Pool Tadpole Shrimp

Suitable habitat for vernal pool fairy shrimp and vernal pool tadpole shrimp, in the form of small vernal pools, was identified within the northwestern corner of the proposed FERC Project Boundary. Project O&M and recreation would not occur in the vicinity of these vernal pools, except for vegetation management, both by hand trimming and herbicides, on the existing north berm. Three vernal pools were mapped along the base of this berm. However, vegetation management is and would be kept to the face of the berm only, and all herbicide application, as required by State law, are and would be supervised by a Qualified Applicator with direction of a licensed PCA, avoiding impacts to the pools at the berm's base.

No vernal pools would be inundated by the Pool Raise. Other wetland features that would be inundated include 0.04-ac of intermittent channel, 0.06-ac of seasonal swale, 0.03-ac of seasonal wetland and 0.06-ac of seep. None of the features that would be inundated are potential habitat for vernal pool branchiopods.

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 would be affected by Proposed Project flows.

The proposed construction for the Pool Raise includes work in the existing spillway and a laydown area south of Blackford Road. There is no suitable vernal pool habitat for either species in these areas. Additionally, there are no vernal pools in the recreation areas; therefore, the construction in these areas would not impact vernal pool fairy shrimp or vernal pool tadpole shrimp.

For these reasons, SSWD concludes that the Proposed Action may affect, but is not likely to adversely affect vernal pool fairy shrimp and vernal pool tadpole shrimp, and will have no effect on their designated Critical Habitats.

CRLF

Project O&M activities that have a potential to affect CRLF include ground-disturbing activities and vegetation control, particularly the application of herbicides, at non-aquatic and terrestrial areas where this species could occur within the proposed FERC Project Boundary. Aquatic habitats within the Action Area include two sewage holding ponds and a non-Project seasonal stock pond. SSWD staff follow Regional Water Quality Control Board (RWQCB) permit requirements to treat algae within the sewage ponds with copper, and to maintain the ponds.[13] In addition, aquatic vegetation in the ponds and around the pump stations is treated with Diquat. Vegetation spraying typically occurs in February, and again in summer. No other Project-related activities which could affect amphibians typically occur at the sewage ponds. The Project does not apply herbicides or perform other O&M activities at the seasonal stock pond.

Camp Far West Reservoir itself is not suitable habitat for CRLF. Accordingly, operations of the reservoir are unlikely to directly affect CRLF.

[13] RWQCB Order WQ 2014-0153-DWQ for sewage ponds associated with the NSRA and SSRA.

No aquatic habitats suitable for CRLF breeding would be affected by the Pool Raise. However, the Pool Raise would result in seasonal inundation from January to May of a narrow band of current terrestrial areas along the shoreline, some of which may be suitable for CRLF. Within this affected area, occasional use by CRLF (e.g., during dispersal from other areas) may be reduced as habitat is eliminated or altered. However, the Pool Raise would not preclude CRLF from using adjacent areas during seasonal inundation.

SSWD restricts vegetation removal to areas where it is mandated by law and/or necessary to maintain Project facilities, including the immediate vicinity of the powerhouse, recreation areas, and Project access road. Vegetation management would be limited to Project facilities and roads only, and all herbicide application would be supervised by a Qualified Applicator with direction of a licensed PCA. SSWD does not and would not use ground-disturbing equipment for vegetation clearing.

The two sewage ponds where American bullfrogs were observed are part of the Project's recreation areas; however, the presence of American bullfrogs in the area is not a function of the Project. As discussed in Section 3.3.5.4.2, numerous semi-permanent to permanent ponds suitable for American bullfrogs occur on private property in the surrounding area, especially northwest, east, and south of Camp Far West Reservoir.

No aquatic habitats suitable for CRLF breeding would be affected by construction of new Project facilities. However, construction of new recreation facilities could displace existing terrestrial habitats suitable for CRLF, including areas that may be used occasionally during dispersal. The potential for effects is limited because existing campgrounds and day-use picnic areas would be relocated into adjacent areas already used for recreation.

For these reasons, SSWD concludes that the Proposed Action may affect, but is unlikely to adversely affect CRLF and its designated Critical Habitat.

CV Steelhead DPS

SSWD found no accounts of CV steelhead DPS in the lower Bear River including a recent CNDDB search, although steelhead have been reported to occur historically in Dry Creek, a tributary to the Bear River entering at RM 5. During SSWD's relicensing studies, *O. mykiss* were positively identified in 11 of 49 eDNA samples and in limited numbers during snorkel and seining efforts. These observations cannot differentiate between resident rainbow trout or steelhead life histories. SSWD also did not observe any CV steelhead DPS redds during surveys between January and March 2018, when CV steelhead DPS spawning would be expected.

SSWD analyzed effects to habitat quantity and quality for fall-run Chinook salmon lifestages (see Section 3.3.3.2 in this Exhibit E) that would be expected under the Proposed Action, and the results revealed trends that are generally applicable to CV steelhead DPS lifestages and associated habitats.

CV Steelhead DPS Adult Immigration and Holding

As stated above, under the Environmental Baseline there is sufficient hydraulic connectivity to allow access to spawning habitats throughout the lower Bear River during the CV steelhead DPS adult immigration and holding period. Access to spawning habitats would be maintained or improved under the Proposed Action, because minimum streamflows in the lower Bear River would be improved between mid-October or mid-November through March, depending on WY type, and otherwise maintained between August and mid-October or mid-November at the levels that exist under the Environmental Baseline. The EPA (2003) recommended 7DADM stream temperature for migrating adult steelhead is 18°C. Stream temperatures in the lower Bear River under the Proposed Action would be similar to those currently occurring under the Environmental Baseline. Stream temperatures in all water year types under the Proposed Action would remain unsuitable in August and September, marginally suitable in October, and become highly suitable from November through March. Implementation of fall pulse flows in wetter year types under the Proposed Action would potentially benefit CV steelhead DPS adult immigration and holding lifestage by stimulating upstream migration behaviors in years where water is more plentiful and spawning and rearing habitats would be generally more available, thereby, increasing the CV steelhead DPS production potential in the lower Bear River.

CV Steelhead DPS Spawning and Embryo Incubation

As discussed in Section 3.3.3.1.3, the results of SSWD's spawning gravel investigation showed that gravels and intragravel conditions suitable for salmonid spawning and embryo incubation are present in a variety of habitats throughout the lower Bear River, both within the low flow active channel and the bank-full channel. Gravels within the low flow active channel are readily available for spawning salmonids. Gravels outside of the low flow active channel but within the bank-full channel serve two potential functions: those in close proximity to the low flow active channel become available to spawning salmonids during regular rises in flows resulting from winter rainfall events, while those located further outside the low flow active channel serve as stores of gravel available for redistribution to the low flow active channel at bank-full and greater discharges. Additionally, the spawning habitat that currently exists in the lower Bear River has existed there since prior to construction of Camp Far West Dam, and is a result of the mass movement of sediments out of the upper Bear River basin during the gold mining era. Furthermore, the Proposed Action would not affect or change any of the mechanisms that contribute to persistence or degradation of spawning habitat, so the currently existing habitats are expected to persist throughout the proposed term of the new license.

Through implementation of water-year-type-specific flow schedules that provide greater minimum streamflows than occur under the Environmental Baseline, the Proposed Action would increase available habitat for spawning salmonids in all water year types as compared to the Environmental Baseline. The largest increases in spawning habitat availability would occur under the proposed Wet and Above Normal WYs, when water is more plentiful and opportunistic utilization of the lower Bear River by CV steelhead DPS is more likely. The increases would extend into May, which is when CV steelhead DPS spawning and incubation lifestages are expected to be complete in the lower Bear River. Minimum streamflows under the Environmental Baseline provide only 2 to 5 percent of Max WUA modeled spawning habitat area depending on Instream Flow Study site. The Proposed Action would provide up to approximately 75 to 80 percent of Max WUA modeled CV steelhead DPS spawning habitat area

during December through February of Wet WYs (Figure 3.3.3-31 in Section 3.3.3.1.3). Under the Proposed Action, stream temperatures that would be expected to occur during the spawning and incubation lifestage periods would not be substantially changed compared to the Environmental Baseline, remaining suitable (less than the EPA guideline of 13°C) in January, and generally becoming less suitable in a downstream direction in February and March. By April and May, temperatures throughout the lower Bear River would remain unsuitable under the Proposed Action, even in Wet WYs where the Proposed Action increases minimum streamflows the most (Table 3.3.3-36, -39, -42, -45, and -48 in Section 3.3.3.3.2).

CV Steelhead DPS Fry and Juvenile Rearing

The habitat-flow relationship for CV steelhead DPS fry resulting from the relicensing Instream Flow Study (see Section 3.3.3.1.3) shows that modeled fry habitat generally decreases with increasing streamflow up to approximately 75 to 100 cfs, depending on Instream Flow Study site, and then remains relatively constant at values of approximately 50 to 90 percent of Max WUA as flows continue to increase. Because of this, modeled CV steelhead DPS fry habitat availability under the Proposed Action would generally decreases compared to the Environmental Baseline. Despite being reduced, modeled CV steelhead fry rearing habitat would remain relatively highly available under the Proposed Action, never dropping below approximately 60 percent of Max WUA (Figure 3.3.3-32 in Section 3.3.3.1.3). On the other hand, modeled rearing habitat for juvenile CV steelhead, while relatively highly available (i.e., approximately 60% to 90% of Max WUA, depending on the Instream Slow Study site) under the Environmental Baseline, would increase or be maintained at existing availability in all WYs under the Proposed Action (Figure 3.3.3-33 in Section 3.3.3.1.3).

Similar to the Environmental Baseline, temperature conditions for fry and juvenile rearing stages of CV steelhead DPS, which are generally expected to extend from January through July for fry and potentially year-round for juveniles, would remain generally suitable or mostly suitable (less than the EPA 7DADM guideline of 16°C) from November through March throughout the entire lower river, marginally suitable downstream of Highway 65 in April and May, and unsuitable (exceeding the EPA guideline) in the lower Bear River under the Proposed Action in all WYs during the summer months (June through October upstream of Highway 65 and May through October downstream of Highway 65; Table 3.3.3-36, -39, -42, -45, and -48).

To reduce the negative impacts to rearing juvenile salmonids resulting from the lack of suitable summer and fall rearing temperatures that exist in the lower Bear River, the Proposed Action includes the implementation of spring pulse flows, as described in Measure AR2. Implementation of the spring pulse flows would provide juvenile CV steelhead DPS with a means of avoiding the unsuitable summer and fall conditions in the lower Bear River by initiating downstream migratory behaviors prior to the onset of unsuitable stream temperatures.

As shown in Figures 3.3.5-6 through 3.3.5-8, an evaluation of inflow temperatures into Camp Far West Reservoir and temperatures of Project releases into the lower Bear River shows that, under the Environmental Baseline, Project releases are cooler than water flowing into Camp Far West Reservoir in the summer and fall months (generally June through September or October) and otherwise similar in three WYs representing wet, normal, and dry water year conditions). The beneficial effect was found to be limited spatially, however, as at Highway 65, temperatures

in the lower Bear River were in equilibrium with ambient air temperatures and resembled temperature of inflow. Additionally, during the summer, temperatures upstream and downstream of Camp Far West Reservoir exceed the EPA temperature guideline for salmonid rearing.

SSWD extended that analysis to evaluate, in those same representative years, conditions that would occur under the Proposed Action and found that release temperatures under the Proposed Action would be slightly improved compared to Camp Far West Reservoir inflow temperatures during each of the three representative years (Figure 3.3.5-9, Figure 3.3.5-10, Figure 3.3.5-11), but that stream temperatures upstream and downstream of Camp Far West Reservoir would continue to exceed the EPA rearing salmonid temperature guideline during the summer months. These analyses indicate three key considerations regarding stream temperatures in the Bear River. First, summertime temperatures in the lower Bear River would be unsuitable for juvenile salmonid rearing according to the EPA guideline temperature even if the Project and Camp Far West Dam were not in place. The Project and Camp Far West Reservoir were not in place, the quantity of habitat available for anadromous salmonids, including CV steelhead DPS, would not increase substantially due to the historically-reported presence of a barrier waterfall immediately upstream of Camp Far West Dam. Second, the Project provides some benefit to temperatures in the lower Bear River during the summer and fall, although not enough to make conditions suitable for juvenile salmonid rearing. Third, the Project's ability to extend temperature benefits to the entire lower Bear River during the summer and fall months is nonexistant, since any benefit to temperature that is provided is lost to ambient air temperatures by Highway 65.

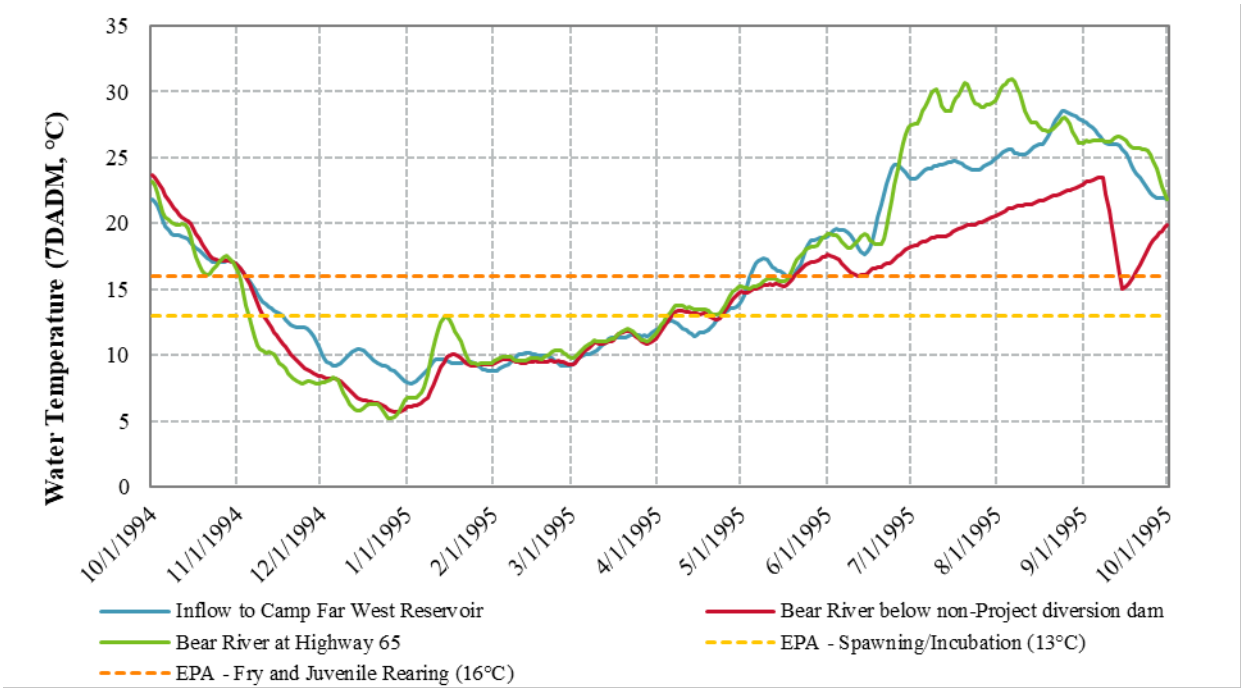

Figure 3.3.5-9. Modeled water temperatures in water year 1995 (a representative wet WY) under the Proposed Action.

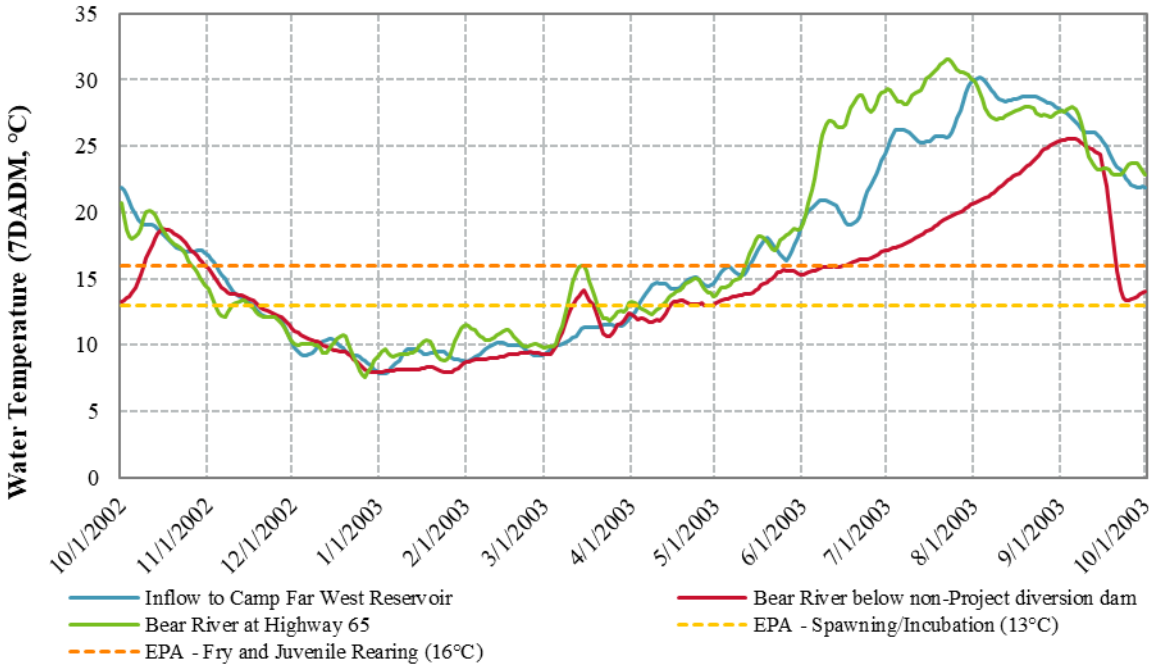

Figure 3.3.5-10. Modeled water temperatures in water year 2003 (a representative above normal WY) under the Proposed Action.

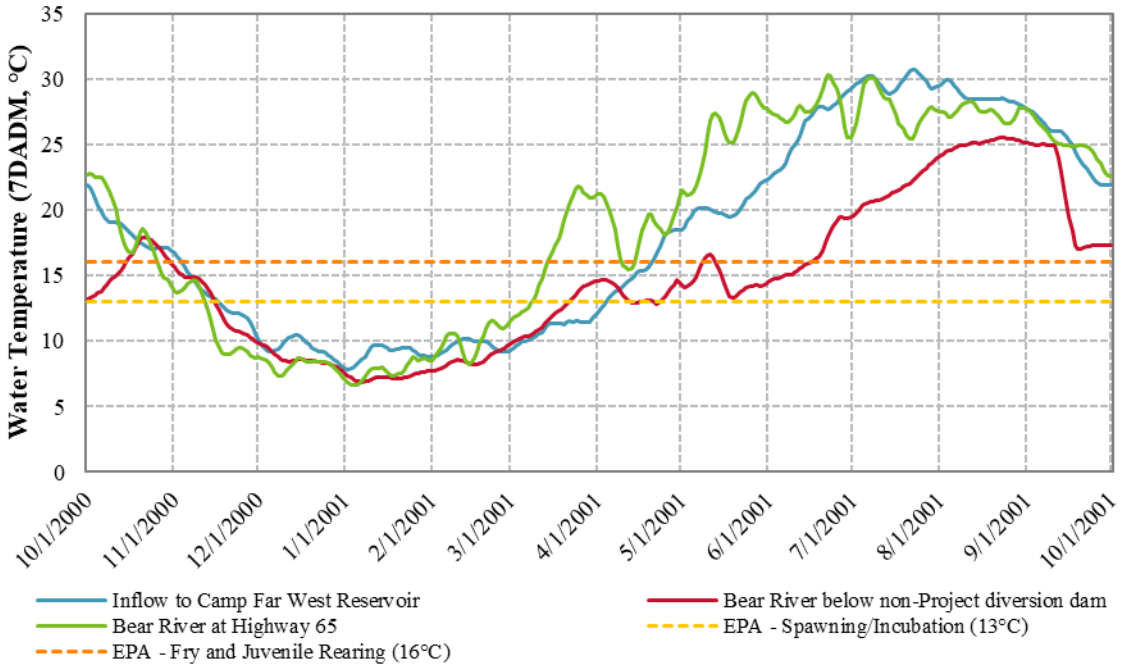

Figure 3.3.5-11. Modeled water temperatures in water year 2001 (a representative dry WY) under the Proposed Action.

To reduce the negative impacts to rearing juvenile CV steelhead DPS resulting from the lack of suitable summer and fall rearing temperatures that exist in the lower Bear River, the Proposed Action includes the implementation of spring and fall pulse flows, as described in Measure AR2. Implementation of the proposed spring pulse flows would provide juvenile CV steelhead with a means of avoiding the unsuitable summer and fall conditions in the lower Bear River by initiating downstream migratory behaviors prior to the onset of unsuitable stream temperatures.

Construction related activities would not affect CV steelhead DPS. Flow requirements in the new license would be maintained throughout construction and be released in a manner consistent with the Proposed Action. Any potential water quality impacts would be confined to the reservoir and permits related to construction will have appropriate mitigation requirements.

For the potential benefits described above, SSWD concludes that the Proposed Action may affect, but is unlikely to adversely affect CV steelhead DPS and its Critical Habitat.

CV Spring-run Chinook Salmon ESU

The lower Bear River is identified as Critical Habitat for CV spring-run Chinook salmon from its confluence with the Feather River to its confluence with Dry Creek, approximately 5 RM. NMFS (2014) acknowledges that conditions and habitat within the lower Bear River are not suitable for supporting a self-maintaining population of CV spring-run Chinook salmon ESU, but that the portion of the lower Bear River designated as Critical Habitat may serve, during high flow periods in the Feather River, as non-natal rearing refugia for juvenile CV spring-run Chinook salmon ESU originating from the Feather or Yuba rivers. Opportunistic usage of non-natal habitat does not result in specific management actions or lead to an increased potential for Project effect on the species. The Proposed Action would improve flow conditions in the lower 5 mi of the Bear River through increases to minimum streamflow requirements. The increases to flow, however, are not likely to substantially change the muted velocity signature of the Bear River at its confluence with the Feather River due to the substantial backwatering effect of the Feather River on the Bear River, as was observed during a 2018 water transfer that increased flows in the Bear River from approximately 10 cfs to 125 cfs. As a result, conditions that would attract migrating juvenile salmonids would remain minimal. Additionally, the Proposed Action would not change temperature conditions in that lowest portion of the river, as water temperatures reach equilibrium with ambient air temperatures well upstream of this Critical Habitat area.

Construction would not affect CV spring-run Chinook salmon ESU in the lower Bear River. Flow requirements in the new license would be maintained throughout construction and be released in a manner consistent with the Proposed Action. Any potential water quality impacts would be confined to the reservoir and permits related to construction will have appropriate mitigation requirements.

For the potential benefits described above, SSWD concludes that the Proposed Action may affect, but is unlikely to adversely affect CV spring-run Chinook salmon and its designated Critical Habitat.

Southern DPS of North American Green Sturgeon

No critical habitat for green sturgeon occurs in the lower Bear River, and no conclusive evidence exists that green sturgeon utilize the lower Bear River. Reported accounts generally do not confirm species (e.g., white or green sturgeon), but rather report generalized observations or are the result of angler harvest. Anglers are only allowed to harvest white sturgeon, which is not protected under the ESA.

Construction related activities would not affect green sturgeon that may occur in the lower Bear River. Flow requirements in the new license would be maintained throughout construction and be released in a manner consistent with the Proposed Action. Any potential water quality impacts would be confined to the reservoir and permits related to construction will have appropriate mitigation requirements.

SSWD cannot rule out that green sturgeon (adults or juveniles) may utilize the lower few miles of the Bear River, even though this is not documented. Typically, flow conditions in the Bear and Feather rivers cause backwatering (e.g., no positive flow) of the Bear River that results in deeper, slower moving water, which may improve conditions for green sturgeon. SSWD found that increasing summertime flows from 10 cfs to about 125 cfs during a 2018 water transfer allowed for this backwater effect in the lower 1 mi of the Bear River. Depending on flow conditions in the Bear River, green sturgeon could move upstream as far as the non-Project diversion dam. The ability of green sturgeon to access the upper 15 mi of the lower Bear River is impacted by flows below the non-Project diversion dam and natural barriers (e.g., beaver dams, giant cane grass blockages, and vertical barriers). There would be little effect from the Proposed Action on water temperature as it relates to green sturgeon in the lower Bear River because water temperatures reach equilibrium about 5 miles downstream of the non-Project diversion dam. The Proposed Action would provide increased minimum streamflows during the winter and spring of most WYs according to Measures WR1 and AR1, would provide spring and fall pulse flows in accordance with measure AR2, and would implement ramping rates according to measure AR3. While not specifically targeted at green sturgeon, implementation of these measures under the Proposed Action would likely benefit green sturgeon when water conditions allow for their opportunistic utilization of the lower Bear River. Specifically, increases to minimum streamflows during the winter and spring would improve passage conditions for sturgeon throughout the lower Bear River in all WY types, and implementation of ramping rates would reduce the potential for stranding as sturgeon are migrating out of the river when flows recede in the spring.

For the potential benefits described above, SSWD concludes the Proposed Action <u>may affect, but is unlikely to adversely affect</u> the Southern DPS of North American green sturgeon and its designated Critical Habitat.

3.3.5.4 Cumulative Effects

The Proposed Action would have no effect on Hartweg's Golden Sunburst and vernal pool fairy shrimp. The aggregate effect of the Proposed Action and other actions in the watershed are described below.

3.3.5.4.1 Hartweg's Golden Sunburst

As discussed in Section 3.3.5.3.1, the Proposed Project would have no effect on Hartweg's Golden Sunburst.

3.3.5.4.2 Vernal Pool Fairy Shrimp and Vernal Pool Tadpole Shrimp

While there are no direct effects on vernal pool fairy shrimp and vernal pool tadpole shrimp from the Proposed Action, cattle are allowed to graze freely in the area where vernal pools are located. Cattle grazing would impact these habitats and the ESA-listed species if they are present. The Proposed Action would have a *de minimis* effect compared to ongoing cattle grazing and other actions that could effect vernal pool fairy shrimp and vernal pool tadpole shrimp.

3.3.5.4.2 CRLF

One impact to CRLF with the potential to occur within the Project is from American bullfrogs introduced from outside of the Project and unrelated to the Proposed Action. The two sewage ponds located within the FERC boundary provide habitat for American bullfrogs, which are present currently. However, it is highly likely that other nearby water features also have American bullfrog present. SSWD's relicensing study identified 134 aquatic habitat locations potentially suitable for CRLF within 1-mi of the Project Boundary. Most of these features (i.e., 122 of the total) are constructed impoundments along drainages, or excavated ponds used to support livestock, hold irrigation water, or for undetermined purposes on private property. Aquatic habitat locations are largely concentrated northwest, east, and south of Camp Far West Reservoir. On the basis of apparently suitability hydrology, many of the aquatic habitats, particularly where supplemented by irrigation water, are potentially suitable habitat for CRLF and American bullfrog, and in most areas there are multiple suitable sites, which would facilitate dispersal of either species, including into the Project boundary independent of the Proposed Action. The Proposed Action would have a *de minimis* effect on American bullfrogs compared to nearby sources of the frog.

3.3.5.4.3 CV Steelhead DPS, CV spring-run Chinook Salmon ESU, and Southern DPS of North American Green Sturgeon

The cumulative effects resulting from past, present, and reasonably foreseeable future actions, including the Proposed Action, have the potential to affect ESA-listed fish (and habitat) in the lower Bear River. These activities include timber harvest, livestock grazing, mining, and operation of upstream and downstream water projects.

While timber harvest and grazing rates are likely to decline in the future, the effects of past impacts from these activities are likely negative to ESA-listed fish and include altered flows, sediment availability and transport, increased stream temperatures, and reduced availability of large woody material. The water projects on the Bear River, including the Proposed Action, further these effects by blocking sediment and large woody material from traveling downstream and further altering flow and temperature regimes.

Similarly, mining on the scale that occurred in the mid-1800s has ceased, but those activities significantly altered the geology and soils of the Bear River watershed. These activities moved large amounts of sediment, some of which were deposited in the lower Bear River channel. The effect of that deposition is mixed, since these gravels were deposited prior to the construction of the water projects and continue to be available to ESA-listed fish in the lower Bear River (e.g., spawning habitat for anadromous salmonids) despite reduced sediment transport caused by the various water projects, including the Proposed Action. Mining activities also introduced mercury and other harmful metals into the Bear River. Camp Far West and the other reservoirs provide an opportunity for these elements to settle and in the case of mercury be bioaccumulated in fish. Camp Far West Reservoir likely prevents additional sediment containing these metals to be transported downstream into the lower Bear River and beyond.

The ongoing operation of the various water projects on the Bear River, all of which went into operation prior to the Project, represent the most significant past and present actions in the Project area, and the operators of those projects are predicting increased demand for water in the foreseeable future. The upstream projects affect inflow into the Project, and the non-Project diversion dam immediately downstream affects the Project's water releases to the lower Bear River. The resulting hydrograph in the lower Bear River is impaired and can be unpredictable. Such a hydrograph likely has negative effects to ESA-listed fish through reduced streamflows, including the timing and magnitude of spring run-off flows, which may negatively impact available spawning and rearing habitats and alter stream temperatures.

Another cumulative effect on ESA-listed fish is the introduction and persistence of non-native species. These species have been introduced by resource agencies, the public, or by conveyance from upstream projects. Camp Far West Reservoir provides good habitat for non-native fish (especially black bass species) which compete with native species and could be transported downstream during spill events. Similarly, the Sacramento River basin has also been stocked with non-native fish which are now present in the Bear River. These non-native species often predate on juvenile salmonids including ESA-listed CV steelhead DPS and CV spring-run Chinook salmon ESU.

The net effect of these cumulative impacts to ESA-listed fish in the lower Bear River is negative and likely realized through lower productivity and survival rates resulting from reductions in suitable habitats, altered magnitude and timing of stream flows, increased stream temperatures, and interactions with non-native species. However, the Proposed Action includes measures that would reduce the negative effects to ESA listed fish species in the lower Bear River that result from these cumulative impacts.

3.3.5.5 Measures or Studies Recommended by Agencies and Not Adopted by SSWD

As described in Appendix E4 in this Exhibit E, besides others, USFWS and NMFS, each submitted written comments on SSWD's December 29, 2018, DLA. SSWD reviewed each letter and, with regards to ESA-listed species, identified two individual proposals to modify a SSWD proposed measure or add a new measure. In addition, during discussions with Relicensing Participants, USFWS recommended specific management measures to mitigate potential impacts at the recreation sewage ponds. Each of the comments is discussed below.

3.3.5.5.1 Future Collaboration with NMFS

In its comment letter on the DLA, NMFS states:

> NMFS looks forward to working with the Licensee and FERC to develop license terms that mitigates the Projects' effects and enhance anadromous resources in the lower Bear River.

Section 1.4.2.4 and Appendix E2 in SSWD's Exhibit E states SSWD's current understanding of collaboration among SSWD and agencies regarding agreement on SSWD's proposed conditions. SSWD appreciates NMFS's collaboration on these conditions.

3.3.5.5.2 Spawning Gravels and Large Woody Material

In its comment letter on the DLA, NMFS states:

> The Project effects on the recruitment of large woody material and spawning gravel should be mitigated for based on the length of the license. Even though these resources are available now, the Project will continue to inhibit the addition of new materials; future sediment/LWM surveys and new substrate augmentation are likely to be needed. This Project effect should be acknowledged and long-term mitigation measures should be developed.

and

> NMFS does not agree that the Project is beneficial to anadromous fish resources in the Bear River. The Project's dam blocks any ongoing recruitment of large woody material and spawning gravels as well as operations altering the natural hydrograph, including the natural recession rates from high to low flows. NMFS also believes that fall-run Chinook salmon are not the only anadromous fish, "that is most sensitive to flow and temperature." CCV steelhead, North American green sturgeon, and CV spring-run Chinook salmon are also seasonal present and are sensitive to changes in flow and water temperature.

SSWD has not included in its FLA a PM&E measure for monitoring or augmenting LWM or spawning gravels in the Bear River downstream of Camp Far West Dam and the non-Project diversion dam for the following reasons. First, NMFS does not provide an adequate description of the rationale, scope, or estimated cost for the suggested monitoring and augmentation so that SSWD can respond in detail to NMFS's request. Without these details, SSWD can only evaluate and reply to NMFS's suggestion in general terms. Second, and in general terms, the need for monitoring is unclear, because the best available science shows that adequate quantities of these resources currently exist and continue to persist in the lower Bear River, and because NMFS does not provide adequate description of a mechanism by which these resources would become

depleted in the future. Finally, and also in general terms, the use of monitoring data and utility of LWM and gravel augmentation is unclear. Specifically, NMFS does not describe a mechanism to isolate in monitoring data Project-related effects from non-Project-related effects on these resources, and does not describe how monitoring data would be used to inform and guide augmentation activities.

SSWD clarifies that the Proposed Project, as described in Appendix E2 and evaluated in this section and in Section 3.3.3.2.2, is anticipated to be beneficial to anadromous fish resources in the Bear River because of the inclusion of flow-related measures that are being collaboratively developed by SSWD, agencies and NGOs. While SSWD is collaborating on proposed conditions to provide pulse flows and ramping rates, the proposed flow-related measures do not represent an attempt to mimic the 'natural hydrograph' but simply to provide more favorable conditions for aquatic resources in the lower Bear River. The Bear River does not experience a natural hydrograph because of the cumulative effects of the operations of four projects upstream of Camp Far West and the non-Project diversion dam downstream.

3.3.5.5.3 American Bullfrog Control

In its comment letter on the DLA, USFWS states:

> The commission and Licensee should develop an Aquatic Invasive Species Management Plan that addresses species not addresses adequately in the DLA: Asian Clam, Brazilian waterweed, floating water primrose, parrot's feather milfoil, Eurasian water milfoil, and American bullfrog. Bullfrog management actions should be coordinately closely with measures to protect the California red-legged frog.

SSWD has not included in its FLA a measure for the control of American bullfrog. As discussed in Section 3.3.5.4.2, although American bullfrog control is possible through sustained efforts at small and medium ponds, American bullfrog populations control at the Project would be exceptionally difficult, unlikely to be successful, and require permanent, ongoing efforts, as there are uncontrollable source populations all around the Project and the population is already well established. It is likely that nearby water features have American bullfrog present. SSWD's relicensing study identified 134 aquatic habitat locations potentially suitable for CRLF within 1-mi of the Project Boundary, with most of these features constructed impoundments along drainages, or excavated ponds used to support livestock, hold irrigation water, or for undetermined purposes on private property. Many of these features likely support American bullfrog. These sources would assure a constant presence of American bullfrog in the Project area no matter what measures SSWD undertook to control them in the Project area.

3.3.5.5.4 Management of Sewage Ponds

During PM&E measure discussions, USFWS commented on vegetation management at the sewage ponds. SSWD said it maintained the ponds in compliance with a RWQCB permit that required certain measures, including that surrounding vegetation be kept trimmed so that seepage areas could be identified. USFWS said it would speak to the RWQCB. Until such time as the

RWQCB reissues the permit removing the requirement to manage vegetation, SSWD must continue to cut the vegetation around the ponds.

3.3.5.6 List of Attachments

Attachment 3.3.5A IPaC Report

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Attachment 3.3.4C

NNIP Data Table

IPaC Information for Planning and Consultation **U.S. Fish & Wildlife Service**

IPaC resource list

This report is an automatically generated list of species and other resources such as critical habitat (collectively referred to as *trust resources*) under the U.S. Fish and Wildlife Service's (USFWS) jurisdiction that are known or expected to be on or near the project area referenced below. The list may also include trust resources that occur outside of the project area, but that could potentially be directly or indirectly affected by activities in the project area. However, determining the likelihood and extent of effects a project may have on trust resources typically requires gathering additional site-specific (e.g., vegetation/species surveys) and project-specific (e.g., magnitude and timing of proposed activities) information.

Below is a summary of the project information you provided and contact information for the USFWS office(s) with jurisdiction in the defined project area. Please read the introduction to each section that follows (Endangered Species, Migratory Birds, USFWS Facilities, and NWI Wetlands) for additional information applicable to the trust resources addressed in that section.

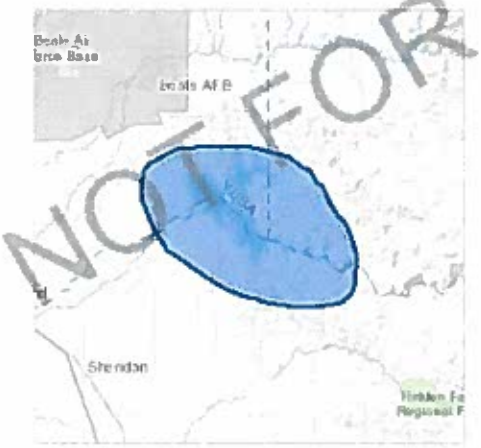
Project information

NAME

Camp Far West Hydrorelicensing

LOCATION

Nevada, Placer and Yuba counties, California



DESCRIPTION

Relicensing
Final License Application, due June 2019.

Local office

Sacramento Fish And Wildlife Office

(916) 414-6600

(916) 414-6713

Federal Building
2800 Cottage Way, Room W-2605
Sacramento, CA 95825-1846

Endangered species

This resource list is for informational purposes only and does not constitute an analysis of project level impacts.

The primary information used to generate this list is the known or expected range of each species. Additional areas of influence (AOI) for species are also considered. An AOI includes areas outside of the species range if the species could be indirectly affected by activities in that area (e.g., placing a dam upstream of a fish population, even if that fish does not occur at the dam site, may indirectly impact the species by reducing or eliminating water flow downstream). Because species can move, and site conditions can change, the species on this list are not guaranteed to be found on or near the project area. To fully determine any potential effects to species, additional site-specific and project-specific information is often required.

Section 7 of the Endangered Species Act requires Federal agencies to "request of the Secretary information whether any species which is listed or proposed to be listed may be present in the area of such proposed action" for any project that is conducted, permitted, funded, or licensed by any Federal agency. A letter from the local office and a species list which fulfills this requirement can only be obtained by requesting an official species list from either the Regulatory Review section in IPaC (see directions below) or from the local field office directly.

For project evaluations that require USFWS concurrence/review, please return to the IPaC website and request an official species list by doing the following:

1. Log in to IPaC.
2. Go to your My Projects list.
3. Click PROJECT HOME for this project.
4. Click REQUEST SPECIES LIST.

Listed species

[1] and their critical habitats are managed by the Ecological Services Program of the U.S. Fish and Wildlife Service (USFWS) and the fisheries division of the National Oceanic and Atmospheric Administration (NOAA Fisheries[2]).

Species and critical habitats under the sole responsibility of NOAA Fisheries are not shown on this list. Please contact NOAA Fisheries for species under their jurisdiction.

1. Species listed under the Endangered Species Act are threatened or endangered; IPaC also shows species that are candidates, or proposed, for listing. See the listing status page for more information.
2. NOAA Fisheries, also known as the National Marine Fisheries Service (NMFS), is an office of the National Oceanic and Atmospheric Administration within the Department of Commerce.

The following species are potentially affected by activities in this location:

Reptiles

NAME	STATUS
Giant Garter Snake Thamnophis gigas No critical habitat has been designated for this species. https://ecos.fws.gov/ecp/species/4482	Threatened

Amphibians

NAME	STATUS
California Red-legged Frog Rana draytonii There is final critical habitat for this species. Your location is outside the critical habitat. https://ecos.fws.gov/ecp/species/2891	Threatened

Fishes

NAME	STATUS
Delta Smelt Hypomesus transpacificus There is final critical habitat for this species. Your location is outside the critical habitat. https://ecos.fws.gov/ecp/species/321	Threatened

Insects

NAME	STATUS
Valley Elderberry Longhorn Beetle Desmocerus californicus dimorphus There is final critical habitat for this species. Your location is outside the critical habitat. https://ecos.fws.gov/ecp/species/7850	Threatened

Crustaceans

NAME	STATUS
Vernal Pool Fairy Shrimp Branchinecta lynchi There is final critical habitat for this species. Your location is outside the critical habitat. https://ecos.fws.gov/ecp/species/498	Threatened
Vernal Pool Tadpole Shrimp Lepidurus packardi There is final critical habitat for this species. Your location is outside the critical habitat. https://ecos.fws.gov/ecp/species/2246	Endangered

Critical habitats

Potential effects to critical habitat(s) in this location must be analyzed along with the endangered species themselves.

THERE ARE NO CRITICAL HABITATS AT THIS LOCATION.

Migratory birds

Certain birds are protected under the Migratory Bird Treaty Act

[1] and the Bald and Golden Eagle Protection Act[2].

Any person or organization who plans or conducts activities that may result in impacts to migratory birds, eagles, and their habitats should follow appropriate regulations and consider implementing appropriate conservation measures, as described below.

1. The Migratory Birds Treaty Act of 1918.
2. The Bald and Golden Eagle Protection Act of 1940.

Additional information can be found using the following links:

- Birds of Conservation Concern http://www.fws.gov/birds/management/managed-species/birds-of-conservation-concern.php
- Measures for avoiding and minimizing impacts to birds http://www.fws.gov/birds/management/project-assessment-tools-and-guidance/conservation-measures.php
- Nationwide conservation measures for birds http://www.fws.gov/migratorybirds/pdf/management/nationwidestandardconservationmeasures.pdf

The birds listed below are birds of particular concern either because they occur on the USFWS Birds of Conservation Concern (BCC) list or warrant special attention in your project location. To learn more about the levels of concern for birds on your list and how this list is generated, see the FAQ below. This is not a list of every bird you may find in this location, nor a guarantee that every bird on this list will be found in your project area. To see exact locations of where birders and the general public have sighted birds in and around your project area, visit the E-bird data mapping tool (Tip: enter your location, desired date range and a species on your list). For projects that occur off the Atlantic Coast, additional maps and models detailing the relative occurrence and abundance of bird species on your list are available. Links to additional information about Atlantic Coast birds, and other important information about your migratory bird list, including how to properly interpret and use your migratory bird report, can be found below.

For guidance on when to schedule activities or implement avoidance and minimization measures to reduce impacts to migratory birds on your list, click on the PROBABILITY OF PRESENCE SUMMARY at the top of your list to see when these birds are most likely to be present and breeding in your project area.

NAME

BREEDING SEASON (IF A BREEDING SEASON IS INDICATED FOR A BIRD ON YOUR LIST, THE BIRD MAY BREED IN YOUR PROJECT AREA SOMETIME WITHIN THE TIMEFRAME SPECIFIED, WHICH IS A VERY LIBERAL ESTIMATE OF THE DATES INSIDE WHICH THE BIRD BREEDS ACROSS ITS ENTIRE RANGE. "BREEDS ELSEWHERE" INDICATES THAT THE BIRD DOES NOT LIKELY BREED IN YOUR PROJECT AREA.)

Bald Eagle Haliaeetus leucocephalus — Breeds Jan 1 to Aug 31
This is not a Bird of Conservation Concern (BCC) in this area, but warrants attention because of the Eagle Act or for potential susceptibilities in offshore areas from certain types of development or activities.
https://ecos.fws.gov/ecp/species/1626

Burrowing Owl Athene cunicularia — Breeds Mar 15 to Aug 31
This is a Bird of Conservation Concern (BCC) only in particular Bird Conservation Regions (BCRs) in the continental USA
https://ecos.fws.gov/ecp/species/9737

California Thrasher Toxostoma redivivum — Breeds Jan 1 to Jul 31
This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska.

Clark's Grebe Aechmophorus clarkii — Breeds Jan 1 to Dec 31
This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska.

Common Yellowthroat Geothlypis trichas sinuosa — Breeds May 20 to Jul 31
This is a Bird of Conservation Concern (BCC) only in particular Bird Conservation Regions (BCRs) in the continental USA
https://ecos.fws.gov/ecp/species/2084

Golden Eagle Aquila chrysaetos — Breeds Jan 1 to Aug 31
This is not a Bird of Conservation Concern (BCC) in this area, but warrants attention because of the Eagle Act or for potential susceptibilities in offshore areas from certain types of development or activities.
https://ecos.fws.gov/ecp/species/1680

Lawrence's Goldfinch Carduelis lawrencei — Breeds Mar 20 to Sep 20
This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska.
https://ecos.fws.gov/ecp/species/9464

Lewis's Woodpecker Melanerpes lewis — Breeds Apr 20 to Sep 30
This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska.
https://ecos.fws.gov/ecp/species/9408

Long-billed Curlew Numenius americanus — Breeds elsewhere
This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska.
https://ecos.fws.gov/ecp/species/5511

Marbled Godwit Limosa fedoa — Breeds elsewhere
This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska.
https://ecos.fws.gov/ecp/species/9481

Nuttall's Woodpecker Picoides nuttallii — Breeds Apr 1 to Jul 20
This is a Bird of Conservation Concern (BCC) only in particular Bird Conservation Regions (BCRs) in the continental USA
https://ecos.fws.gov/ecp/species/9410

Oak Titmouse Baeolophus inornatus — Breeds Mar 15 to Jul 15
This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska.
https://ecos.fws.gov/ecp/species/9656

Rufous Hummingbird selasphorus rufus — Breeds elsewhere
This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska.
https://ecos.fws.gov/ecp/species/8002

Song Sparrow Melospiza melodia — Breeds Feb 20 to Sep 5
This is a Bird of Conservation Concern (BCC) only in particular Bird Conservation Regions (BCRs) in the continental USA

Spotted Towhee Pipilo maculatus clementae — Breeds Apr 15 to Jul 20
This is a Bird of Conservation Concern (BCC) only in particular Bird Conservation Regions (BCRs) in the continental USA
https://ecos.fws.gov/ecp/species/4243

Tricolored Blackbird Agelaius tricolor — Breeds Mar 15 to Aug 10
This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska.
https://ecos.fws.gov/ecp/species/3910

Whimbrel Numenius phaeopus — Breeds elsewhere
This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska.
https://ecos.fws.gov/ecp/species/9483

Wrentit Chamaea fasciata — Breeds Mar 15 to Aug 10
This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska.

Yellow-billed Magpie Pica nuttalli — Breeds Apr 1 to Jul 31
This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska.
https://ecos.fws.gov/ecp/species/9726

Probability of Presence Summary

The graphs below provide our best understanding of when birds of concern are most likely to be present in your project area. This information can be used to tailor and schedule your project activities to avoid or minimize impacts to birds. Please make sure you read and understand the FAQ "Proper Interpretation and Use of Your Migratory Bird Report" before using or attempting to interpret this report.

Probability of Presence (■)

Each green bar represents the bird's relative probability of presence in the 10km grid cell(s) your project overlaps during a particular week of the year. (A year is represented as 12 4-week months.) A taller bar indicates a higher probability of species presence. The survey effort (see below) can be used to establish a level of confidence in the presence score. One can have higher confidence in the presence score if the corresponding survey effort is also high.

How is the probability of presence score calculated? The calculation is done in three steps:

1. The probability of presence for each week is calculated as the number of survey events in the week where the species was detected divided by the total number of survey events for that week. For example, if in week 12 there were 20 survey events and the Spotted Towhee was found in 5 of them, the probability of presence of the Spotted Towhee in week 12 is 0.25.
2. To properly present the pattern of presence across the year, the relative probability of presence is calculated. This is the probability of presence divided by the maximum probability of presence across all weeks. For example, imagine the probability of presence in week 20 for the Spotted Towhee is 0.05, and that the probability of presence at week 12 (0.25) is the maximum of any week of the year. The relative probability of presence on week 12 is 0.25/0.25 = 1; at week 20 it is 0.05/0.25 = 0.2.

3. The relative probability of presence calculated in the previous step undergoes a statistical conversion so that all possible values fall between 0 and 10, inclusive. This is the probability of presence score.

To see a bar's probability of presence score, simply hover your mouse cursor over the bar.

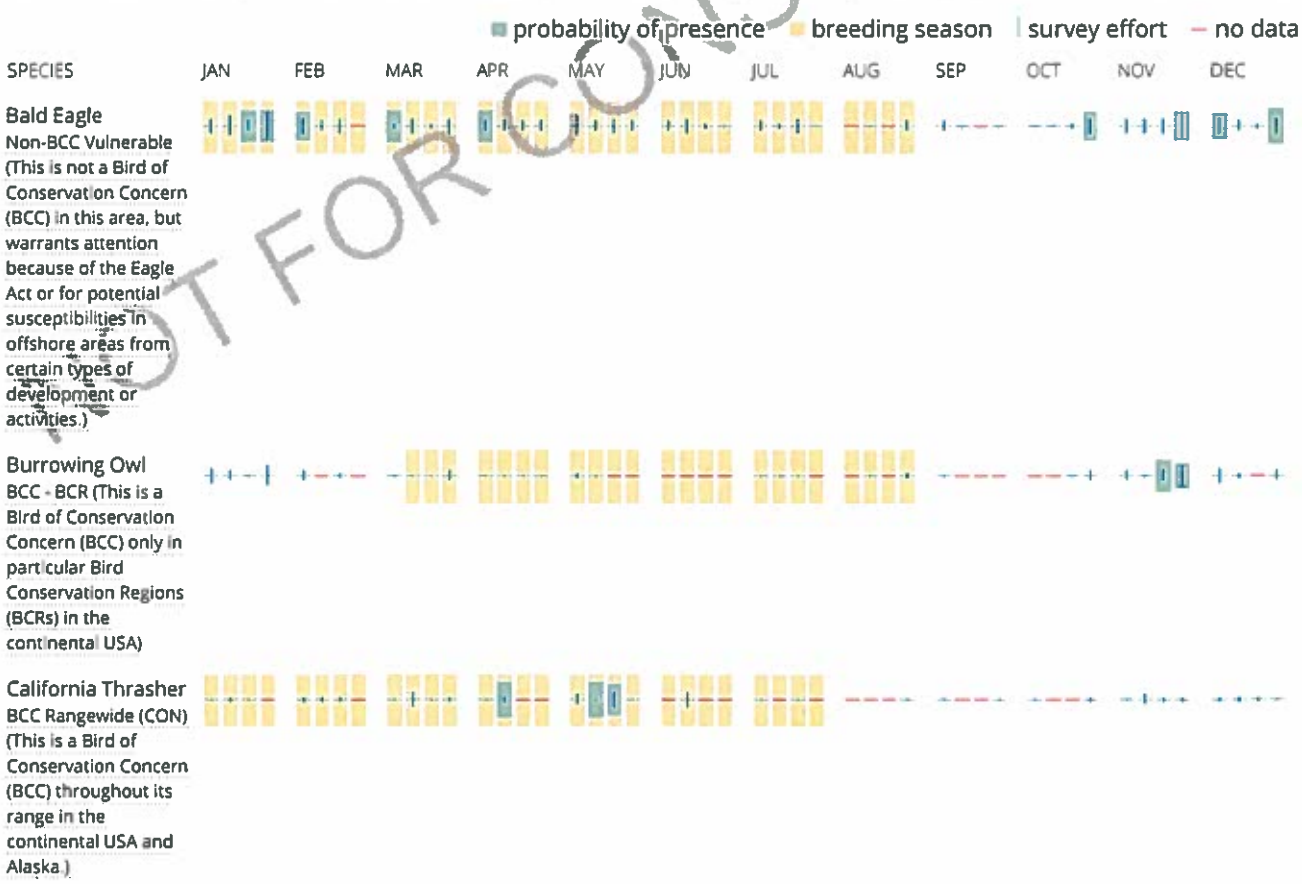
Breeding Season (▪)
Yellow bars denote a very liberal estimate of the time-frame inside which the bird breeds across its entire range. If there are no yellow bars shown for a bird, it does not breed in your project area.

Survey Effort (|)
Vertical black lines superimposed on probability of presence bars indicate the number of surveys performed for that species in the 10km grid cell(s) your project area overlaps. The number of surveys is expressed as a range, for example, 33 to 64 surveys.

To see a bar's survey effort range, simply hover your mouse cursor over the bar.

No Data (–)
A week is marked as having no data if there were no survey events for that week.

Survey Timeframe
Surveys from only the last 10 years are used in order to ensure delivery of currently relevant information. The exception to this is areas off the Atlantic coast, where bird returns are based on all years of available data, since data in these areas is currently much more sparse.



Clark's Grebe
BCC Rangewide (CON) (This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska.)

Common Yellowthroat
BCC - BCR (This is a Bird of Conservation Concern (BCC) only in particular Bird Conservation Regions (BCRs) in the continental USA)

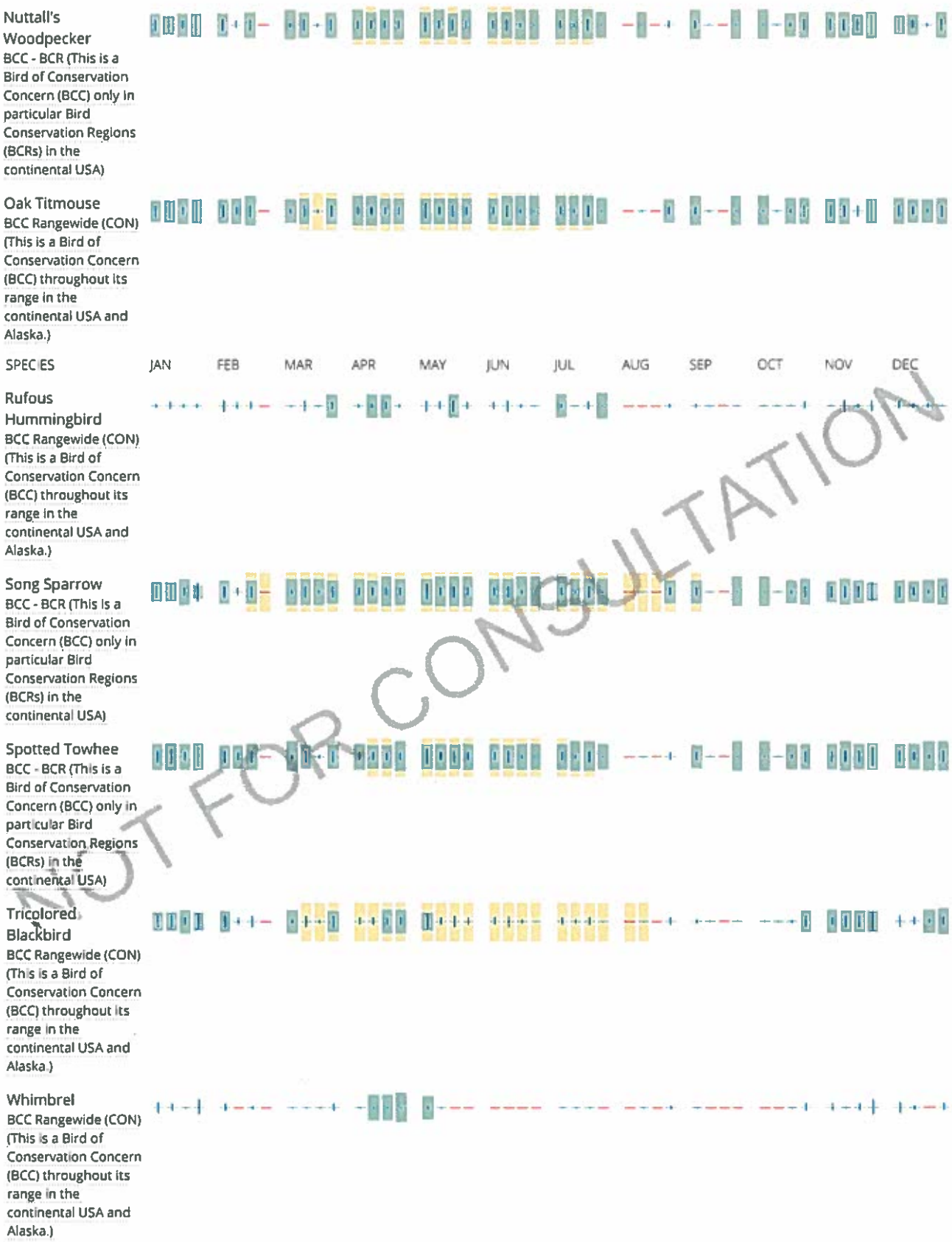
Golden Eagle
Non-BCC Vulnerable (This is not a Bird of Conservation Concern (BCC) in this area, but warrants attention because of the Eagle Act or for potential susceptibilities in offshore areas from certain types of development or activities.)

Lawrence's Goldfinch
BCC Rangewide (CON) (This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska.)

Lewis's Woodpecker
BCC Rangewide (CON) (This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska.)

Long-billed Curlew
BCC Rangewide (CON) (This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska.)

Marbled Godwit
BCC Rangewide (CON) (This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska.)



Wrentit
BCC Rangewide (CON) (This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska.)

Yellow-billed Magpie
BCC Rangewide (CON) (This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska.)

Tell me more about conservation measures I can implement to avoid or minimize impacts to migratory birds.

Nationwide Conservation Measures describes measures that can help avoid and minimize impacts to all birds at any location year round. Implementation of these measures is particularly important when birds are most likely to occur in the project area. When birds may be breeding in the area, identifying the locations of any active nests and avoiding their destruction is a very helpful impact minimization measure. To see when birds are most likely to occur and be breeding in your project area, view the Probability of Presence Summary. Additional measures and/or permits may be advisable depending on the type of activity you are conducting and the type of infrastructure or bird species present on your project site.

What does IPaC use to generate the migratory birds potentially occurring in my specified location?

The Migratory Bird Resource List is comprised of USFWS Birds of Conservation Concern (BCC) and other species that may warrant special attention in your project location.

The migratory bird list generated for your project is derived from data provided by the Avian Knowledge Network (AKN). The AKN data is based on a growing collection of survey, banding, and citizen science datasets and is queried and filtered to return a list of those birds reported as occurring in the 10km grid cell(s) which your project intersects, and that have been identified as warranting special attention because they are a BCC species in that area, an eagle (Eagle Act requirements may apply), or a species that has a particular vulnerability to offshore activities or development.

Again, the Migratory Bird Resource list includes only a subset of birds that may occur in your project area. It is not representative of all birds that may occur in your project area. To get a list of all birds potentially present in your project area, please visit the AKN Phenology Tool.

What does IPaC use to generate the probability of presence graphs for the migratory birds potentially occurring in my specified location?

The probability of presence graphs associated with your migratory bird list are based on data provided by the Avian Knowledge Network (AKN). This data is derived from a growing collection of survey, banding, and citizen science datasets .

Probability of presence data is continuously being updated as new and better information becomes available. To learn more about how the probability of presence graphs are produced and how to interpret them, go the Probability of Presence Summary and then click on the "Tell me about these graphs" link.

How do I know if a bird is breeding, wintering, migrating or present year-round in my project area?

To see what part of a particular bird's range your project area falls within (i.e. breeding, wintering, migrating or year-round), you may refer to the following resources: The Cornell Lab of Ornithology All About Birds Bird Guide, or (if you are unsuccessful in locating the bird of interest there), the Cornell Lab of Ornithology Neotropical Birds guide. If a bird on your migratory bird species list has a breeding season associated with it, if that bird does occur in your project area, there may be nests present at some point within the timeframe specified. If "Breeds elsewhere" is indicated, then the bird likely does not breed in your project area.

What are the levels of concern for migratory birds?

Migratory birds delivered through IPaC fall into the following distinct categories of concern:

1. "BCC Rangewide" birds are Birds of Conservation Concern (BCC) that are of concern throughout their range anywhere within the USA (including Hawaii, the Pacific Islands, Puerto Rico, and the Virgin Islands);
2. "BCC - BCR" birds are BCCs that are of concern only in particular Bird Conservation Regions (BCRs) in the continental USA; and
3. "Non-BCC - Vulnerable" birds are not BCC species in your project area, but appear on your list either because of the Eagle Act requirements (for eagles) or (for non-eagles) potential susceptibilities in offshore areas from certain types of development or activities (e.g. offshore energy development or longline fishing).

Although it is important to try to avoid and minimize impacts to all birds, efforts should be made, in particular, to avoid and minimize impacts to the birds on this list, especially eagles and BCC species of rangewide concern. For more information on conservation measures you can implement to help avoid and minimize migratory bird impacts and requirements for eagles, please see the FAQs for these topics.

Details about birds that are potentially affected by offshore projects

For additional details about the relative occurrence and abundance of both individual bird species and groups of bird species within your project area off the Atlantic Coast, please visit the Northeast Ocean Data Portal. The Portal also offers data and information about other taxa besides birds that may be helpful to you in your project review. Alternately, you may download the bird model results files underlying the portal maps through the NOAA NCCOS Integrative Statistical Modeling and Predictive Mapping of Marine Bird Distributions and Abundance on the Atlantic Outer Continental Shelf project webpage.

Bird tracking data can also provide additional details about occurrence and habitat use throughout the year, including migration. Models relying on survey data may not include this information. For additional information on marine bird tracking data, see the Diving Bird Study and the nanotag studies or contact Caleb Spiegel or Pam Loring.

What if I have eagles on my list?

If your project has the potential to disturb or kill eagles, you may need to obtain a permit to avoid violating the Eagle Act should such impacts occur.

Proper Interpretation and Use of Your Migratory Bird Report

The migratory bird list generated is not a list of all birds in your project area, only a subset of birds of priority concern. To learn more about how your list is generated, and see options for identifying what other birds may be in your project area, please see the FAQ "What does IPaC use to generate the migratory birds potentially occurring in my specified location". Please be aware this report provides the "probability of presence" of birds within the 10 km grid cell(s) that overlap your project; not your exact project footprint. On the graphs provided, please also look carefully at the survey effort (indicated by the black vertical bar) and for the existence of the "no data" indicator (a red horizontal bar). A high survey effort is the key component. If the survey effort is high, then the probability of presence score can be viewed as more dependable. In contrast, a low survey effort bar or no data bar means a lack of data and, therefore, a lack of certainty about presence of the species. This list is not perfect; it is simply a starting point for identifying what birds of concern have the potential to be in your project area, when they might be there, and if they might be breeding (which means nests might be present). The list helps you know what to look for to confirm presence, and helps guide you in

knowing when to implement conservation measures to avoid or minimize potential impacts from your project activities, should presence be confirmed. To learn more about conservation measures, visit the FAQ "Tell me about conservation measures I can implement to avoid or minimize impacts to migratory birds" at the bottom of your migratory bird trust resources page.

Facilities

National Wildlife Refuge lands

Any activity proposed on lands managed by the National Wildlife Refuge system must undergo a 'Compatibility Determination' conducted by the Refuge. Please contact the individual Refuges to discuss any questions or concerns.

THERE ARE NO REFUGE LANDS AT THIS LOCATION.

Fish hatcheries

THERE ARE NO FISH HATCHERIES AT THIS LOCATION.

Wetlands in the National Wetlands Inventory

Impacts to NWI wetlands and other aquatic habitats may be subject to regulation under Section 404 of the Clean Water Act, or other State/Federal statutes.

For more information please contact the Regulatory Program of the local U.S. Army Corps of Engineers District.

Please note that the NWI data being shown may be out of date. We are currently working to update our NWI data set. We recommend you verify these results with a site visit to determine the actual extent of wetlands on site.

This location overlaps the following wetlands:

FRESHWATER EMERGENT WETLAND

PEM1C

FRESHWATER FORESTED/SHRUB WETLAND

PSS/EM1C

PSSC

FRESHWATER POND

PUBK

LAKE

L1UBK

RIVERINE

R4SBC
R3UBH
R2UBH
R5UBFx
R4SBA
R5UBF

A full description for each wetland code can be found at the National Wetlands Inventory website

Data limitations

The Service's objective of mapping wetlands and deepwater habitats is to produce reconnaissance level information on the location, type and size of these resources. The maps are prepared from the analysis of high altitude imagery. Wetlands are identified based on vegetation, visible hydrology and geography. A margin of error is inherent in the use of imagery; thus, detailed on-the-ground inspection of any particular site may result in revision of the wetland boundaries or classification established through image analysis.

The accuracy of image interpretation depends on the quality of the imagery, the experience of the image analysts, the amount and quality of the collateral data and the amount of ground truth verification work conducted. Metadata should be consulted to determine the date of the source imagery used and any mapping problems.

Wetlands or other mapped features may have changed since the date of the imagery or field work. There may be occasional differences in polygon boundaries or classifications between the information depicted on the map and the actual conditions on site.

Data exclusions

Certain wetland habitats are excluded from the National mapping program because of the limitations of aerial imagery as the primary data source used to detect wetlands. These habitats include seagrasses or submerged aquatic vegetation that are found in the intertidal and subtidal zones of estuaries and nearshore coastal waters. Some deepwater reef communities (coral or tuberficid worm reefs) have also been excluded from the inventory. These habitats, because of their depth, go undetected by aerial imagery.

Data precautions

Federal, state, and local regulatory agencies with jurisdiction over wetlands may define and describe wetlands in a different manner than that used in this inventory. There is no attempt, in either the design or products of this inventory, to define the limits of proprietary jurisdiction of any Federal, state, or local government or to establish the geographical scope of the regulatory programs of government agencies. Persons intending to engage in activities involving modifications within or adjacent to wetland areas should seek the advice of appropriate federal, state, or local agencies concerning specified agency regulatory programs and proprietary jurisdictions that may affect such activities.