

SECTION 4

ISSUES AND PROPOSED STUDIES

In addition to this introductory information, this section is divided into four subsections. Section 4.1 lists by resource area preliminary issues, which may be of concern and may need to be evaluated during the relicensing process, associated with potential Project effects that are described in Section 3. For ease of reference, each preliminary issue is assigned an alpha-numeric designation. Section 4.2 includes a “data gap analysis,” that is, the section identifies existing, relevant and reasonably available information found by SSWD that would inform an analysis of each preliminary issue and requirements in a new license, and any additional information needs. Section 4.3 describes Project O&M activities SSWD proposes to undertake as a condition of the new license for the purpose of: 1) protecting or mitigating impacts from continued Project O&M; or 2) enhancing resources affected by continued Project O&M. The last sub-section, Section 4.4, describes the studies¹ proposed at this time by SSWD to acquire the identified additional information.

4.1 Preliminary Issues

Identification of issues is a key step in the relicensing process because the issues represent specific concerns or questions that may need to be addressed. Once issues that are to be evaluated are identified, existing information relevant to the issues can be assessed for adequacy, and additional information and potential studies needed to augment the existing information can be identified. Identified preliminary issues may or may not ultimately warrant specific PM&E measures.

The preliminary issues listed in this section have come from SSWD and responses to the PAD Information Questionnaire SSWD sent to potential interested parties during preparation of the PAD. The Questionnaire, which SSWD mailed to 66 separate individuals, agencies and organizations, requested the party provide to SSWD: 1) any existing, relevant and reasonably available information regarding the Project and resources potentially affected by the Project in the party’s possession; 2) the name of any other party that may have existing, relevant and reasonably available information; 3) a description of any known or potential Project effects; 4) a description of any preliminary issues related to the relicensing; and 5) a description of any studies the party believes are necessary. The Questionnaire, a list of parties to whom SSWD mailed the Questionnaire, and a list of parties that responded to the Questionnaire are included in Appendix C. SSWD received nine responses to its Questionnaire.

The preliminary issues list below is not intended to be exhaustive or final list, but contains those issues raised to date. In some instances, SSWD may have combined or re-worded issues identified by respondents to the Questionnaire. The list is subject to modification during the relicensing proceeding.

¹ For the purpose of this PAD, a “study” is any data gathering or analysis effort to be undertaken by SSWD as part of the relicensing, and may or may not include fieldwork.

4.1.1 Geology and Soils

- G&S1: Effects of Project O&M on channel morphology in the Bear River below Camp Far West Dam (e.g. channel stability, erosion/sedimentation, substrate composition and floodplain/channel connectivity).
- G&S2: Effects of Project O&M on sediment and sediment movement in the Bear River downstream of the Project, especially related to the trapping of sediment in Camp Far West Reservoir and Project flows.
- G&S3: Effects of Project O&M on soil erosion, slope failures and slope stability at the Camp Far West Reservoir shoreline and in the Bear River downstream of the Project.
- G&S4: Effects of Project O&M on runoff from Project roads and other hard surface runoff on erosion and sediment transport and Project flow-related movement of sediment.
- G&S5: Effects of Project O&M on soil erosion and bank stability due to use of the Camp Far West Dam spillways and outlet facilities.
- G&S6: Effects of Project O&M on LWM distribution and recruitment into the Bear River downstream of the Project.
- G&S7: Effects of Project-related recreation on soil compaction and erosion.

4.1.2 Water Resources

- WR1: Effects of Project O&M on flow regime.
- WR2: Effects of Project O&M to water quality and quantity that may affect the growth, reproduction, and extent of populations of special-status plants and natural communities.
- WR3: Effects of Project O&M on water quantity and quality that may adversely affect the plant diversity, quantity, composition, and extent of wetland, riparian, and littoral habitats.
- WR4: Effects of Project O&M on water temperature in the reservoir due to water fluctuations.
- WR5: Effects of Project O&M on connectivity between the reservoir and upstream tributaries due to water fluctuations.
- WR6: Effects of Project O&M on water temperature in the Bear River downstream of the dam due to the amount of water released from the dam.
- WR7: Effects of Project O&M on the size and extent of the wetted channel and streambed area in the Bear River downstream of the dam due to the amount of water released from the dam.

- WR8: Effects of Project O&M on water quality within the reservoir and in the Bear River and other tributaries upstream and downstream of the reservoir.
- WR9: Effects of Project O&M on bioaccumulation of mercury and other toxins in reservoir and stream fish.
- WR10: Project operations may affect downstream water deliveries to SSWD and CFWID.
- WR11: Project operations may affect SSWD's ability to continue to meet its obligations as part of the Bay-Delta Agreement.

4.1.3 Aquatic Resources

- AQ1: Effects of Project O&M and Project recreation may introduce and/or spread aquatic invasive species.
- AQ2: Effects of Project O&M may adversely affect benthic macroinvertebrate diversity.
- AQ3: Effects of Project O&M may adversely affect amphibians and their habitat.
- AQ4: Effects of Project O&M may adversely affect western pond turtles and their habitat.
- AQ5: Effects of Project O&M may adversely affect the diversity, quantity and composition of fish species.
- AQ6: Effects of Project O&M may adversely affect anadromous fish migration, spawning and juvenile rearing.
- AQ7: Effects of Project O&M may adversely affect non-anadromous stream fish spawning and habitat.
- AQ8: Effects of Project O&M may adversely affect reservoir fish spawning and habitat.
- AQ9: Effects of Project O&M may cause the stranding of fish.
- AQ10: Effects of Project O&M may cause the dewatering of fish spawning sites.

4.1.4 Terrestrial Resources

- TR1: Effects of Project O&M on riparian zone, e.g., vegetation structural diversity and connectivity, vegetation productivity and diversity, longitudinal habitat connectivity, and extent and frequency of flooding.
- TR2: Effects of Project O&M by disturbing habitat for and displace special-status plants, such as big-scale balsamroot, Sierra foothills brodiaea, dwarf downingia, stinkbells, Boggs Lake hedge-hyssop, Ahart's dwarf rush, dubious pea, legenera, Humboldt lily, pincushion navarretia, Brazilian watermeal, and natural communities.

- TR3: Effects of Project O&M on the spread of invasive plant species.
- TR4: Effects of Project O&M that may impact migration, foraging, and nesting of birds species including special-status species such as bald eagle, golden eagle, Swainson's hawk, and California black rail.
- TR5: Effects of Project O&M, especially related to transmission lines, that may present collision and electrocution hazards to bird species, including special-status species such as bald eagle, golden eagle, Swainson's hawk, and California black rail.
- TR6: Effects of Project O&M on disturbing bat colonies roosting within the Project structures.
- TR7: Potential deer entrapment, injury, and mortality in Project facilities.

4.1.5 Federal Endangered Species Act Listed and Candidate Species

- ESA1: Effects of Project O&M and associated recreation on reproduction, foraging, and migration of ESA-listed species.
- ESA2: Effects of Project O&M and associated recreation on ESA-listed fish species and their critical habitat.

4.1.6 Recreation

- RR1: Effects of Project O&M on public access to Project waters, existing recreational opportunities, and future recreational opportunities within the Project Area, including angling.
- RR2: Effects of Project O&M, especially reservoir water levels, on recreation.
- RR3: Effects of Project O&M on quality and availability of flow-dependent recreation opportunities.
- RR4: Adequacy of existing Project recreation facilities (including accessible facilities) to meet current and future recreational demands.

4.1.7 Land Use

- LU1: Effects of Project O&M on the condition and use of roads in the Project Area.
- LU2: Effects of Project O&M on wildlife risks and fire management.
- LU3: Effects of Project O&M and recreation on the California National Historic Trail.

4.1.8 Aesthetic Resources

- AR1: Effects of Project O&M and facilities on aesthetic resources.

4.1.9 Socioeconomic Resources

SR1: Effects of Project on local infrastructure, including law enforcement and fire protection, if SSWD proposes significant additions to the Project.

4.1.10 Cultural Resources

CR1: Effects of any Project construction on burials.

CR2: Effects of Project O&M and associated Project recreation on NRHP-eligible, unevaluated, and/or undocumented cultural resources.

4.1.11 Tribal Interests

TI1: Effects of any construction related to the Project on TCPs.

TI2: Effects of Project O&M and associated recreation on potentially unevaluated or undocumented ethnographic sites and traditional cultural properties related to tribal interests.

4.1.12 Air Resources

AIR1: Effects of proposed new Project construction on air quality.

4.1.13 Noise

N1: Effects of proposed new Project construction on noise levels.

In addition, respondents to SSWD's Questionnaire identified the following preliminary issues that SSWD considers outside the scope of the relicensing:

- NMFS and Placer County both identified channel incision, lack of a natural meander pattern and single-thread simplified channel in the lower Bear River as a potential issue. Incision into historic mining debris, levee construction, and agriculture development is responsible for the current shape of the channel.
- FWN identified climate change as having the potential to affect Project O&M. Project O&M has no effect on climate change.
- FWN identified Project O&M as having an impact on habitat conditions in Dry Creek for anadromous fish. Dry Creek is a tributary to the Bear River. SSWD has no control of conditions in Dry Creek.

4.2 Data Gap Analysis

For each preliminary issue listed in Section 4.1, SSWD determined whether existing, relevant and reasonable available information would be adequate for SSWD, FERC and Relicensing Participants to assess Project effects and, if appropriate, develop recommendations for requirements in the new license. If existing information was deemed not adequate, SSWD identified what additional information it believes is needed. Table 4.2-1 provides a summary of SSWD’s data gap analysis.

Table 4.2-1. Summary of SSWD’s data gap analysis.

	Preliminary Issue (No. and Description)	Existing Information	SSWD’s Identified Data Gap(s)	SSWD’s Proposed Study(s) to Close Data Gap(s)
G&S1	Effects of Project O&M on channel morphology in the Bear River below Camp Far West Dam (e.g. channel stability, erosion/sedimentation, substrate composition and floodplain/channel connectivity)	Hydrologic flow regime known and there is no control of spill. Inundation of channel and inset floodplain is essentially the 1.5-yr return frequency.	Frequency and extent of inundation, bank stability, substrate type, and sediment type and availability for spawning is unknown.	Study 3.1, <i>Salmonid Redd</i> Study 3.3, <i>Instream Flow</i>
G&S2	Effects of Project O&M on sediment and sediment movement in the Bear River downstream of the Project, especially related to the trapping of sediment in Camp Far West Reservoir and Project flows.	Historic mining sediment trapped in Camp Far West Reservoir but reworking of alluvial material in Bear River downstream provides mobile substrate and system is not sediment starved.	Quantity, distribution, and availability of spawning-sized substrate is unknown.	Study 3.1, <i>Salmonid Redd</i> Study 3.3, <i>Instream Flow</i>
G&S3	Effects of Project O&M on soil erosion, slope failures and slope stability at the Camp Far West Reservoir shoreline and in the Bear River downstream of the Project.	No identified exposed shoreline and Bear River has only ~5% exposed banks actively eroding.	Type of and extent of erosion that varies with channel type in the Lower Bear River is unknown.	Study 3.3, <i>Instream Flow</i> Incidental observations during all relicensing studies.
G&S4	Effects of Project O&M on runoff from Project roads and other hard surface runoff on erosion and sediment transport and Project flow-related movement of sediment.	There are no Project Primary roads.	Existing information is adequate to address the issue.	None
G&S5	Effects of Project O&M on soil erosion and bank stability due to use of the Camp Far West Dam spillways and outlet facilities.	Spillway is located over and on bedrock, and outlet is not causing active bank erosion or otherwise in Bear River.	Existing information is adequate to address the issue.	None
G&S6	Effects of Project O&M on LWM distribution and recruitment into the Bear River downstream of the Project.	In most years, SSWD collects no LWM from the surface of Camp Far West Reservoir. Little LWM enters the reservoir from upstream and the reservoir shoreline has very little LWM.	Existing information is adequate to address the issue.	None
G&S7	Effects of Project-related recreation on soil compaction and erosion.	Based on site reconnaissance, the compaction and use impacts within the developed recreation areas are typical of developed recreation sites. Significant erosion is not evident along the gently sloping shorelines within the recreation areas.	Existing information is adequate to address the issue.	None

Table 4.2-1. (continued)

	Preliminary Issue (No. and Description)	Existing Information	SSWD's Identified Data Gap(s)	SSWD's Proposed Study to Close Data Gap(s)
WR1	Effects of Project O&M on flow regime.	USGS and CDEC gage data and unpublished SSWD data	Existing information is adequate to address the issue.	None
WR2	Effects of Project O&M to water quality and quantity that may affect the growth, reproduction, and extent of populations of special status plants and natural communities.	Water quality data available from Alpers et al. 2008, SSWD 2015, CDWR and SWRCB 2012. SSWD collected basic water quality measurements in the reservoir in 2015. Historical water quality data exists, but is limited to a few sampling locations. SWRCB has already listed the Bear River and Camp Far West for mercury.	No data for a complete analyte list from multiple sampling locations in the Bear River and Camp Far West Reservoir.	Study 2.3, <i>Water Quality</i>
WR3	Effects of Project O&M on water quantity and quality that may adversely affect the plant diversity, quantity, composition, and extent of wetland, riparian, and littoral habitats.	Wetlands and riparian data available from NWI 2015, CDFW 2015g (CWHR), and Sycamore Associates 2013 (Wetland Delineation). A 2013 wetland delineation identified no riparian areas within the FERC Project Boundary that could be affected by Project O&M.	Existing information is adequate to address the issue.	None
WR4	Effects of Project O&M on water temperature in the reservoir due to water fluctuations.	SSWD collected water temperature profiles for seven months in 2015 in the reservoir.	No long range water temperature data over a variety of water year types.	Study 2.1, <i>Water Temperature Monitoring</i> Study 2.2, <i>Water Temperature Modeling</i>
WR5	Effects of Project O&M on connectivity between the reservoir and upstream tributaries due to water fluctuations.	SSWD developed an Operations model of the Camp Far West Project and results are provided in Appendix G of the PAD. Additional operations scenarios may be considered throughout the relicensing process.	Existing information is adequate to address the issue.	None
WR6	Effects of Project O&M on water temperature in the Bear River downstream of the dam due to the amount of water released from the dam.	SSWD installed loggers in 2015 in the lower Bear River. CDWR recorded spot measurements at one location monthly from 1964 – 1987.	No long range water temperature data exists over a variety of water year types and throughout the river.	Study 2.1, <i>Water Temperature Monitoring</i> Study 2.2, <i>Water Temperature Modeling</i>
WR7	Effects of Project O&M on the size and extent of the wetted channel and streambed area in the Bear River downstream of the dam due to the amount of water released from the dam.	CDFG completed an instream flow study in 1991 to determine target flows for salmon in the Lower Bear River. Hydrologic flow regime known and there is no control of spill. Inundation of channel and inset floodplain is essentially the 1.5 yr return frequency.	Instream flow study methods and results as cited in CDFG 1991 are inadequate to inform requirements in new license.	Study 3.3, <i>Instream Flow</i>

Table 4.2-1. (continued)

Preliminary Issue (No. and Description)		Existing Information	SSWD's Identified Data Gap(s)	SSWD's Proposed Study to Close Data Gap(s)
WR8	Effects of Project O&M on water quality within the reservoir and in the Bear River and other tributaries upstream and downstream of the reservoir.	Data available from Alpers et al. 2008, SSWD 2015, CDWR and SWRCB 2012. SSWD collected basic water quality field measurements in the reservoir in 2015. Historical water quality data exists, but is limited to a few sampling locations. SWRCB has already listed the Bear River and Camp Far West for mercury.	No data for a complete analyte list from multiple sampling locations in the Bear River and Camp Far West Reservoir.	Study 2.3, <i>Water Quality</i>
WR9	Effects of Project O&M on bioaccumulation of mercury and other toxins in reservoir and stream fish.	Data available from Saiki et al. 2010, Davis et al. 2009, Alpers et al. 2008, OEHHA 2009. Extensive research on mercury bioaccumulation in the Bear River and Camp Far West Reservoir has been done including fish ingestion advisory for Camp Far West.	Existing information is adequate to address the issue	None
WR10	Project operations may affect downstream water deliveries to SSWD and CFWID.	SSWD developed an Operations model of the Camp Far West Project and results are provided in Appendix G of the PAD. Additional operations scenarios may be considered throughout the relicensing process.	Existing information is adequate to address the issue	None
WR11	Project operations may affect SSWD's ability to continue to meet its obligations as part of the Bay-Delta Agreement.	SSWD developed an Operations model of the Camp Far West Project and results are provided in Appendix G of the PAD. Additional operations scenarios may be considered throughout the relicensing process.	Existing information is adequate to address the issue	None
AQ1	Effects of Project O&M and Project recreation may introduce and/or spread aquatic invasive species.	Data available from Cal Weed Mapper 2015, Ivasive.org 2014, USGS 2015 and USGS 2014. One AIS species- Asian clam- is known from the Project, with American bullfrog suspected. The invasive weed surveys will include any sightings of aquatic weeds. California law mandates an education program and monitoring to prevent the invasion of quagga and zebra mussels.	Existing information is adequate to address the issue	Incidental observations during all relicensing studies.
AQ2	AQ2: Effects of Project O&M may adversely affect benthic macroinvertebrate diversity.	Data available from ECORP 2014, SWRCB 2011 and SWRCB 2013. Recent BMI surveys upstream and downstream of the Project indicate an abundance and diversity of BMIs.	Existing information is adequate to address the issue	None

Table 4.2-1. (continued)

Preliminary Issue (No. and Description)		Existing Information	SSWD's Identified Data Gap(s)	SSWD's Proposed Study to Close Data Gap(s)
AQ3	Effects of Project O&M may adversely affect amphibians and their habitat.	Data available from CDFW 2015a (CNDDDB). No accounts of special status amphibians within the FERC boundary. A search of the CNDDDB for the USGS 1:24,000 quadrangles of Camp Far West, Nicolaus, Sheridan, Wheatland and Wolf found no known occurrences of foothill yellow legged frogs.	Existing information is adequate to address the issue	Incidental observations during all relicensing studies.
AQ4	Effects of Project O&M may adversely affect western pond turtles and their habitat.	Data available from CDFW 2015a (CNDDDB). No accounts of western pond turtle within the FERC boundary. The closest known occurrence of WPT is approximately 4.3 mi from Camp Far West Dam in the Dry Creek basin.	Existing information is adequate to address the issue	Incidental observations during all studies.
AQ5	Effects of Project O&M may adversely affect the diversity, quantity and composition of fish species.	Data available from CDFW boat electrofishing of Camp Far West Reservoir, CDFW Stocking Records and CDFW seining records. Results of CDFW's surveys indicate a persistent warm water sport fishery typical of Central Valley reservoirs. Spotted bass are the dominant species in Camp Far West Reservoir.	Existing information is adequate to address the issue	None
AQ6	Effects of Project O&M may adversely affect anadromous fish migration, spawning and juvenile rearing.	Data available from Moyle 2002, NMFS 2008a Yoshiyama et al. 2001, Reynolds et al. 1993, CDFG 1991, Chamberlain and Wells 1879, Monohan 2007, Shilling and Gervetz 2003, and CDFW unpublished Salmon Redd Surveys. Studies indicate that adult anadromous salmonids intermittently use the lower Bear River during years of high fall flows. Chinook salmon estimates have varied from as high as 300 individuals to as low as zero.	Available data for anadromous species in the lower Bear River is primarily anecdotal or not specific to the lower Bear River. Available data is lacking in specificity of timing, location, lifestage and general habitat conditions.	Study 3.1, <i>Salmonid Redd</i> Study 3.2, <i>Stream Fish Populations</i>
AQ7	Effects of Project O&M may adversely affect non-anadromous stream fish spawning and habitat.	Data available from Moyle 2002, UC Davis 2009, Moyle et al. 2004, SSWD 2015. Information on non-anadromous species in the lower Bear River is primarily derived from species known to occur in the Feather River. Available information suggests that the lower Bear River is primarily a warm water fishery comprised of both native and non-native fish species typical of Central Valley streams.	Only anecdotal and regional data available for non-anadromous species in the lower Bear River.	Study 3.2, <i>Stream Fish Populations</i>

Table 4.2-1. (continued)

Preliminary Issue (No. and Description)		Existing Information	SSWD's Identified Data Gap(s)	SSWD's Proposed Study to Close Data Gap(s)
AQ8	Effects of Project O&M may adversely affect reservoir fish spawning and habitat.	SSWD has water surface elevation data along with bathymetry to adequately assess effects on reservoir fish populations.	Existing information is adequate to address the issue.	None
AQ9	Effects of Project O&M may cause the stranding of fish.	PAD Section 2 "Project Description" and Section 3.2 "Water Resources." SSWD operations data indicates that project does not operate in a peaking fashion that would cause rapid fluctuations in water surface elevations leading to fish stranding.	Existing information is adequate to address the issue.	Incidental observations during all studies
AQ10	Effects of Project O&M may cause the dewatering of fish spawning sites.	No data was found describing specific fish spawning sites in the lower Bear River.	No data specific to fish spawning sites relative to flow and habitat conditions.	Study 3.1, <i>Salmonid Redd</i> Study 3.3, <i>Instream Flow</i>
TR1	Effects of Project O&M on riparian zone, e.g., vegetation structural diversity and connectivity, vegetation productivity and diversity, longitudinal habitat connectivity, and extent and frequency of flooding.	Data available from NWI 2015, CDFW 2015g (CWHR), Sycamore Associates 2013 (Wetland Delineation). A 2013 wetland delineation identified no riparian areas within the FERC Project Boundary that could be affected by Project O&M.	Existing information is adequate to address the issue	None
TR2	Effects of Project O&M by disturbing habitat for and displacing special-status plants, such as big-scale balsamroot, Sierra foothills brodiaea, dwarf downingia, stinkbells, Boggs Lake hedge-hyssop, Ahart's dwarf rush, dubious pea, legener, Humboldt lily, pincushion navaretia, Brazilian watermeal, and natural communities.	Data available from CNPS 2015, CDFW 2015a (CNDDDB) and Sycamore Associates 2013. There was a special-status plant survey in 2013 which covered the area of the reservoir, done by Sycamore Associates.	There are no data for some areas within the FERC Project Boundary, particularly at recreation areas.	Study 4.1, <i>Special-status Plants and Non-native Invasive Plants</i>
TR3	Effects of Project O&M on the spread of invasive plant species.	Data available from NRCS 2015 and Sycamore Associates 2013. The complete plant list for the special-status plant surveys included all observed weeds.	There are no data on the location, number or size of invasive weed occurrences.	Study 4.1, <i>Special-status Plants and Non-native Invasive Plants</i>
TR4	Effects of Project O&M that may impact migration, foraging, and nesting of birds species including special-status species such as bald eagle, golden eagle, Swainson's hawk, and California black rail.	Data available from CDFW 2015a (CNDDDB), CDFW 2015g (CWHR) and Sycamore Associates 2013. The Biological Assessment surveys performed by Sycamore Associates located one bald eagle nest, habitat for Swainson's hawk, and no potential habitat for California black rail.	There is no specific information on golden eagles or Swainson's hawk occurrences for the Project, and bald eagle data requires updating.	Study 4.2, <i>Special-status Raptors</i>

Table 4.2-1. (continued)

Preliminary Issue (No. and Description)		Existing Information	SSWD's Identified Data Gap(s)	SSWD's Proposed Study to Close Data Gap(s)
TR5	Effects of Project O&M, especially related to transmission lines, that may present collision and electrocution hazards to bird species, including special-status species such as bald eagle, golden eagle, Swainson's hawk, and California black rail.	Data available from CDFW 2015a (CNDDDB), CDFW 2015g (CWHR) and Sycamore Associates 2013. The Biological Assessment surveys performed by Sycamore Associates located one bald eagle nest, habitat for Swainson's hawk, and no potential habitat for California black rail.	There is no specific information on golden eagles or Swainson's hawk occurrences for the Project, and bald eagle data requires updating. There are no project transmission lines.	Study 4.2, <i>Special-status Raptors</i>
TR6	Effects of Project O&M on disturbing bat colonies roosting within the Project structures.	Data available from CDFW 2015a (CNDDDB) and CDFW 2015g (CWHR). Per reconnaissance of the Project, there are multiple structures without any exclusionary devices that could house roosting bats.	There is no specific data on location or species of bats on Project.	Study 4.3, <i>Special-status Bats</i>
TR7	Potential deer entrapment, injury, and mortality in Project facilities.	There are no reports of any deer injuries or mortalities associated with the Project and there are no Project canals or flumes for deer to become entrapped in.	Existing information is adequate to address the issue	None
ESA1	Effects of Project O&M and associated recreation on reproduction, foraging, and migration of ESA-listed species.	Data available from CDFW 2015a (CNDDDB), CDFW 2015g (CWHR), CNPS 2015 and Sycamore Associates 2013. The surveys for the Biological Assessment located no ESA-listed plant species, two occurrences of Valley Elderberry Longhorn Beetle habitat (elderberry shrubs), no habitat for any fairy or tadpole shrimp, potential habitat for California red-legged frog and no habitat for giant garter snake or Western yellow-billed cuckoo.	There are no up-to-date surveys for California red-legged frog for the Project. There is no botanical survey data for some areas within the FERC Project Boundary, particularly at recreation areas.	Study 5.3, <i>California Red-legged Frog Habitat Assessment</i> Study 5.1, <i>ESA-listed Plants Survey</i>
ESA2	Effects of Project O&M and associated recreation on ESA-listed fish species and their critical habitat	Data available from Moyle 2002, NMFS 2008a Yoshiyama et al. 2001, Reynolds et al. 1993, CDFG 1991, Chamberlain and Wells 1879, Monohan 2007, Shilling and Gervetz 2003, CDFW unpublished Salmon Redd Surveys. Studies suggest that there are no self-sustaining populations of spring-run Chinook or steelhead in the lower Bear River. However, the potential exists for both species to intermittently utilize the lower Bear River for spawning and rearing.	Available data for anadromous species in the lower Bear River is primarily anecdotal or not specific to the lower Bear River. Available data is lacking in specificity of timing, location, lifestage and general habitat conditions.	Study 3.1, <i>Salmonid Redd</i> Study 3.3, <i>Instream Flow</i>

Table 4.2-1. (continued)

Preliminary Issue (No. and Description)		Existing Information	SSWD's Identified Data Gap(s)	SSWD's Proposed Study to Close Data Gap(s)
RR1	Effects of Project O&M on public access to Project waters, existing recreational opportunities, and future recreational opportunities within the Project Area, including angling.	Functional range of water surface elevation at Camp Far West Reservoir boat ramps by water year type.	Information on the preferences, attitudes, and characteristics of the Project's recreation users, including anglers; and current project recreational activities and future demand for activities that occur within the Study Area.	Study 6.1, <i>Recreation Use and Visitor Survey</i>
RR2	Effects of Project O&M, especially reservoir water levels, on recreation	Functional range of water surface elevation at Camp Far West Reservoir boat ramps by water year type.	Information on the preferences, attitudes, and characteristics of the Project's recreation users; and current project recreational activities and future demand for activities at Camp Far West Reservoir.	Study 6.1, <i>Recreation Use and Visitor Survey</i>
RR3	Effects of Project O&M on quality and availability of flow-dependent recreation opportunities.	USGS and CDEC gage data. Recreational use on the Bear River below Camp Far West Reservoir is very limited as it flows through privately-owned land; and the reach is not a viable whitewater boating reach.	Existing information is adequate to address the issue.	None
RR4	Adequacy of existing Project recreation facilities (including accessible facilities) to meet current and future recreational demands.	Recreation facilities are in adequate condition to meet current recreation demand; however, facilities will need to be repaired or replaced, as needed, to meet future demand.	Information on future demand for use and activities at Camp Far West Reservoir.	Study 6.1, <i>Recreation Use and Visitor Survey</i>
LU1	Effects of Project O&M on the condition and use of roads in the Project Area.	There are three main Project roads—the access roads to the North and South Recreation Areas and the powerhouse facilities. All of these roads are on SSWD lands and are currently functional.	Existing information is adequate to address the issue.	None
LU2	Effects of Project O&M on wildlife risks and fire management.	Data from CAL FIRE 2015. Over the past nearly fifty years (1967 to 2014), there are only four reported fires that occurred in the Project Vicinity, three of them that occurred in part within the FERC Project Boundary. None of these fires were caused by Project O&M.	Existing information is adequate to address the issue	None
LU3	Effects of Project O&M and recreation on the California National Historic Trail.	The California National Historic Trail, as it exists within the FERC Project Boundary, is a non-developed designated area around the historic emigrant trail.	Additional information on the traces of the historic trail within the FERC Project Boundary is needed.	Study 10.1, <i>Cultural Resources</i>

Table 4.2-1. (continued)

Preliminary Issue (No. and Description)		Existing Information	SSWD's Identified Data Gap(s)	SSWD's Proposed Study to Close Data Gap(s)
AR1	Effects of Project O&M and facilities on aesthetic resources.	Effects of the Project result in moderate visual contrast for the dam, spillway and bridge in foreground and low visual contrast from middle ground views. There is high visual contrast in immediate foreground for the powerhouse as seen from vehicles traveling southbound across the dam.	Existing information is adequate to address the issue.	None
SR1	Effects of Project on local infrastructure, including law enforcement and fire protection, if SSWD proposes significant additions to the Project.	Currently, SSWD is not proposing any significant additions to the Project.	Existing information is adequate to address the issue.	None
AIR1	Effects of proposed new Project construction on air quality.	Currently, SSWD is not proposing any significant additions to the Project.	Existing information is adequate to address the issue.	None
N1	Effects of proposed new Project construction on noise levels.	Currently, SSWD is not proposing any significant additions to the Project.	Existing information is adequate to address the issue.	None
CR1	Effects of any Project construction on burials.	Existing and relevant information indicates that the lands within the existing FERC Project Boundary are highly sensitive for prehistoric resources. UAIC has indicated the potential for discovery of burials during Project construction.	Existing and relevant information indicates that the lands within the existing FERC Project Boundary are highly sensitive for both prehistoric and historic cultural resources. It is important to perform this study to determine whether unidentified burial sites may occur within the Study Area and prepare for proper procedures in the event of discovery.	Study 10.1, <i>Cultural Resources</i>
CR2	Effects of Project O&M and associated Project recreation on NRHP-eligible, unevaluated, and/or undocumented cultural resources.	SSWD identified 39 previously recorded cultural resources within the FERC Project Boundary, 37 of which are archaeological sites and two of which are historic structures. In addition, SSWD identified 38 previously recorded isolated artifacts within the FERC Project Boundary, 35 of which are prehistoric and three of which are historic. SSWD's review of historical maps indicates that there are approximately 53 potential historic-era sites or features that may be located within the existing FERC Project Boundary.	Existing and relevant information indicates that the lands within the existing FERC Project Boundary are highly sensitive for both prehistoric and historic cultural resources. Additionally SSWD's review of historic maps suggests the possibility that undocumented historic-period cultural resources may still be present within the FERC Project Boundary. Moreover, the hydroelectric system and its individual features are over 50 years of age and have not been documented individually or as a system, or evaluated for the NRHP.	Study 10.1, <i>Cultural Resources</i>

Table 4.2-1. (continued)

Preliminary Issue (No. and Description)		Existing Information	SSWD's Identified Data Gap(s)	SSWD's Proposed Study to Close Data Gap(s)
TI1	Effects of any construction related to the Project on TCPs.	SSWD found that the area within the existing FERC Project Boundary did not include any Indian reservation lands, other lands under tribal ownership, sacred lands, or tribal agreements that pertain to lands within this area. The research did not identify any documented ITAs or TCPs within this area.	Existing and relevant information indicates that lands within the existing FERC Project Boundary and the surrounding area are highly sensitive for both prehistoric and historic cultural resources. Previous studies did not include ethnographic or TCP investigations. It is important to perform this study to determine whether unidentified tribal interests occur within the Study Area.	Study 11.1, <i>Tribal Interests</i>
TI2	Effects of Project O&M and associated Project recreation on potentially unevaluated or undocumented ethnographic sites and traditional cultural properties related to tribal interests.	SSWD found that the area within the existing FERC Project Boundary did not include any Indian reservation lands, other lands under tribal ownership, sacred lands, or tribal agreements that pertain to lands within this area. The research did not identify any documented ITAs or TCPs within this area.	Existing and relevant information indicates that lands within the existing FERC Project Boundary and the surrounding area are highly sensitive for both prehistoric and historic cultural resources. Previous studies did not include ethnographic or TCP investigations. It is important to perform this study to determine whether unidentified tribal interests occur within the Study Area.	Study 11.1, <i>Tribal Interests</i>

4.3 SSWD Proposed Measures

SSWD does not propose any PM&E measures at this time.

4.4 Proposed Studies

4.4.1 Study Plan Template

For each proposed study, SSWD prepared a study plan based on 18 C.F.R. Section 5.11. Each study plan includes the following sections:

- Section 1. Project Nexus. This information satisfies the requirements of 18 C.F.R. Section 5.11(d)(4), and includes the general description of the Project nexus to the resource addressed in the study.
- Section 2. Study Goal and Objectives. This information satisfies the requirement of 18 C.F.R. Section 5.11(d)(1).
- Section 3. Existing Information and Need for Additional Information. This information satisfies the requirements of 18 C.F.R. Section 5.11(d)(3), and includes a brief description of existing, relevant and reasonably available information, and may include a reference to the appropriate portions of the PAD, rather than repeating information in the

study plan. This section also describes the need for the additional information to be developed by the study.

- Section 4. Study Methods and Analysis
 - Section 4.1. Study Area. This section describes the specific geographic area encompassed by the study. Studies may have different study areas based on the issue addressed by the study. A map is attached that shows specific sampling locations to the extent applicable.
 - Section 4.2. General Concepts and Procedures. This section includes information (e.g., safety, use of GPS, and taking incidental observations) that pertains to all relicensing studies.
 - Section 4.3. Methods. This information satisfies the requirement of 18 C.F.R. Section 5.11(b)(1). This section describes the sampling locations and frequency to the extent possible, and the specific study methods to be employed to develop the additional information. If a relatively common approach is proposed, the section references that approach (i.e., citation, including page numbers), but also provides enough detail for an interested party to understand the approach and how it will be applied without reading the citation. In addition, this section describes any specific analysis that will be performed as part of the study, including products [(e.g., maps, tables and spreadsheets) and the format for these products (e.g., *.DSS, Excel and pdf).]
- Section 5.0. Consistency of Methodology with Generally Accepted Scientific Practices. This information satisfies the requirement of 18 C.F.R. Section 5.11(d)(5). This section briefly describes how the study methodology is consistent with generally accepted practices in the scientific community and employed during hydro relicensings.
- Section 6.0. Schedule. This information satisfies the requirement of 18 C.F.R. Section 5.11(b)(2) and, in part, Section 5.11(d)(5). This section includes the study schedule.
- Section 7.0. Level of Effort and Cost. This information satisfies the requirement of 18 C.F.R. Section 5.11(d)(6). This section includes a range of costs in 2015 dollars for the study as proposed.
- Section 8.0. References Cited. This section lists any references cited in the study plan.

4.4.2 SSWD’s Proposed Studies

Table 4.3-2 lists SSWD’s proposed studies referenced in Table 4.3-1. A detailed study plan for each study is provided in Appendix H.

Table 4.3-1. List of SSWD’s proposed studies.

Study Number	Study Name
2.1	Water Temperature Monitoring
2.2	Water Temperature Modeling
2.3	Water Quality
3.1	Salmonid Redd
3.2	Stream Fish Populations
3.3	Instream Flow
4.1	Special-status Plants and Non-native Invasive Plants

Table 4.3-1. (continued)

Study Number	Study Name
4.2	Special-status Wildlife – Raptors
4.3	Special-status Wildlife – Bats
5.1	ESA-listed Plants
5.2	ESA-listed Wildlife – Valley Elderberry Longhorn Beetle
5.3	ESA-listed Amphibians – California Red-legged Frog
6.1	Recreation Use and Visitor Survey Study
10.1	Cultural Resources
11.1	Tribal Interests
Total	15

In addition, respondents to SSWD’s Questionnaire suggested the following studies that SSWD did not adopt and considers unnecessary:

- Cal Fish and Wildlife identified a need for a channel morphology study in the Bear River below Camp Far West Dam. The request was not specific as to type of study and what the data needs are. However, Study 3.3 *Instream Flow Study*, has channel-form, substrate and cover, and LWM components that address bed and bank form and interaction, floodplain connectivity, channel inundation type and frequency, and substrate type. Also, Study 3.1 *Salmonid Redd Study*, quantifies spawning gravel.
- FWN and Placer County identified the need for a climate change study. Project O&M does not affect climate change. In addition, FERC does not require an applicant for a new license to address climate change during its relicensing.
- Cal Fish and Wildlife identified the need for a water balance/operations model. SSWD has already prepared an operations model and provided it in the PAD as existing information.
- Cal Fish and Wildlife and FWN identified the need for a bioaccumulation and mercury study, respectively. As noted in Section 3.2.2, a number of studies have been conducted regarding mercury and bioaccumulation in Camp Far West Reservoir and the Bear River. Fish ingestion advisories have already been established to address any human health concerns. In addition, SSWD does not contribute mercury to the watershed through any of its O&M. No additional information is needed to inform a license requirement.
- FWN identified the need for a study of non-natal juvenile rearing in the lower Bear River based on the findings of Maslin et al. (1996), which measured growth rates of fish rearing in intermittent streams to the Sacramento River. The river of natal origin was determined based on coded wire tags and adipose fins clips. In certain years, adult Chinook salmon have been observed spawning in the lower Bear River. Juvenile fish rearing in the lower Bear River could be a mix of any naturally-spawned population upstream of the Bear River confluence with the Feather River (i.e. naturally-spawned juveniles from the Feather and Yuba rivers). Therefore, the natal stream of fish rearing in the lower Bear River could not be determined.
- Cal Fish and Wildlife identified the need for a reservoir fish population study. Based on Cal Fish and Wildlife fish stocking records and boat electrofishing data as recently as

2012, there is sufficient amount of information regarding reservoir fish populations to inform requirements in the new license.

- Cal Fish and Wildlife identified the need for a stream fish populations study in tributaries to Camp Far West Reservoir and Bear River below Camp Far West Dam. SSWD has proposed Study 3.2, *Stream Fish Populations*, which will investigate fish populations downstream of Camp Far West Dam in the main stem of the Bear River. Project O&M does not have an effect on fish populations in tributaries to the reservoir.
- Cal Fish and Wildlife identified the need for a benthic macroinvertebrates study in tributaries to Camp Far West Reservoir and Bear River below Camp Far West Dam. Project O&M does not have an impact on the benthic macroinvertebrate community in tributaries to Camp Far West Reservoir. Furthermore, benthic macroinvertebrate studies were conducted in 2011 and 2013 (SWRCB 2011, SWRCB 2013) both upstream of Camp Far West Reservoir and in the lower Bear River. There is sufficient information regarding the benthic macroinvertebrate community to inform requirement in the new license.
- Cal Fish and Wildlife identified the need for a western pond turtle and a special-status amphibians study. No special-status amphibians have been reported to occur within the FERC Project Boundary. The nearest known occurrence of western pond turtle is in Dry Creek, a tributary to the lower Bear River, approximately 4.3 mi from Camp Far West Dam. Any incidental sightings of western pond turtle or special-status amphibians during all relicensing studies will be compiled and include in SSWD's DLA and FLA.
- Cal Fish and Wildlife identified the need for a California black rail study. The species has not been reported to occur within the FERC Project Boundary, and a 2013 survey of the Project specifically identified no suitable habitat for the species (Sycamore Associates 2013a). Therefore, SSWD believes that no study for California black rail is warranted.
- Cal Fish and Wildlife identified the need for an avian collision and electrocution study for the Project. There are no transmission lines associated with the Project. Therefore, there is no need for this proposed study.
- Cal Fish and Wildlife identified the need for a vernal pool study on the Project. A 2013 wetland delineation of the area around Camp Far West Reservoir identified no vernal pools (Sycamore Associates 2013b), nor was there any identified by the NWI or during Project reconnaissance for the PAD. SSWD believes this is sufficient information about the resource to inform license requirements.
- Cal Fish and Wildlife identified the need for a wetlands and riparian habitat in tributaries to Camp Far West Reservoir and in the Bear River below Camp Far West Dam study. A wetland delineation, along with riparian habitat data collection, was performed for the entirety of the Camp Far West Reservoir in 2013, which also included areas of the tributaries to the reservoir. The delineation identified five seasonal wetlands (0.077-ac), 10 seasonal wetland swales (0.22-ac), nine seeps (0.457-ac), eleven emergent wetlands (1.018-ac), six irrigated wetlands (1.484 ac) and one scrub-shrub wetland (0.236-ac). None of the identified wetlands were determined to be caused by or receiving water from the reservoir or any other Project-related sources (Sycamore Associates 2013b). The

wetland delineation of Camp Far West Reservoir identified riparian vegetation only on Rock Creek, upstream of the reservoir, where it would not be affected by reservoir water fluctuations. The area of the Bear River was specifically noted as having little to no riparian vegetation (Sycamore Associates 2013b). SSWD believes this to be a sufficient amount of information to address wetlands and riparian habitat in tributaries to Camp Far West and in the Bear River below Camp Far West Dam, such that a study is not warranted.

- Cal Fish and Wildlife identified the need for an angling study. SSWD believes the proposed Study 6.1, *Recreation Use and Visitor Survey*, will adequately address angling uses, opportunities and preferences. In particular, the proposed study includes a 4-page recreation visitor questionnaire, where all visitors surveyed including anglers at the Project recreation areas will be able to provide feedback related to angling at the Project. However, the proposed Recreation Use and Visitor Survey study questionnaire also includes an angling-specific section (Section 2) that specifically addresses current angler characteristics and experiences.

4.5 List of Attachments

Detailed Study Plans are provided in Appendix H.