United States Department of the Interior

OFFICE OF THE SECRETARY
Office of Environmental Policy and Compliance
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San Francisco, California, 94104

In Reply Refer To:
ER 17/0550

January 29, 2018

Honorable Kimberly D. Bose, Secretary
Federal Energy Regulatory Commission
888 First Street, NE
Washington, DC 20426

Subject: Department of the Interior COMMENTS, RECOMMENDATIONS, PRELIMINARY TERMS AND CONDITIONS, and PRELIMINARY FISHWAY PRESCRIPTIONS on the Federal Energy Regulatory Commission Ready for Environmental Analysis Notice for the Don Pedro Hydroelectric Project, Federal Energy Regulatory Commission Project No. P-2299-082, Tuolumne River, Tuolumne and Stanislaus Counties, California

Dear Secretary Bose:

The U.S. Department of the Interior (Department), including the U.S. Fish and Wildlife Service (USFWS), Bureau of Land Management (BLM) and the National Park Service (NPS) has reviewed the Federal Energy Regulatory Commission's (Commission or FERC) November 30, 2017, "*Notice of Application Accepted for Filing; Soliciting Motions to Intervene and Protests, Ready for Environmental Analysis and Soliciting Comments, Recommendations, Preliminary Terms and Conditions, and Preliminary Fishway Prescriptions*" (REA/Intervention Notice) for Turlock and Modesto Irrigation Districts' (Licensees or Districts) Don Pedro Hydroelectric Project (FERC Project No. 2299) (Project). An Amended Final License Application was filed with the Commission on October 10, 2017. The Department's following mandatory Section 4(e) Conditions, Recommended 10(j) Conditions, Section 10(a) Recommendations, Reservation of Authority for Section 18 Prescriptions for Fishways, and comments are provided in response to the Commission's November 30, 2017, REA/Intervention Notice regarding the Project in accordance with the Federal Power Act (FPA), as amended (16 U.S.C. § 791a, *et seq*.); the Fish and Wildlife Coordination Act, as amended (16 U.S.C. § 661, *et seq*.); the Endangered Species Act (ESA) of 1973, as amended (16 U.S.C. § 1531, *et seq.*); the Migratory Bird Treaty Act (MBTA) of 1918, as amended (16 U.S.C. 703-712); the Bald and Golden Eagle Protection Act (BGEPA) of 1940, as amended (16 U.S.C. § 668-668d); the National Environmental Policy Act (NEPA) of 1969, as amended (42 U.S.C. §4321 *et seq*.); the Central Valley Project Improvement Act (CVPIA) (Pub. L. No. 102-575, 106 Stat. 4600, 4706, Title 34 (1992)); and the Federal Land Policy Management Act (FLPMA) (43 U.S.C. § 1701, et seq.).

The Department, through its Bureaus, is a participant in the new licensing proceedings for the Don Pedro Hydroelectric Project, Project No.2299. To date, BLM, USFWS, NPS, state and federal agencies, various other parties, and the Applicants, Modesto and Turlock Irrigation

Districts, collectively known as "Relicensing Participants," have been in negotiations to reach agreement on Protection, Mitigation, and Enhancement (PM&E) measures.

The current license for the Project has an extensive record of discussion and analyses of Project effects. The Department hereby requests that the November 20, 2009, *Final Report of the Presiding Judge on Interim Measures* and the December 1, 2009, *Administrative Law Judge's Certification of the Final Report of the Presiding Judge on Interim Measures* be brought forward into the current record and incorporated by reference, including exhibits submitted by the USFWS, National Marine Fisheries Service (NMFS), and California Department of Fish and Game [Wildlife].

The Department hereby incorporates by reference the following exhibits:

- Exhibit FWS-1 through Exhibit FWS-30, filed on October 6, 2009 (FERC Accession Numbers 20091129-0163 through 20091129-0192)
- Exhibit FWS-31 through Exhibit FWS-41 (FERC Accession Numbers 20091129-0212 through 20091129-0222)
- Exhibit FWS-42, filed on December 4, 2009 (FERC Accession Number 20091129-0223)
- Exhibit FWS-43 through Exhibit FWS-106 (FERC Accession Numbers 20091129-0224 through 20091129-0283)
- Exhibit FWS-70, filed on October 6, 2009 (FERC Accession 20091129-0315)

On August 8, 2005, Congress enacted the Energy Policy Act of 2005 (EP Act), Pub. L. No. 109-58, which mandates new processes when the Department prescribes fishways pursuant to Section 18 of the FPA and mandates conditions pursuant to Section 4(e) of the FPA. The Department's revised interim regulations implementing the EP Act are codified at 43 C.F.R. Section 45.1 *et seq*. In this proceeding, the Department is filing preliminary mandatory conditions pursuant to Section 4(e); any party to the license proceeding may request a hearing on disputed issues of material fact with respect to any preliminary condition filed herein, as provided in 43 C.F.R. 45.21. Moreover, any party to the license proceeding may also propose an alternative condition as provided in 43 C.F.R 45.71. In this proceeding the Department is reserving the Secretary's Section 18 authority to prescribe fishways; consequently, the Department will not provide hearing or alternative review processes at this time with respect to fishway prescriptions under Section 18 of the FPA(43 C.F.R. Section 45.1(c)). The Department will provide such processes if (and when) the Department exercises its reserved Section 18 authority during the term of any license that may be issued in this proceeding.

The impacts we seek to ameliorate are addressed in our FPA Section 4(e) conditions, which provide for the protection and utilization of reservation lands used by the Project, and in our recommended conditions, which contain a wide variety of protection, mitigation and enhancement measures to benefit threatened and endangered species, and to address water quality; riparian, floodplain, terrestrial and aquatic habitats; cultural, recreational, and other public resources throughout the Project; and ensure consistency of the Project with comprehensive plans that guide these resources. Incorporation of the Department's Section 18 fishway prescription, our Section 4(e) conditions, and our proposed recommended conditions into any license issued for this Project will help to ensure protection of the Department's trust resources. In addition, at this time, several ESA issues remain to be addressed through the Commission's compliance with Section 7 of the ESA, and the USFWS requests formal ESA consultation on effects to the ESA-listed species pursuant to 50 CFR 402.14(a).

ENVIRONMENTAL SETTING

The Don Pedro and La Grange Projects are an integrated water complex that provides irrigation and municipal water to farmland and municipalities in Stanislaus County, flood control for the Tuolumne and San Joaquin Rivers, water banking for the City and County of San Francisco, hydroelectric generation, recreation, and fish flows. In 2012, the Commission issued an Order Finding Licensing of Hydroelectric Project Required, which found that the licensing of the previously unlicensed La Grange Project is required (Docket UL11-1-000, 141 FERC ¶ 62,211 (12/19/2012); see also Order on Rehearing, 144 FERC ¶ 61,051 (7/19/2013). Consequently, an application for license of the La Grange Project is pending, and the Commission issued the REA/Intervention Notices for both projects on the same day. The integrated water complex of the Don Pedro and La Grange Projects (DPLG Complex) is owned and operated by Modesto and Turlock Irrigation Districts (Districts). Don Pedro Reservoir acts as the regulating reservoir for hydropower generation, water delivery, and flood control aspects of the DPLG Complex. The La Grange Reservoir acts as both an afterbay for the Don Pedro Project hydropower generation and a water diversion point for the Districts. Decisions regarding water releases and hydropower generation that are made at the Don Pedro Hydroelectric Project affect water availability for the diversions at La Grange Reservoir, hydropower generation at the La Grange Powerhouse, and availability of water for fish flows in the lower Tuolumne River.

La Grange Dam (built in 1883) is much older than Don Pedro Dam (built in 1971, replacing a much smaller 1926 dam), and its utility would be significantly reduced without the up to 4060 times-greater water availability provided by Don Pedro Reservoir. The Districts share water rights on the Tuolumne River and ownership of the Don Pedro Project and Don Pedro powerhouse.

Effects from the combined operations of the two reservoirs and their hydroelectric facilities should be considered interrelated with each other and interdependent on the joint operations plan because the La Grange and Don Pedro components are operated in an integrated manner, and they collectively affect both reservoir levels in Don Pedro Reservoir and flows in the lower Tuolumne River.

CONSULTATION HISTORY

The Department hereby incorporates by reference the filings made by the Department, including the USFWS, NPS, and BLM; the Districts; and the issuances by the Commission in the Integrated Licensing Process for the Project. The following is a brief chronology of the Commission issuances, the Districts' major filings with the Commission for the Project, and the corresponding responses filed with the Commission by the Department through USFWS, BLM and NPS. The Resource Agencies include the Department and its component bureaus including the USFWS, BLM, and the NPS; the Department of Commerce, National Marine Fisheries Service (NMFS); the California Department of Fish and Wildlife (CDFW); and the State Water Resources Control Board (SWRCB). *July 25, 2005*—DOI Notice of Intervention for the Project, FERC #2299

August 12, 2005—DOI Service List Request for the Project, FERC #2299

July 22, 2008—DOI Answer to Motion to Clarify Record of Modesto and Turlock Irrigation Districts for the Project, FERC #2299.

July 16, 2009—FERC Order on Rehearing, Amending License, Denying Later Intervention, Denying Petition, and Directing Appointment of a Presiding Judge for a Proceeding on Interim Conditions. The Commission directed the Districts to develop and implement instream flow and water temperature modeling in the Tuolumne River below La Grange Dam, for the Don Pedro Hydroelectric Project.

August 4, 2009—DOI for USFWS Prehearing Conference Statement including a Notice of Appearance and Designation of Party Representatives for the Project, FERC #2299

August 26, 2009—DOI for USFWS Response to Districts' Submittal of Report on Additional Protective Measures for the Project, FERC #2299

September 14, 2009—DOI for USFWS CD containing direct written testimony and exhibits for the Project, FERC #2299

September 22, 2009—DOI for USFWS Written Rebuttal Testimony and Exhibits for the Project, FERC #2299

November 5, 2009—USFWS Comments on the Districts' Instream Flow and Water Temperature Study Plans for the Project, FERC #2299

June 10, 2011—NPS comments and study requests for a Whitewater Boating Take-Out Adequacy and Feasibility Study and Lower Tuolumne Recreation Flow Study on the Preliminary Application Document for the Project, FERC #2299

June 10, 2011—USFWS Comments on the Districts' February 2011 Pre-Application Document and April 2011 Scoping Document 1, and Study Requests for the Project, FERC #2299

June 10, 2011—Reclamation Comments on the Pre-Application Document for the Project, FERC #2299

October 19, 2011 ---The NPS submitted comments on proposed RR-02: Wards Ferry Takeout Adequacy and Feasibility Study Plan and RR-03: Lower Tuolumne Recreation Flow Study Plan. Updated Study Plan filed by Applicants on October 14, 2011.

October 19, 2011 -- NPS submitted comments on revised RR-02: Wards Ferry Takeout Adequacy and Feasibility Study Plan and RR-03: Lower Tuolumne Recreation Flow Study Plan, Revised Study Plan filed by Applicants on November 22, 2011.

October 24, 2011—USFWS and BLM Comments on the Districts' Updated Proposed Study Plan for the Project, FERC #2299

October 24, 2011—NPS Comments on the Updated Study Plans RR-1, RR-2, and RR-3 for the Project, FERC #2299

December 6, 2011—NPS Comments on the Updated Study Plans RR-1, RR-2, and RR-3 for the Project, FERC #2299

December 7, 2011—BLM Comments on ILP Proposed or Revised Study Plan under FERC Project # 2299

December 8, 2011—USFWS Comments on the Districts' Revised Study Plan for the Project, FERC #2299-Tuolumne, California.

February 16, 2012—USFWS Nomination of Agency Panelist Identified for the Study Dispute Technical Conference for the Project, FERC #2299

February 21, 2012—USFWS Comments on the Districts' Study Plan Determination Modifications for Water and Aquatic Resources Study (W&AR) 18-Sturgeon Study Plan, W&AR 19 - Lower Tuolumne River Riparian Information and Synthesis Study Plan, and W&AR 20 - Oncorhynchus mykiss Scale Collection for the Project, FERC #2299, Tuolumne, California

March 1, 2012—USFWS Designation of Agency Panelist for the Study Dispute for the Project, FERC #2299

March 21, 2012—USFWS comments on the Districts' Modified Study Plan W&AR-12 February 2012 Draft Oncorhynchus mykiss Habitat Survey Study Plan for the Project, FERC #2299

May 7, 2012—USFWS exhibits containing Witness Rebuttal Testimony and exhibits in connection with the new license proceeding for the Project, FERC #2299

August 23, 2012—USFWS comments on the District's Tuolomne River Flow Requirement for 2012-2013 for the Project, FERC #2299

August 24, 2012—USFWS comments on the Workshop No. 2 for Study W&AR-5 Salmonid Populations Information Integration and Synthesis, W&AR-6 Chinook Salmon Populations Model, W&AR-10 O. mykiss Population Studies, and on W&AR-20 Oncorhynchus mykiss Scale Collection and Age Determination Study Plan for the Project, FERC #2299

October 3, 2012—USFWS Comments on the Districts' Tuolumne River Revised Flow Schedule for 2012-2013 for the Project, FERC #2299

March 11, 2013—USFWS, NPS, and BLM comments on the Initial Study Reports for the Project, FERC #2299

April 9, 2013—USFWS comments on the Districts' February 2013 Draft Report for the Lower Tuolumne River Instream Flow Study for the Project, FERC #2299

June 21, 2013—USFWS concurrence to extend the deadline for filing Final Study Plans with the Commission for 2014 Predation and Juvenile Chinook Salmon Floodplain Rearing Hydraulic Analysis for the Project, FERC #2299

September 9, 2013—USFWS comments on the Districts' W&AR-7 Draft 2014 Predation Study Plan for the Project, FERC #2299

September 16, 2013—USFWS comments on the Districts' W&AR-7 Draft 2014 Predation Study Plan for the Project, FERC #2299

September 16, 2013—USFWS comments on the Districts' Lower Tuolumne Floodplan Hydraulic Assessment Study Plan for the Project, FERC #2299

September 23, 2013—USFWS comments on the Districts' W&AR-6, Chinook Salmon Population Model Study Draft Report and Workshop No. 2 Draft Meeting Notes for the Project, FERC #2299

September 26, 2013—USFWS comments on the Districts' 2013 to 2014 Tuolumne River Flow Requirement for the Project, FERC #2299

November 26, 2013—Districts file Draft License Application for the Project, FERC #2299

February 20, 2014—NPS comments that identified the deficiencies of the RR-02 and RR-03 studies and made study modification requests on the Updated Study Report for the Project, FERC #2299.

February 26, 2014—USFWS Comments and Enclosures on the Districts' Updated Study Report/Draft License Application for the Project, FERC #2299

February 26, 2014—USFWS Comments on the Districts' Draft License Application and Updated Study Report for the Project, FERC #2299. Included in the comments were USFWS requests for formal ESA consultation on Project effects on the California red-legged frog and California tiger salamander.

February 27, 2014—USFWS Comment Letter Enclosure 5 on the Districts' Updated Study Report/Draft License Application for the Project, FERC #2299

March 3, 2014—BLM Responses to Draft License Application for the Project, FERF #2299.

March 27, 2014—USFWS Comments on the Districts' Technical Memorandum for the Lower Tuolumne River Instream Flow Study - Pacific lamprey, Sacramento Splittail, and Non-native Predatory Fish Habitat Assessment: Final 1-D PHABSIM Habitat Suitability Criteria for the Project, FERC #2299

April 29, 2014—Districts file the Final License Application for the Project, FERC #2299

August 19, 2014—BLM Comments on Draft Historic Management Plan for the Project, FERC# 2299

April 6, 2015—USFWS Comments on the Districts' 2015 to 2016 Tuolumne River Flow Requirement for the Project, FERC #2299

April 8, 2015—USFWS Comments on the Districts' February 2015 Draft Report Lower Tuolumne River Instream Flow Study-Evaluation of Effective Useable Habitat Area for Over-summering Oncorhynchus mykiss for the Project, FERC #2299

April 8, 2015—USFWS Comments on the Districts' 2015 to 2016 Tuolumne River Flow Requirement for the Project, FERC #2299

April 23, 2015—USFWS Comments on the Districts' February 2015 Draft Report on the Lower Tuolumne River Instream Flow Study, Evaluation of Effective Useable Habitat Area for over-summering Oncorhynchus mykiss for the Project, FERC #2299

April 23, 2015—USFWS Comments on the Districts' March 2015 Chinook Salmon Otolith Draft Study Report (W&AR 11) for the Project, FERC #2299

October 2, 2015—USFWS Comments on W&AR-21 Lower Tuolumne River Floodplain Hydraulic Assessment Draft Report for the Project, FERC #2299

October 11, 2017—Districts' Amended Final License Application for New Hydroelectric Project License, Don Pedro Hydroelectric Project FERC #2299.

October 27, 2017—FERC files Deficiency of License Application and Request for Additional Information for the Project, FERC #2299

November 27, 2017—Districts' submittal of ERRATA to October 11, 2017 Amendment of Application for License for the Project, FERC #2299

November 30, 2017—FERC Notice of Application Accepted for Filing, Soliciting Comments, Motions to Intervene and Protests, Ready for Environmental Analysis, and Soliciting Comments, Recommendations, Preliminary Terms and Conditions, and Preliminary Fishway Prescriptions for the Project, FERC #2299.

January 19, 2018—DOI Notice of Intervention for the Project, FERC #2299

January 24, 2018—DOI Deadline Extension Requests for Comments on the REA Notice for the Project, FERC #2299

DEPARTMENT OF THE INTERIOR OBJECTIVES FOR THE PROJECT

USFWS RESOURCE OBJECTIVES FOR THE PROJECT

1. Healthy resident trout and anadromous salmonid populations throughout the Tuolumne River watershed, including creating the conditions necessary to increase spring- and fall-run salmon and steelhead spawning and juvenile production to achieve self-sustaining, viable populations and adult doubling goals, thereby maximizing natural production and full utilization of ecosystem carrying capacity;
2. Streamflow regimes that simulate the shape of the natural hydrograph in duration, magnitude, timing, rate of change, and frequency to the extent necessary to restore or protect applicable ecological functions throughout the lower Tuolumne River;

3. Conservation of resident salmonids during times of thermal stress, such as during the summer and during droughts;
4. Attainment of USFWS Anadromous Fish Restoration Program (AFRP) doubling goal of 38,000 Chinook salmon in the Tuolumne River, consistent with the Central Valley Project Improvement Act;
5. Minimization of adverse predation to salmonids through restoration of in-river holding and foraging habitat by filling in deep-pool predator fields;
6. Restoration of in-river spawning habitat by placing and replenishing sufficient spawning gravel to support 38,000 spawning salmonids.
7. Restoration of riparian forest and floodplain in the Tuolumne River to support juvenile salmonid rearing;
8. Restoration of large woody material (LWM) into the Tuolumne River downstream of Don Pedro and La Grange dams;
9. Conservation of Layne's butterweed and Red Hills vervain within the FERC Boundary and within the Red Hills Area of Special Environmental Concern;
10. Conservation of the California red-legged frog in the Tuolumne River watershed; including protection from wood stockpiling and burning and protection from the spread of disease;
11. Conservation of California red-legged frog habitat in the Core Area # 6 of Recovery Unit 1, and recovery and conservation of California red-legged frog populations within the FERC Boundary;
12. Protection of San Joaquin kit foxes and California tiger salamanders from pesticides and burrow fumigants;
13. Protection of bat habitat;
14. Protection of breeding bald eagles at Don Pedro Reservoir;
15. Conservation of migratory birds protected under the MBTA;
16. Monitoring to assure effective implementation of conservation actions and wildlife and plant population responses.
17. Protection of breeding bald eagles at Don Pedro Reservoir and within the FERC Boundaries of the DPLG Complex; and
18. Conservation of migratory birds protected under the MBTA.

The above objectives would be obtained through the implementation of our FPA Terms, as stated in the USFWS *Recommendations, Terms and Conditions, and Prescriptions* Section of this letter.

BUREAU OF LAND MANAGEMENT OBJECTIVES FOR THE PROJECT:

a. Bureau of Land Management's Planning Objective

In the management of its lands, the BLM is required to satisfy the management objectives as outlined in the Federal Land Policy Management Act (FLPMA). 43 U.S.C. § 1701. These objectives should, among other things, protect the quality of scenic, historical, environmental values; preserve and protect public lands; and provide for outdoor recreation, human occupancy, and a variety of other actions. Pursuant to the FLPMA, the Agencies should utilize the principles of multiple use and sustained yield to design their land plans. 43 U.S.C. § 1701(a) (7) (8). The "multiple use" concept is more fully defined as follows:

"The term 'multiple use' means the management of the public lands and their various resource values so that they are utilized in the combination that will best meet the present and future needs of the American people; making the most judicious use of the land for some or all of these resources or related services over areas large enough to provide sufficient latitude for periodic adjustments in use to conform to changing needs and conditions; the use of some land for less than all the resources; a combination of balanced and diverse resource uses that takes into account the long-term needs of future generations for renewable and nonrenewable resources, including, but not limited to, recreation, range, timber, minerals, watershed, wildlife and fish, and natural scenic, scientific and historical values; and harmonious and coordinated management of the various resources without permanent impairment of the productivity of the land and the quality of the environment with consideration being given to the relative values of the resources and not necessarily to the combination of uses that will give the greatest economic return or the greatest unit output." 43 U.S.C. § 1702 (c).

Additionally, BLM has developed the regional Sierra Resource Management Plan (RMP) to follow the requirements of the FLPMA, and provide a more focused approach to land management representing local understanding of the uses and concerns about public lands. Below is a description of a relevant provision from the management plan:

Sierra Resource Management Plan and Record of Decision (2008) ("BLM's Sierra RMP")

"Maintain and/or improve wildlife and fisheries habitats in order to support viable populations. Provide for the protection of threatened habitats of game and nongame species. Ensure adequate river flows for boating, fishing, swimming, etc. Develop recreation sites that meet health and safety standards. Mitigate or eliminate conflicts among recreation users. Maintain existing campground, trail, and day use facilities to accepted BLM Standards" (BLM 2008a).

Bureau of Land Management's Resource Objectives are identified in the Sierra RMP, BLM manuals, Tuolumne Wild and Scenic River Management Plan, and other resource documents.

Aquatic Biota Objectives

Populations of native aquatic biota, including fish, benthic macro-invertebrates (including aquatic mollusks), amphibians, reptiles, and riparian species are viable with adequate habitat consistent with species' needs. Maintain, enhance, or restore all life stages of native aquatic species. Maintain, recover, and restore riparian resources, channel condition, and aquatic habitat.

- Maintain, recover, and restore streamflow regime sufficient to sustain desired conditions of native riparian, aquatic, wetland, and meadow habitats.

- Protect aquatic systems to which species are uniquely adapted.

- Maintain and restore spatial and temporal connectivity for aquatic and riparian species within and between watersheds to provide physically, chemically and biologically unobstructed movement for their survival, migration and reproduction.

Water Resources Objectives

- Restore and maintain the ecological health of watersheds and aquatic ecosystems on BLM lands and, to the extent possible, partner with other landowners and stakeholders to coordinate restoration efforts across watersheds.
- Maintain and improve surface water and groundwater quality consistent with applicable state and federal water quality standards and to help meet the needs of downstream beneficial uses.
- Maintain or improve stream channel conditions, including channel integrity/stability, balanced sediment transport, and channel bed material mobilization/distribution.
- Ensure seasonal discharge fluctuations that follow the natural hydrograph for duration, magnitude, rate of change, and frequency to meet resource objectives for aquatic species.
- Provide water to facilitate authorized uses.

Threatened, Endangered, and Sensitive Species and Management Indicator Species Objectives

- Ensure that proposed license conditions and recommended measures provide for well distributed, viable populations of special status species including threatened, endangered and BLM sensitive species, and are consistent with any applicable biological opinion issued under the federal or state Endangered Species Act. Ensure that proposed license conditions and recommended measures comply with the BLM plans and policy. Minimize the effects of stream diversion or other flow modifications from hydroelectric projects on threatened, endangered, or sensitive species.

- Ensure all management activities and BLM authorizations are consistent with the conservation needs for special status species.

- Manage special status species habitat to assist in the recovery of listed species.

- Maintain or improve habitat for special status species.

- Coordinate with the USFWS on implementation of recovery plans and conservation strategies for special status species

- Manage sensitive species to ensure that species do not become threatened or endangered.

- Maintain and restore habitat to support viable populations of TES species. Work cooperatively to reduce impacts to native populations where invasive species are adversely affecting the viability of native species.

- "Conserve and/or recover ESA-listed species and the ecosystems on which they depend" (BLM 2008b).

- Avoid impact to species designated as fully protected under FGC sections 3511(b) and 4700(b).

- Avoid or minimize impacts to species whose viability has been identified as a concern.

- If impacts cannot be avoided, analyze the significance of potential adverse effects on the population or its habitat within the area of concern and on the species as a whole.

Entrainment Objective

Minimize or avoid the entrainment effects of stream diversions or other flow modifications from hydroelectric projects on aquatic life including threatened, endangered, and sensitive species and fish. Mitigate for losses of fish and wildlife due to entrainment at tunnel intake structures and at the outlets of the reservoirs.

Macro-invertebrate Objectives

- Maintain high macro-invertebrate indices of biotic integrity (IBIs) (metrics) in project streams to demonstrate healthy stream function and provide adequate prey base. Benthic aquatic invertebrates comprise the foundation of the food web critical to all aquatic carnivores, including fish. The organisms are also indicative of the overall aquatic habitat condition in which they occur because different kinds of taxa predominate in differing habitat conditions. Project bypassed reaches and reservoirs will receive increasing public visitation pressure into the foreseeable future. Watershed development adjacent to Project facilities may also occur. The prescribed benthic invertebrate sampling will be the cornerstone to monitoring the status of the indicative populations that could be affected by Project-related disturbance sources. It is possible that, due to their primary role in the aquatic food web, changes to the basic composition of the aquatic invertebrate fauna over time may be evident through this sampling prior to the changes becoming evident by fish or hydrologic sampling.

- Ensure that proposed license conditions and recommendations provide for well-distributed, viable populations of aquatic mollusks.

- Ensure that the level of large woody debris in streams is within the range of natural variability in terms of frequency and distribution and is sufficient to sustain stream channel physical complexity and stability. If characteristics are outside the range of natural variability, implement mitigation measures and short-term restoration actions as needed to prevent further declines or cause an upward trend in condition. Ensure large woody debris passage beyond dams and diversions.

Natural Hydrograph Objectives

- Develop and implement streamflow regimes that simulate the shape of the natural hydrograph in duration, magnitude, timing, rate of change, and frequency to the extent necessary to restore or protect applicable ecological functions.

- Ensure that seasonally appropriate geomorphic flows occur at magnitudes and recurrence intervals necessary to maintain healthy stream processes and prevent riparian encroachment within channels that leads to channelization while allowing riparian establishment along stream banks.

- Minimize project-caused flow fluctuations uncharacteristic of the natural hydrograph to protect biota and maintain public safety.

- Manage spills from project reservoirs to simulate timing on natural hydrograph.

Channel Morphology, Sediment Transport, and Riparian Objectives

- Maintain or restore channel integrity.

- Maintain, improve, or restore fluvial processes to provide for balanced sediment transport, channel bed material mobilization and distribution, and channel structural stability that contribute to diverse aquatic habitat and healthy riparian habitat.

- Maintain sediment regime that addresses ecosystem values.

- Ensure delivery and transport of sediment are balanced so that stream channels are not excessively aggrading or degrading over time, and particle size distribution allows for diverse bed form within the stream channel.

- Keep sediment regimes as close as possible to those which aquatic and riparian biota evolved.

- Ensure stream channels have appropriate cross-section size (width to depth) and stable stream banks, and floodplains and flood-prone areas have connectivity to the stream channel.

- Maintain riparian vegetation in proper functioning condition.

- Maintain or restore riparian resources.

- Maintain or restore streamflow regime sufficient to sustain desired conditions of native riparian, aquatic, wetland, and meadow habitats.

- Address Riparian Conservation Objectives.

- Manage streamflows so they are sufficient to sustain desired conditions of riparian plant communities.

- Manage streambanks and shorelines to minimize erosion and sustain desired riparian habitats.

- Manage riparian plant communities to maintain and improve the species composition and structural diversity to provide desired habitats and ecological functions.

- Manage riparian plant communities to maintain and/or improve spatial and temporal connectivity for native riparian plant species within and between watersheds to provide physically, chemically and biologically unobstructed movement for their survival, migration and reproduction.

- Maintain and restore the distribution and health of biotic communities in special aquatic habitats (such as springs, seeps, vernal pools, fens, bogs, and marshes) to perpetuate their unique functions and biological diversity.

- Maintain and restore the connections of floodplains, channels, and water tables to distribute flood flows and sustain diverse habitats.

Water Quality Objective

Ensure compliance with the water quality objectives to fully protect the beneficial uses as designated in the Central Valley Regional Water Quality Control Board Basin Plan.

Water Temperature Objective

Ensure that flows are protective of the designated beneficial uses of warm and cold freshwater habitat as appropriate, and do not adversely affect water temperatures for resident and native aquatic- and riparian-dependent species assemblages.

Aquatic Invasive Species (AIS) Objectives

- Maintain ecosystem health including water quality through prevention of the introduction and establishment of aquatic invasive species such as quagga and zebra mussels, Eurasian water-milfoil, and Hydrilla.

- Develop and implement a Prevention Program for project reservoirs with boating and fishing activities (FGC §2302).

- Keep project reaches free of Didymosphenia geminata (diatomaceous algae).

Invasive Plant Objectives

- Control invasive species using early detection, rapid response and prevention measures.

- Prevent, eliminate, and/or control undesired non-native vegetation or other invasive species using an Integrated Pest Management approach that combines biological, cultural, physical and chemical tools to minimize economic, health and environmental risks.

- The Carlson-Foley Act of 1968 and the Plant Protection Act of 2000 authorize and direct the BLM to manage noxious weeds and to coordinate with other Federal and state agencies in activities to eradicate, suppress, control, prevent, or retard the spread of any noxious weeds on Federal lands.

- The Federal Noxious Weed Act of 1974 established and funded an undesirable plant management program, implemented cooperative agreements with state agencies, and established integrated management systems to control undesirable plant species.

- Executive Order 13112, Invasive Species, directs Federal agencies to prevent the introduction of invasive species and provide for their control, and to minimize the economic, ecological, and human health impacts that invasive species cause.

- Executive Order 13751, Safeguarding the Nation From the Impacts of Invasive Species, amends Executive Order 13112 and directs actions to continue coordinated Federal prevention and control efforts related to invasive species.

- The BLM has also produced national-level strategies for invasive species prevention and management. These include Partners Against Weeds (BLM 1996), which outlines the actions BLM will take to develop and implement a comprehensive integrated weed management program; and Pulling Together: National Strategy for Invasive Plant Management (BLM 1998), which illustrates the goals and objectives of a National Invasive Plant Management Plan (prevention, control and eradication).

- The Federal Interagency Committee for the Management of Noxious and Exotic Weeds is leading a national effort to develop and implement a National Early Detection and Rapid Response System for Invasive Plants in the United States (FICMNEW 2003). The primary long-term goals of the proposed system are to detect, report, and identify suspected new species of invasive plants in the United States.

Recreation Management Objectives

- Provide for quality day use and overnight recreation opportunities associated with the Project and ensure that other resources are not adversely impacted by this recreational use.

- Ensure adequate river flows for boating, fishing, swimming, and other water play.

Recreation Design Objective

- Ensure Project-related facilities meet current BLM design standards and standards for accessibility.

Public Safety Objectives

- Provide a safe recreational experience for the public.

- Provide public safety information at project reservoirs and primary river recreation access points.

- Provide an administrative presence during the public recreation and whitewater boating season. (Ward's Ferry Day Use Area is a critical whitewater boating takeout area and is currently unsafe for boaters to takeout. Safety and an adequate takeout area is a primary issue that needs to be addressed in this relicensing process.)

Project-Related Recreation Objectives

- Ensure Licensee provides for and is responsible for project-related recreation, including providing facilities, long-term maintenance, and periodic heavy maintenance.

- Post appropriate signs, including interpretive signs.

Streamflow and Reservoir Level Information Objective

- Provide streamflow and reservoir level information for Project-affected reaches and reservoirs that is available to the public and is adequate for river and reservoir recreation use.

Fish and Wildlife Objectives

- Maintain, improve, or enhance native fish and wildlife populations and the ecosystems upon which they depend.
- Maintain the ecological integrity of foothill ecosystems in the face of urban growth and residential development through protection or improvement of habitat connectivity.
- Provide opportunities for research and education.
- Restore disturbed or altered habitat for all life stages of native wildlife species, aquatic species, macroinvertebrates, special status species, and native fish species, including spawning fish passage habitat.
- Maintain or improve numbers of native fish, macroinvertebrates and other aquatic species.
- Provide for adequate large woody debris (size, frequency and distribution) within the natural range of variability to contribute to stream channel complexity and stability.
- Maintain or improve desired native plant communities while providing for wildlife/fisheries needs and soil stability.
- Reduce habitat fragmentation and maintain altitudinal migratory corridors (approximately 1,500-3,500').
- Prevent and control infestations of non-native species that negatively impact native and game species.

Visual Resource Objective

- Ensure that visual quality meets appropriate management area direction.

Cultural Resources Objectives

- Evaluate cultural resources that may be affected by the project (including project-related activities), and protect/conserve significant resources, or mitigate effects to those resources.

- Conduct, as part of Section 106 compliance, on-going consultation with the appropriate Native American tribe(s) as defined by the BLM.

- Ensure full compliance of Section 106 through a Programmatic Agreement.

Transportation and Facilities Management Objectives

- Ensure appropriate level of maintenance on Project-related roads and trails. Ensure roads and trails are operated and maintained to established BLM standards and are consistent with BLM Plans. Ensure that substandard Project Roads and Trails conditions are brought up to current standards.

- Ensure Project-related facilities are appropriately identified and maintained.

- Ensure Licensee is authorized for the use and is responsible for their road maintenance and repairs of general access.

- Ensure that all traffic and information signs in project facilities comply with current BLM standards for size, shape, message, color, symbology and maintenance and replacement.

Special-Use Authorization Objective

- Ensure that Project-related special-use authorizations are up to date and address current uses.

Vegetation Management and Fire Prevention Objectives

- Ensure appropriate vegetation management for Project-related activities.

- Minimize loss of resources from Project-related fires.

- Implement vegetative treatments to reduce hazardous fuels at recreation sites, along transmission lines, around structures, Project and Project related roads, etc.

Anadramous Fish Objective

- To sustain and manage viable populations of Chinook salmon (Central Valley spring and fall runs) and steelhead in the planning area by managing factors affecting the distribution, abundance, and quality of habitat of these species, and by minimizing other adverse impacts to the species.

Forest Raptors Including Bald Eagle (Halieaeetus leucocephalus), California Spotted Owl (Strix occidentalis occidentalis), and Northern Goshawk (Accipiter gentilis) Objective

- To sustain and manage forest ecosystems to such an extent as to support and maintain viable populations of the bald eagle, California spotted owl, and northern goshawk (forest raptors) on BLM lands in the planning area by managing factors affecting the distribution, abundance, and quality of habitat of these species, and by minimizing impacts to breeding during forest raptor nesting seasons.

Bat Objectives

- Because of the widespread decrease in bat numbers and increasing loss of habitat, the BLM management approach will be an effort to protect all species of bats and their habitats. Conservation of bat roosting and foraging habitats is important to consider when conserving bats on BLM land. Habitats include specific roost and foraging requirements, which vary by species, as well as by season and reproductive status.
- To sustain and manage viable populations of these bat species by managing factors affecting the distribution, abundance and quality of habitat for these species, and by minimizing adverse impacts to these species.

Frog Objective

To sustain and manage viable populations of the California red-legged frog and foothill yellow-legged frog on BLM lands within the Mother Lode Field Office area.

Consistency with Plans

Ensure that hydropower operations are consistent with the applicable resource agency plans (for example, BLM Sierra RMP, Basin Plan,) and their revisions over the life of the license.

BLM's objectives during FERC relicensing include maintenance or improvement of the following (relevant RMP sections (BLM 2008a) containing greater detail are in parentheses):

- Meadow and wetland habitat (2.4); riparian and aquatic habitat for all life stages of native fish, macroinvertebrates, other aquatic species, and special status species (2.5).
- Stream channel conditions (integrity, morphology, bedloads, sediment, flow etc.) and the natural hydrograph (2.3).
- Water quality to protect downstream designated beneficial uses (2.3) and aquatic species habitat (2.5).
- Noxious weed control (2.4).
- Large woody debris (frequency, size, and distribution adequate for channel complexity/stability) (2.5).

PROJECT EFFECTS

The Project and DPLG remove the natural hydrographic-flow conditions in the lower Tuolumne River, which results in a loss of juvenile salmonid rearing habitat by limiting or preventing access to an active, vegetated floodplain that provides food as well as refugia from predators. The salmonids currently adversely affected by this loss of juvenile rearing habitat are fall-run Chinook salmon (*Oncorhynchus tshawytscha*) and steelhead trout (*Oncorhynchus mykiss*). Reservoir fluctuations, recreation, and O&M have potential adverse effects on ESA-listed terrestrial species such as the San Joaquin kit fox (*Vulpes macrotis mutica*), California red-legged frog (*Rana aurora draytonii*), California tiger salamander (*Ambystoma californiense*), Valley elderberry longhorn beetle (*Desmocerus californicus dimorphus*), Layne's butterweed (*Senecio [Packera] layneae*), and Red Hills vervain (*Verbena californica*). The Project and DPLG Complex has potential impacts on sensitive species such as bald eagles (*Haliaeetus leucocephalus*), several bat species, and western pond turtles (*Clemmys [Actinemys] marmorata marmorata*).

Loss of Floodplain and Riparian Habitat

Access to an active, vegetated floodplain and riparian area results in positive, population-level effects to steelhead trout (Hayes *et al*. 2008), and the benefit of off-channel and floodplain access to Chinook salmon survivorship has been well established (Jeffres *et al*. 2008, Limm and Marchetti 2009, Sommer *et al*. 2005). Chinook salmon and steelhead trout that rear in off-channel areas have greater growth rates than those that rear in the river channel (Limm and Marchetti 2009), and juvenile Chinook salmon with greater size and growth rates have higher survivorship in low recruitment years (Magnusson and Hilborn 2003, Woodson *et al*. 2013).

The lower Tuolumne River has a mature riparian overstory; however, the Project does not have a flow recession that would allow the riparian forest to regenerate. Riparian forests are an important source of prey biomass for salmonids, because terrestrial invertebrates from riparian forests fall into or interface with the river where they can be preyed upon by salmonids. This in-fall of insect biomass is considered a "terrestrial subsidy" to salmonid bioenergetics; therefore, without regeneration of the riparian overstory and floodplain habitat, there will be decreased food availability for foraging salmonids and populations are likely to continue to decline.

Low prey availability and cover, coupled with adequate winter and spring flows missing from the hydrograph, are a plausible explanation for low fall-run Chinook return rates in the lower Tuolumne River. Mesick *et al.* (2008) found that the number of adult Tuolumne River fall-run Chinook salmon produced as a given spring flow had declined significantly, by approximately 50% after implementation of the 1996 FERC Settlement Agreement (FSA) and revised license conditions.

The USFWS is concerned that the essential life-history stage of juvenile rearing has not been adequately addressed either through the ILP process or through the lower Tuolumne River flows proposed in the AFLA. There is an absence of explanation about how flows affect juvenile salmonid rearing habitat and how the limited access of juvenile fish to the floodplain may affect juvenile salmonid survival in the lower Tuolumne River. This information is necessary to inform a decision on return rates for salmon. In the absence of such data, the Districts' conclusion that low return rates are a result of out-of-basin mortality influences is not supported by evidence in the record, and cannot support a similar finding by the Commission. In addition, the size-recruitment relationship described by Magnusson and Hilborn (2003) and Woodson *et al*. (2013) has not been addressed.

Mesick *et al.* (2008) conducted a limiting factor analysis for the Tuolumne River and found that releases at La Grange from March 1 to June 15 are highly correlated (adj-R2 = 0.82, P = 0.0005) with the number of Tuolumne River smolt outmigrants passing the rotary screw traps at RM 5.3 and significantly affect fall-run Chinook salmon abundance in the Tuolumne River (adj-R2 = 0.96, P = 0.0004). In addition, Mesick (2009) concluded that, during managed flow releases, the rearing habitat in the Tuolumne River can support the progeny of no more than about 434 adult fall-run Chinook salmon.

The prolonged lack of floodplain inundation, year after year, may have reduced the Tuolumne River fall-run Chinook population to a level where the population is at risk. If the floodplain fails to activate for two or more consecutive years, the pressure on the population means that less adult fish are left to repopulate the river. When this happens, less marine-derived nutrients are available to the ecosystem and less riparian and prey biomass can be generated. This decreased food availability then puts increased negative pressure on the population.

The required return-to-spawn rate needed for the Tuolumne River fall-run Chinook salmon or steelhead populations to be either self-sustaining or reach the CVPIA/AFRP doubling goal for fall-run Chinook salmon within the next 15 years has not been investigated. Survival and production of key life stages may vary among streams and populations for a variety of reasons, but identifying the limiting life stage is essential for population (and species) recovery (Petrosky *et al.* 2001). The entire suite of methods for life cycle monitoring currently used in some coastal California streams (Adams *et al*. 2011) may be difficult to implement on larger rivers such as the Tuolumne River, but the concepts of assessing life-stage-specific effects on populations certainly are applicable. Rates such as parr-to-smolt and smolt-to-adult survival have been estimated (*e.g.*, Petrosky *et al.* 2001; Achord *et al.* 2007; Chesney *et al.* 2009; USFWS 2010).

The amount of optimal juvenile salmonid rearing habitat available on the lower Tuolumne River is much less than what is needed. Based on empirical data and peer-reviewed scientific literature, the Emigrating Salmonid Habitat Estimation (ESHE) model calculates the amount of rearing habitat needed for a target number of juvenile salmonids. This robust model has been widely used in the Central Valley including in: the San Joaquin "Minimum Floodplain Habitat

Area for Spring and Fall-Run Chinook Salmon" (SJRRP 2012) report, the Central Valley Flood Protection Plan Conservation Strategy (CDWR 2017), and efforts by the State of California to develop goals and objectives for San Joaquin tributaries. The ESHE model found that the amount of rearing habitat needed to support CVPIA salmon doubling goals in the lower Tuolumne River is 2,700 acres—assuming 30% habitat suitability (Cramer Fish Sciences, Unpublished Data).

The historical loss of ecological function from diminished riparian overstory due to placer mining, the deep, lake-like pools left over from historical and contemporary mining, channel incision, and changes in natural flow regimes resulting from dam construction and operations, sediment and LWM held upstream by both La Grange and Don Pedro Dams have all resulted in a river that lacks an abundance of large riparian trees and the small woody material that make up the dry plant matter biomass that is found on the edge of healthy rivers. In other rivers, it has been shown that the restoration of a flow regime that supports riparian regeneration has led to the return of large riparian trees and diverse riparian cover (Hughes and Rood 2003, Mahoney and Rood 1993, Rood *et al*. 2003, Rood *et al*. 2005).

From 1996 through 2012, the USFWS and federal partners have spent approximately $8 million on restoration actions in the lower Tuolumne River.

Natural Hydrograph Diminishment

Components of the natural hydrograph that are diminished or altered by the Project are: (1) winter freshets; (2) winter high flows; (3) floodplain inundation amount, duration, and timing; (4) continuity of flows during spring snowmelt period; and (5) snowmelt moderated flow recession.

The Project does not provide for winter freshets. Winter freshets provide migration cues for *O. mykiss* to migrate upstream to spawn and are a migration cue that is not provided for the *O. mykiss* in the lower Tuolumne River. If spring-run Chinook salmon were present in the Tuolumne River, winter freshets would cue outmigration.

The USFWS measures the impact of the Project on winter and spring high flows and floodplain inundation, duration, and timing using an acre-day analysis. The amount of time that the riparian floodplain is inundated and the duration of the inundation are two important metrics for determining habitat availably for juvenile salmonids, because both of these conditions contribute to food and cover availability. The longer the floodplain is inundated the more time juvenile salmonids are able to forage on it and the more the invertebrate food-web becomes activated. The more acres of habitat that are inundated, the more area is available to juvenile salmonids for foraging. Because both area and time are important considerations in estimating juvenile salmonid rearing habitat during the springtime high-flow period, the USFWS uses the metric of acres * days, or "acre-days."

Acre-days has been used as a metric in fisheries management (Beam 1983), forage availability for livestock (Campbell 1963), shellfish harvest opportunities (Trowbridge 2006, Trowbridge 2009), foraging rates in fish culture (Schrader *et al*. 2011), aquatic harvest yield (Hauser 1984) and terrestrial harvest yield (Wilks and Murphy 1985). Acre-days is a metric that takes into consideration both area and time, so it can be used to measure the decrease in floodplain area and decrease in inundation duration caused by hydropower projects.

In two studies of the effect of floodplain inundation on juvenile salmonid survival, the USFWS found a correlation between the number of acre-days of inundated floodplain and juvenile salmonid survival. The analysis for the Tuolumne River was provided to the Commission in USFWS comments on October 1, 2015 (FERC Accession Number 20151002-5019) and the analysis for the Stanislaus River is attached herein (Attachment 1, USFWS 2014). With the understanding that a high number of acre-days of inundation is likely to result in high juvenile salmonid survival, and that management of releases from hydropower projects can reduce the inundation area and frequency of inundation of the riparian edge, the USFWS chose this metric to analyze the effect of the Project on juvenile salmonid habitat in the lower Tuolumne River.

Moderation of the snowmelt recession is discussed above under *Loss of Floodplain Habitat and Riparian Regeneration.*

Loss or Diminishment of Ecological Function

Loss of Large Woody Material—Floating LWM and woody debris washes downstream into Don Pedro Reservoir each year. The amount of material ranges from 0 cubic feet (in 2012) to 952,000 cubic feet (in 2006) (W&AR-12). A greater amount of LWM and woody debris may have entered Don Pedro Reservoir in 2017, following four years of drought and heavy rains in February 2017. When deemed necessary by the Districts, the wood is stockpiled, dried, and burned by the Districts. This removal of organic matter contributes to the poor condition of salmonid habitat directly downstream of La Grange Dam.

In California, high rainfall years that follow periods of low rainfall or drought lead to mobilization of dead trees and branches that have fallen into rivers and been carried downstream. Winter storms lead to high volumes of large woody material and woody debris covering the surface of large and small reservoirs (wood-flow events). Wood-flow events result in the need to remove the wood expeditiously in order to maintain reservoir operations and provide for safe recreation. A wood-flow event at Don Pedro Reservoir resulted in approximately 952,000 cubic feet of LWM and woody debris flowing into the reservoir in 2006. The wood volume of the wood-flow event 2017 has not been calculated, but the amount is likely to be similar in volume to the 2006 wood-flow event.

In the past, floating woody material at Don Pedro Reservoir has been stockpiled on the reservoir edge adjacent to and downstream of Wards Ferry Bridge. After drying, the wood has been burned. This methodology has presented both a safety issue for recreational boaters, a take issue for California red-legged frogs, and a wildfire risk.

Large logs are an important ecological component in rivers, because they: (1) increase the quantity and diversity of benthic macroinvertebrates, thereby increasing food availability for salmonids; (2) retain and sort instream sediments, such as spawning gravel for fish and sands for riparian regeneration; (3) allow for the formation of deep pools that provide both cover and thermal refugia for salmonids; (4) provide velocity shelter for fish and frogs. The lower Tuolumne has very little LWM that provides this function. In a 6th order stream, such as downstream of La Grange Dam, we would expect an average of 2.9 stable pieces per 100 meters as determined by Ruediger and Ward (1996).

Benthic Macroinvertebrates and Terrestrial Subsidies – Aquatic benthic macroinvertebrate (BMI) assemblages are communities of aquatic macroinvertebrates that are an integral part of a stream's ecosystem and are important food sources for resident stream fish. The quality of the BMI community and its structure reflects the degree of impairment that exists within a stream's ecosystem. Terrestrial subsidies from the riparian overstory are an important component of salmonid food supply, especially in summer (Mason and MacDonald 1982, Nakano and Murakami 2001, Nakano *et al*. 1999, Wipfli 1997). Like benthic macroinvertebrates, terrestrially-derived invertebrates are partially or fully dependent upon the plant biomass provided by riparian trees. The riparian tree energy and biomass contributes to the food chain, and terrestrially-derived invertebrate inputs contribute to 50 to 80 % of salmonid biomass (Allan *et al*. 2003, Kawaguchi *et al*. 2003). In rivers with riparian overstory with high canopy closure (*i.e.,* 95 to 97 %), bioavailability of terrestrially-derived invertebrates is greatest in the summer, when benthic macroinvertebrate bioavailability has tapered off (Nakano and Murakami 2001). Because of this difference in seasonal bioavailability, terrestrially-derived invertebrates are the primary food source for rearing and over-summering salmonids.

Terrestrial subsidies are an important component of salmonid food supply, especially in summer (Mason and MacDonald 1982, Nakano and Murakami 2001, Nakano *et al*. 1999, Wipfli 1997). Like benthic macroinvertebrates, terrestrial-derived invertebrates (TI) are partially or fully dependent upon the plant biomass provided by riparian trees. The riparian tree energy and biomass contributes to the food chain, and TI inputs contribute to 50 to 80 % of salmonid biomass (Allan *et al*. 2003, Kawaguchi *et al*. 2003). In rivers with riparian overstory with high canopy closure (*i.e.,* 95 to 97 %), bioavailability of TI is greatest in the summer, when benthic macroinvertebrate bioavailability has tapered off (Nakano and Murakami 2001). Because of this difference in seasonal bioavailability, TI is the primary food source for rearing and over-summering salmonids.

Lack of riparian floodplain and riparian overstory are common side effects of regulated rivers, due to lack of conditions that lead to riparian regeneration and to a diminished or constrained area for tree establishment. The lower Tuolumne River is notably lacking in both riparian floodplain and riparian overstory. The relationship between flow and establishment of cottonwoods (*Populus spp*.) has been well-established (*e.g.*, Braatne *et al*. 2007, Busch and Smith 1995, Carlisle *et al*. 2010, Fenner *et al*. 1985, Mahoney and Rood 1998, Naiman and Décamps 1997, Opperman *et al*. 2010, Poff *et al*. 2007, Rood *et al*. 2003). A river's flow regime affects the ability of that river to recruit large overstory trees and to support diverse riparian structure and composition (Bovee and Scott 2002; Lytle and Poff 2004; Poff *et al*. 2007; Poff and Zimmerman 2010; Richter and Richter 2000). Once riparian-regeneration flows have been incorporated into the license, it may take greater than the life of the license to see the ecological function of a riparian forest realized on the lower Tuolumne River; however, riparian plantings and restoration would be expected to significantly accelerate the return of this ecological function to the lower Tuolumne River.

Without a healthy and diverse riparian overstory that contributes LWM, complex edge structure, and terrestrial subsidies to the river, and without access to the riparian floodplain to forage and seek cover from predators, juvenile salmonids are likely to compete for limited resources, starve, outmigrate prior to smoltification, and be exposed to heavy predation.

Marine-Derived Nutrients—When salmon returns are low, ecological processes in a river are diminished. The food web of nutrient exchange becomes suppressed, with less nutrients

becoming available for riparian food webs and a feedback loop of less terrestrial invertebrates being produced and becoming bio-available to foraging fish. Marine-derived nutrients (Bilby *et al.* 1996; Bilby *et al.* 1998; Moore *et al.* 2007) and the macronutrient pulse from adult salmon carcasses are one of the primary drivers of aquatic invertebrate abundance. Within the Tuolumne River watershed, the nutrient contribution to the system from returning adult Chinook salmon is less than 10 % of what can be supported and may be less than 2 %. Reduced levels of salmon carcasses in the lower Tuolumne River reduces the nutrient and micro-nutrient boost that would have occurred if robust and stable salmonid populations occurred in the river. A deficiency in marine-derived nutrients reduces the ability of the ecosystem to support large numbers of stream invertebrates and reduces the quantity available food resources for juvenile salmonids rearing (Bilby *et al.* 1996, Bilby *et al.* 1998, Moore *et al.* 2007, Wipfli and Baxter 2010, Zhang 2003).

The upstream migrations of adult salmonids bring large amounts of essential nutrients from the ocean into stream and river systems, where they drive primary and secondary productivity (Bilby *et al*., 1996, Bilby *et al*.1998, Merz and Moyle 2006; Anders and Ashley 2007; Janetski *et al.* 2009). These nutrients, which include nitrogen, carbon, and phosphorous, are accumulated in salmon as they gain approximately 95% of their body mass in the ocean (Groot and Margolis, 1991). The nutrients brought into stream and riparian ecosystems are resource subsidies that strongly influence the structure and function of freshwater ecosystems and beyond (Merz and Moyle, 2006; Janetski *et al.*, 2009).

When salmon return to their natal stream or river to spawn and die, the nutrients in their excretion, carcasses, and gametes are released into the river and riparian systems. The amount of nutrients that are moved into otherwise nutrient-limited systems can be immense. The average Chinook salmon weighs approximately 22 lbs (NMFS 2014a) and has 5.62% nitrogen content per fish Merz and Moyle (2006). So, in a system with 1 million returning Chinook, 1,236,400 lbs of nitrogen (1,000,000 fish * 22 lbs *0.0562 nitrogen) would be brought along with them.

Salmon flesh and gametes are also important food sources for juvenile fish and invertebrates. Juvenile salmon and trout and invertebrates will preferentially ingest highly nutritious eggs or flesh from carcasses. For example, Bilby *et al.* (1998) found that when available, eggs and carcass flesh from spawning salmonids were 60-96% of the stomach contents of juvenile coho and steelhead. Eastman (1996) and others have also found that when marine derived food sources are available, they are often the primary food source of stream-dwelling salmonids and can increase their growth and condition factor (Bilby *et al.* 1998, Janetski *et al.* 2009, Scheuerell 2005).

The benefits brought by marine derived nutrients in the bodies of anadromous salmonids extend far beyond freshwater habitat and into the surrounding area. For example, Helfield and Naiman (2001) used isotope analyses to test for signatures of marine derived nutrients in riparian vegetation and found that foliage of trees and shrubs near spawning streams consisted of 22-24% marine derived nitrogen. Bilby *et al.* (1996) used similar methods and found that 18% of the nitrogen in the foliage of plants along sampled Washington streams was marine-derived from coho salmon. Nitrogen availability is the limiting factor for terrestrial plant growth in many forests (Chabot and Mooney 1985, Kimmins 1997), and marine derived nitrogen is known to increase the growth rates of plants near spawning areas (Helfield and Naiman, 2001; Naiman *et al.*, 2002). Healthy riparian vegetarian increases the quality of instream habitat through shading, sediment and nutrient filtration, nutrient transfers in the form of foliage, and production of

LWM. Thus, salmon-borne marine derived nutrient inputs that enhance riparian production also drive a positive feedback loop in which nutrients improve spawning and rearing conditions for subsequent generations of salmonids. This positive feedback mechanism historically helped maintain the long-term productivity of river corridors along the Pacific coast of North America, including the Lower Tuolumne River.

The effects of reduced nutrient availability and biological production on naturally reproducing anadromous Pacific salmon populations are well known and extensively described in scientific literature (*e.g.* Schindler *et al.* 2003, Wipfli *et al.* 2003, Janetski *et al.* 2009). Such low returns create deficits in marine-derived nutrients, limiting primary and secondary productivity, food availability for juveniles, riparian vegetation growth and regeneration and LWM. The Lower Tuolumne River could support at least 38,000 fall-run Chinook salmon (USFWS 2005a). Multiplying this number by the average weight and nitrogen content of Chinook, we can estimate that 46,983 lbs of nitrogen would be brought into the Lower Tuolumne system with restored salmonid populations. An input of 46,983 lbs of nitrogen would stimulate riparian regeneration, primary and secondary productivity, and the survival and growth of juvenile salmonids.

Don Pedro Dam affects the transport of nutrients, fine and course sediments, and woody material from upstream sources to the lower river, and continues to limit habitat complexity and diversity in the lower Tuolumne River. Lack of fish passage at La Grange Dam Dam, prevents marine-derived nutrients from entering the upper Tuolumne River watershed. Lack of salmon carcasses in the upper Tuolumne River watershed eliminates the nutrient and micro-nutrient boost that would have occurred if adult salmon were able to enter the watershed to spawn. A deficiency in marine-derived nutrients reduces the ability of the ecosystem to support large numbers of stream invertebrates and reduces the quantity of available food resources for juvenile salmonids rearing (Bilby *et al.* 1996, Bilby *et al.* 1998, Moore *et al.* 2007, Wipfli and Baxter 2010, Zhang 2003).

Federally Listed Species

Species listed under the Endangered Species Act are affected by the Project. The federally-listed fish species affected by the Project are under the jurisdiction of NMFS, and the rest of the federally-listed species affected by the Project are under the jurisdiction of the USFWS. In instances where the Project is within the range of the species, suitable habitat is present, and protocol-level surveys were not conducted, the USFWS must give the benefit of the doubt to the species and assume that the species is present for purposes of section 7 consultation.

The AFLA inappropriately limits the scope of the Action Area to only the hydropower infrastructure of the Project. The ESA regulations (50 C.F.R. § 402.02) define Action Area as "all areas to be affected directly or indirectly by the Federal action and not merely the immediate area involved in the action." Accordingly, the Action Area includes indirect effects of the license, including operation and maintenance, water delivery, recreation, and flood control. For the purpose of determining Project effects on listed species, the USFWS will use the "Action Area" as defined by 50 C.F.R. § 402.02.

Under the ESA, direct effects are defined as "the direct or immediate effects of the project on the species or its habitat". 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 area is defined as the point where effects to river flow and habitat availability associated with the Proposed Action are no longer measurable.

Federally Listed Plant Species

Layne's butterweed [ragwort] – The AFLA does not contain adequate protection measures for the Layne's butterweed (*Senecio [Packera] layneae*). The Layne's butterweed was listed as threatened on October 10, 1996 (61 **FR** 54346). Layne's butterweed is a perennial species that sprouts from rootstock. The species occurs on gabbroic or serpentine-derived soils in the central Sierran foothills of California within chaparral or oak woodland communities. Urbanization and the ensuing habitat fragmentation, road construction and maintenance, herbicide spraying, change in fire frequency, off-road vehicle use, unauthorized dumping, horse overgrazing, competition from invasive alien vegetation, and mining imperil the species.

Some small populations of Layne's butterweed occur below the normal maximum water level of Don Pedro Reservoir. As a basal sprouting plant, Layne's butterweed can be killed or destroyed if inundated for too great a period of time. The species also occurs near three recreational facilities, and recreation is a recognized threat to the species. It is unknown whether roadside spraying of herbicides is the reason that the species is not found along Project roads, but this potential threat from O&M activities should not be discounted.

Red Hills [California] vervain – The Terrestrial Resource Management Plan submitted in the AFLA does not contain adequate protection measures for the Red Hills [California] vervain. The Red Hills vervain was listed as threatened on September 14, 1998 (63 **FR** 49022). Observed potential stressors around the Red Hills vervain include cattle grazing and recreation near the population in Poor Man's Gulch. In addition, barbed goatgrass (an invasive species from Eastern and Mediterranean Europe) was observed near both occurrences.

Federally Listed Fish Species

Central Valley-run steelhead trout DPS (*Oncorhynchus mykiss irideus*) – The Central Valley-run steelhead trout DPS was listed as threatened on June 28, 2005 (70 **FR** 37160). On September 2, 2005, critical habitat was designated for steelhead trout in the Tuolumne River downstream of La Grange Dam (70 **FR** 52488). The lower Tuolumne River has been designated in NMFS' (2014d) Recovery Plan as a Core 2 population area for the steelhead trout. Core populations have a known ability or potential to support viable self-sustaining populations and have a moderate capacity to respond favorably to recovery actions (NMFS 2014b; Lindley *et. al*. 2007).

Central Valley-run steelhead trout occur in the Tuolumne River, but are blocked from upstream migration at the Districts' La Grange Dam and Don Pedro Dam. No data exist on downstream migration (outmigration) of *O. mykiss* from Don Pedro Reservoir during spill events. No data exist on the return rates born *O. mykiss* from either Don Pedro or La Grange reservoirs Reservoir. The upper Tuolumne River was historical habitat for this *O. mykiss*. Resident *O. mykiss* are abundant in the upper Tuolumne River indicating that suitable habitat exists for the steelhead trout.

Steelhead trout in the Central Valley do not have access to 80% of their habitat, due to the migration barriers caused by dams. Dams force steelhead trout to attempt to complete the freshwater part of their life history in rivers with minimal spawning habitat, sub-lethal and lethal temperatures, high levels of predation from non-native fishes, and lack of juvenile foraging habitat.

At higher water temperatures, such as those found in the lower Tuolumne River in most summers, steelhead trout are more vulnerable to stress and death (Moyle 2002). Thermal stress increases the need to forage in fast-moving water, which causes energetic stress. Warmer temperatures also result in lower oxygen availability, increased risk of disease, loss of egg viability, and higher exposure to predation by warm water fishes.

Spring-run Chinook salmon ESU – The Central Valley spring-run Chinook salmon (*Oncorhynchus tshawytscha*) Ecologically Significant Unit (ESU) was listed as threatened on June 28, 2005 (70 **FR** 37160). This ESU comprises spring-run Chinook salmon occurring in the Sacramento River basin. The Feather River Hatchery (FRFH) spring-run Chinook salmon population was included as part of the Central Valley spring-run Chinook salmon ESU in the 2005 modification of the Central Valley spring-run Chinook salmon listing status (70 **FR** 37160, June 28, 2005). Critical habitat was designated for Central Valley spring-run Chinook salmon on September 2, 2005 (70 **FR** 52488). Activation of the spillway at Don Pedro Reservoir, such as in 1997 and 2017, may trigger anadromy in the resident spring-run Chinook salmon, resulting in episodic, adult spring-run Chinook salmon returns to the lower Tuolumne River.

Spring-run Chinook salmon from FRFH have historically been stocked in Don Pedro Reservoir and have become established as an adfluvial, or "land-locked" population. They may compete with Kokanee salmon (*O. nerka*), which are adfluvial sockeye salmon. The bio-energetic and competitive interactions of these two species in Don Pedro Reservoir have not been studied and these populations (descendants of hatchery fish stocked by the Districts) have not been monitored.

No critical habitat for spring-run Chinook salmon occurs within the Action Area. The USFWS is reintroducing spring-run Chinook salmon into the San Joaquin River as part of the San Joaquin River Restoration Program (SJRRP). Project flows may affect the designated experimental population of SJRRP spring-run Chinook salmon, but no studies have been done to differentiate the returns of these stocked spring-run Chinook from potential Chinook salmon outmigrants from Don Pedro Reservoir during spill events or from spring-run Chinook strays from other rivers.

Federally Listed Wildlife Species

California red-legged frog – The AFLA does not contain adequate protection measures for California red-legged frogs. The California red-legged frog was listed as threatened on May 23, 1996 (61 **FR** 25813). The proposed consultation with the USFWS, pursuant to the Study Plan for the Project, did not occur; therefore, the USFWS was not provided the opportunity to identify sensitive locations where California red-legged frogs may occur within the Action Area or FERC Boundary. The USFWS requests formal ESA consultation on effects to the California red-legged frog, pursuant to 50 CFR 402.14(a). The USFWS filed comments with the Commission regarding Project effects on the California red-legged frog in our March 11, 2013, comment letter on the Initial Study Report. At that time, the USFWS expressed concern regarding the effects of Project on the California red-legged frog from wood stockpiling, Project-enhanced bullfrog (*Rana* [=*Lithobates*] *catesbeiana*) establishment and dispersal, and the potential for recreational activities to disperse the frog-killing *Batrachochytrium dendrobatidis* fungus. Site assessments under the Study Plan demonstrated that there is potentially suitable habitat for the

California red-legged frog within the FERC Boundary and within the dispersal distance of the species.

The USFWS recommended in several relicensing meetings that the Districts survey for California red-legged in areas of potential habitat. None of those locations have been surveyed; therefore, as the areas contain potentially suitable habitat for the California red-legged frog, the USFWS will assume they are occupied for the purpose of section 7 consultation under the ESA. In our March 11, 2013, filing we enclosed Finkle (2012) and Fuller *et al*. (2010) for further consideration by the Commission of Project effects on California red-legged frogs from operations that support bullfrog habitat and dispersal.

The FERC Boundary is approximately 1.5 mile downstream of the Tuolumne River Core Area (Core Area 6) of the *Recovery Plan for the California Red-Legged Frog (Rana aurora draytonii*) (USFWS 2002) (CRLF Recovery Plan). The Project is within the Sierra Nevada Foothills and Central Valley Recovery Unit of the CRLF Recovery Plan. Conservation needs for the California red-legged frog in the Core Area # 6 are to control bullfrogs and predatory fishes.

Regarding the relevance of the recovery plan in ESA consultation and FERC licensing, please refer to ESA sections 2(b), 2(c), 3("conserve"), 4(f)(2), 7(a)(1), and 7(a)(2). The Commission has an obligation to utilize its authorities for the conservation of listed species, and to ensure than any action it authorizes is not likely to jeopardize the continued existence of the California red-legged frog.

An ongoing concern is the potential future stockpiling and burning, by the Districts, of LWM and woody debris in Don Pedro Reservoir. Stockpiling of LWM in Don Pedro Reservoir occurs almost annually, but the major wood treatment actions are dependent upon wood-flow events and woody debris accumulation. Wood stockpiled at the waters' edge is likely to result in the establishment of one or more large bullfrog populations and is likely to attract any California red-legged frogs that may disperse into the FERC Boundary of the Project. The closer the wood stockpiling and burning is to the Tuolumne River Core Area, the greater the likelihood of adverse effects to the California red-legged frog.

Bullfrogs are well-known invasive, non-native predators that eat and compete with native frogs, such as the California red-legged frog. At the time of ESA-listing of the California red-legged frog, non-native bullfrogs were "considered to be a significant and widespread threat" (USFWS 1996). Introduced bullfrogs have been, and continue to be, a significant factor in the decline of the California red-legged frog (USFWS 1996, USFWS 2002). In spite of the population pressures that bullfrogs place on them, California red-legged frogs are typically able to persist: (1) In sub-optimal habitat where conditions are unfavorable to bullfrogs; (2) in marginal habitat adjacent to bullfrog-occupied areas; (3) where habitat is managed to reduce establishment of bullfrogs; or (4) where bullfrog depredation has been implemented. In areas where bullfrogs and California red-legged frogs co-occur, surveys typically detect high numbers of bullfrogs and low or undetectable numbers of California red-legged frogs. In these same areas, bullfrog removal and/or management have led to resurgence in the California red-legged frog population.

In addition to USFWS concerns regarding wood stockpiling and burning, Project operations could create conditions that have adverse effects on California red-legged frogs. For example, warm water conditions downstream of project facilities can optimize bullfrog breeding habitat and result in pressure on California red-legged frog populations. The USFWS is concerned that

the Project provides conditions that favor bullfrog establishment, either extirpating local California red-legged frog populations or putting constant pressure on California red-legged frog populations and keeping their numbers low.

California red-legged frogs that disperse to the wood stockpiling areas may be eaten by bullfrogs or burned when wood burning is conducted by the Districts or their contractors. When California red-legged frogs co-occur with managed wood piles, they can be crushed or burned from management activities. Formal ESA consultation with the USFWS has not been conducted. The habitat conditions that are preferred by the California red-legged frog are at multiple locations within the FERC boundary and the area affected by the Project. When potential California red-legged frog habitat is not surveyed, the USFWS must give the benefit of the doubt to the species and will proceed as if the habitat is occupied for the purpose of section 7 consultation under the ESA.

There is a workable solution to avoiding boating hazards and adverse effects to the California red-legged frog from LWM stockpiling and burning. The wood can be removed from the reservoir and stockpiled off-site in an area that does not have sensitive species habitat. The wood can then be available to use for ecological restoration, milling, or co-generation.

Central California DPS of California tiger salamander – The AFLA does not contain adequate protection measures for the California tiger salamander. Central Valley DPS of the California tiger salamander was listed as threatened on August 4, 2004 (69 **FR** 47212). The proposed consultation with the USFWS, pursuant to the Study Plan for the Project, did not occur; therefore, the USFWS was not provided the opportunity to identify sensitive locations where California tiger salamanders were likely to occur within the Action Area or FERC Boundary. No consultation under Section 7 of the ESA has occurred; therefore, the USFWS requests formal ESA consultation on Project effects to the California tiger salamander, pursuant to 50 CFR 402.14(a). The USFWS filed comments with the Commission regarding Project effects on the California tiger salamander in our March 11, 2013, comment letter on the Initial Study Report. At that time, the USFWS expressed concern that consultation with the USFWS had not occurred. Site assessments under the Study Plan demonstrated that there is potentially suitable habitat for the California tiger salamander within the FERC Boundary and within the dispersal distance of the species.

There are 247 aquatic sites that provide potentially suitable breeding habitat for central California tiger salamander within the Action Area, and there are 40 potential breeding ponds within the FERC Boundary. In addition, there is potentially suitable upland habitat surrounding many of these aquatic habitats. The Action Area has not been surveyed for the California tiger salamander. ESA consultation has not been concluded for Project effects to this species. In instances where the Project is within the range of the species, suitable habitat is present, and protocol-level surveys were not conducted, the USFWS must give the benefit of the doubt to the species and assume that the species is present for purposes of section 7 consultation.

San Joaquin kit fox – The AFLA does not contain adequate protection measures for the San Joaquin kit fox. The San Joaquin kit fox was listed as endangered on March 11, 1967 (32 **FR** 04001). The San Joaquin kit fox inhabits grasslands and agricultural lands in the San Joaquin Valley. No surveys have been conducted to determine the size or extent of the local population of San Joaquin kit foxes; however predation pressure and ground-squirrel eradication programs make it likely that the population is suppressed. ESA consultation has not been concluded for

Project effects to this species. Don Pedro and La Grange are likely dispersal barriers for San Joaquin kit foxes in the eastern San Joaquin Valley, but kit foxes should be able to cross the Tuolumne River at the La Grange Road, Old La Grange Road, Yosemite Boulevard bridges as well as Bonds Flat Road across Don Pedro Dam. It is unknown whether the Districts grant permission for use of rodenticides or burrow fumigants by third parties in grassland habitats within the FERC Boundary or on the District lands in the Action Area.

To date, conservation efforts for kit foxes have not been successful at reversing the declining trend in kit fox status, and the conservation needs of kit foxes have not been met. By the mid-1990's, it became clear that the goals outlined in the 1983 recovery plan were either inadequate, or the tasks were not being sufficiently implemented to halt the decline of the kit fox and reverse this trend toward extinction. The *Recovery Plan for Upland Species of the San Joaquin Valley, California* (USFWS 1998) identified conservation of core, satellite, and connectivity areas to reverse the trend. Although subjected to rodenticides and habitat loss, San Joaquin kit foxes continue to attempt to use habitat within the historical range of the species. Long term monitoring of key populations (Cypher *et al.* 2000), and incidental monitoring of the remaining populations, indicate that successful reproduction in the northern one-third of the range has curtailed since 1992. Impaired reproduction in the northern one-third of the range coincides with the use of second-generation anticoagulants adjacent to formerly occupied habitat.

Adult San Joaquin kit foxes are usually solitary during late summer and fall. In September and October, adult females begin to excavate and enlarge natal dens (Morrell 1972), and adult males join the females in October or November (Morrell 1972). Typically, pups are born between February and late March following a gestation period of 49 to 55 days (Egoscue 1962; Morrell 1972; Spiegel and Tom 1996; USFWS 1998). Pups appear above ground at about age 3-4 weeks, and are weaned at age 6-8 weeks. Reproductive rates, the proportion of females bearing young, of adult San Joaquin kit foxes vary annually with environmental conditions, particularly food availability. Although some yearling female kit foxes will produce young, most do not reproduce until age 2 years (Spencer *et al*. 1992; Spiegel and Tom 1996; Cypher *et al*. 2000). Some young of both sexes, but particularly females, may delay dispersal, and may assist their parents in raising the following year's litter of pups (Spiegel and Tom 1996). The young kit foxes begin to forage for themselves at about four to five months of age (Koopman *et al*. 2000; Morell 1972).

Although most young kit foxes disperse less than 5 miles (Scrivner *et al*. 1987), dispersal distances of up to 76.3 miles have been documented for the San Joaquin kit fox (Scrivner *et al*. 1987; USFWS 1998). Dispersal attempts can be through disturbed habitats, including agricultural fields, and across highways and aqueducts. The age at dispersal ranges from 4-32 months (Cypher 2000). Among juvenile kit foxes surviving to July 1 at the Naval Petroleum Reserve, 49% of the males dispersed from natal home ranges while 24% of the females dispersed (Koopman *et al*. 2000). Among dispersing kit foxes, 87% did so during their first year of age. Most, 65.2%, of the dispersing juveniles at the Naval Petroleum Reserve died within 10 days of leaving their natal home den (Koopman *et al*. 2000). Some kit foxes delay dispersal and may inherit their natal home range.

Dens used by San Joaquin kit foxes play a vital role in the persistence of the species and are necessary for temperature regulation, shelter from adverse environmental conditions, and escape from predators. Kit foxes excavate their own dens, use those constructed by other animals, and use human-made structures (culverts, abandoned pipelines, roadbeds, and banks in water

detention basins). Kit foxes often change dens and may use many dens throughout the year; therefore, evidence that a den is being used by kit foxes may be absent. San Joaquin kit foxes have multiple dens within their home range and individual animals have been reported to use up to 70 different dens (Hall 1983). At the Naval Petroleum Reserve, individual kit foxes used an average of 11.8 dens per year (Koopman *et al*. 1998). Den switching by the San Joaquin kit fox may be a function of predator avoidance, local food availability, or external parasite infestations (*e.g.,* fleas) in dens (Egoscue 1956).

Natal and pupping dens usually can be identified by the presence of scat, prey remains, matted vegetation, and mounds of excavated soil (*i.e.*, ramps) outside the dens (O'Farrell 1984), although some active dens in areas outside the valley floor often do not show evidence of use (Orloff *et al*. 1986). During studies of kit foxes in the northern portion of their range, between 70 and 79 percent of the dens that were known to be active showed no sign of use (*e.g.*, tracks, scats, ramps, or prey remains) (Orloff *et al*. 1986, Jones and Stokes Associates 1997); some burrows showed signs of recent excavation (Jones and Stokes Associates 1997), which can easily be confused with occupancy by other mammals. Orloff has stated that it is her experience the usual methods employed for detection for the kit fox in the northern range are often ineffective (*pers. comm.* 2006).

A San Joaquin kit fox can use more than 100 dens throughout its home range, although on average, an animal will use approximately 12 dens a year for shelter and escape cover (Cypher *et al*. 2001). Kit foxes typically use individual dens for only brief periods, often for only one day before moving to another den (Ralls *et al.* 1990). Possible reasons for changing dens include infestation by ectoparasites, local depletion of prey, or avoidance of coyotes (*Canis latrans*). Kit foxes tend to use dens that are located in the same general area, and clusters of dens can be surrounded by hundreds of hectares of similar habitat devoid of other dens (Egoscue 1962). In the southern San Joaquin Valley, kit foxes were found to use up to 39 dens within a denning range of 320 to 482 acres (Morrell 1972). An average den density of one den per 69 to 92 acres was reported by O'Farrell (1984) in the southern San Joaquin Valley.

The diet of the San Joaquin kit fox varies geographically, seasonally, and annually, based on temporal and spatial variation in abundance of potential prey. Known prey species of the kit fox include white-footed mice (*Peromyscus* spp.), insects, California ground squirrels, kangaroo rats (*Dipodomys* spp.), San Joaquin antelope squirrels (*Ammospermophilus nelsoni*), black-tailed hares (*Lepus californicus*), and chukar (*Alectoris chukar*) (Jensen 1972, Archon 1992). Kit foxes also prey on desert cottontails (*Sylvilagus audubonii)*, ground-nesting birds, and pocket mice (*Perognathus* spp.).

Insects are a significant prey source for the San Joaquin kit fox (Hawbecker 1943 Scrivner *et al.* 1987, Vanderbilt-White 1993), especially during periods of low prey availability. During the summer months in the northern range, particularly July and August, insects provide the primary prey for San Joaquin kit foxes (Archon 2004, Briden *et al*. 1988). Insects are an important part of the diet of juvenile San Joaquin kit foxes. Cypher and Brown (2006) found that "pups primarily consumed ground squirrels and insects" at the Bena Landfill site in Kern County. Kit foxes have demonstrated the ability to switch to insect prey, when their habitat is destroyed or impaired (Arjo *et al*. 2003), although such prey may not prove stable over time in areas where the insects are responding to changes in vegetation, weather, and climate. Insecticides that target the supplemental prey base of grasshoppers and crickets (Scrivner *et al*. 1987), and detritivorous

insects (Vanderbilt White 1993), may suppress San Joaquin kit fox populations, reduce juvenile survivorship, or inhibit successful dispersal.

White and Ralls (1993) found that prey scarcity was the primary factor contributing to decreased reproductive success during a short drought period on the Carrizo Plain. The California ground squirrel, which is the staple prey of kit foxes in the northern portion of their range, was thought to have been eliminated from Contra Costa County in 1975, after extensive rodent eradication programs. Field observations indicated that the long-term use of ground squirrel poisons in this county severely reduced kit fox abundance through secondary poisoning and the suppression of populations of its staple prey (Orloff *et al*. 1986). Starvation and lack of reproductive success occurs in San Joaquin kit fox populations when their prey base is reduced or removed (Morell 1972, Orloff *et al*. 1986, Spiegel and Tom 1996, White and Ralls 1993, White *et al*. 1996, White and Garrott 1997), and this can lead to population suppression or collapse.

San Joaquin kit foxes are primarily nocturnal, although individuals are occasionally observed resting or playing (mostly pups) near their dens during the day (Grinnell *et al*. 1937). Kit foxes occupy home ranges that vary in size from 1.7 to 4.5 square miles (White and Ralls 1993). A mated pair of kit foxes and their current litter of pups usually occupy each home range (White and Ralls 1993, Spiegel 1996, White and Garrott 1997). Other adults, usually offspring from previous litters, also may be present (Koopman *et al*. 2000), but individuals often move independently within their home range (Cypher 2000). Ralls *et al*. (2001) found that foxes sometimes share dens with foxes from other groups; many of these cases involved unpaired individuals and appeared to be unsuccessful attempts at pair formation. Average distances traveled each night range from 5.8 to 9.1 miles and are greatest during the breeding season (Cypher 2000).

Dens are essential for the survival and reproduction of kit foxes that use them year-round for shelter and escape, and in the spring for rearing young. Hence, kit foxes generally have dozens of dens scattered throughout their territories. However, land conversion reduces the number of typical earthen dens available to kit foxes. For example, the average density of typical, earthen kit fox dens at the Naval Hills Petroleum Reserve was negatively correlated with the intensity of petroleum development (Zoellick *et al*. 1987), and almost 20 percent of the dens in developed areas were found to be in well casings, culverts, abandoned pipelines, oil well cellars, or in the banks of sumps or roads (USFWS 1983). These results are important because the California Energy Commission found that, even though kit foxes frequently used pipes and culverts as dens in oil-developed areas of western Kern County, only earthen dens were used to birth and wean pups (Spiegel 1996). Similarly, kit foxes in Bakersfield use atypical dens, but have been found to rear pups only in earthen dens (Pat Kelly, Endangered Species Recovery Program, Fresno, California, personal communication to P. White, USFWS, Sacramento, California April 6, 2000). Hence, the fragmentation of habitat and destruction of earthen dens could adversely affect the reproductive success of kit foxes. Furthermore, the destruction of earthen dens may also affect kit fox survival by reducing the number and distribution of escape refuges from predators.

Extensive habitat destruction and fragmentation have contributed to smaller, more-isolated populations of kit foxes. Small populations have a higher probability of extinction than larger populations because their low abundance renders them susceptible to stochastic (*i.e.*, random) events such as high variability in age and sex ratios, and catastrophes such as floods, droughts, or disease epidemics (Lande and Orzack 1988, Frankham and Ralls 1998, Tanaka 2000). Similarly, isolated populations are more susceptible to extirpation by accidental or natural catastrophes

because their recolonization has been hampered. These chance events can adversely affect small, isolated populations with devastating results. Extirpation can even occur when the members of a small population are healthy, because whether the population increases or decreases in size is less dependent on the age-specific probabilities of survival and reproduction than on raw chance (sampling probabilities). Owing to the probabilistic nature of extinction, many small populations will eventually lose out and go extinct when faced with these stochastic risks (Lande 1993).

The Biological Assessment, prepared by the Districts, appeared to focus on natal dens for a determination of occupancy. With the low numbers of San Joaquin kit foxes in this part of the range, the focus should be on methodology that detects the species when numbers are low (*i.e.,* using dogs used to detect kit foxes by scent). In addition, measures should be in place to prevent dispersing kit foxes from being harmed or killed within the FERC Boundary or from Project O&M.

The majority of the upland within the FERC Boundary is potential San Joaquin kit fox dispersal habitat. In addition, the Districts' and BLM land surrounding Don Pedro Reservoir and the DPLG Complex is potential dispersal habitat. Under the right conditions, and without ground squirrel eradication, San Joaquin kit foxes could become re-establish within the Action Area.

The Action Area has not been adequately surveyed for the San Joaquin kit fox. ESA consultation has not been concluded for Project effects to this species. In instances where the Project is within the range of the species, suitable habitat is present, and protocol-level surveys were not conducted, the USFWS must give the benefit of the doubt to the species and assume that the species is present for purposes of section 7 consultation.

Valley elderberry longhorn beetle – The Valley elderberry longhorn beetle was listed as threatened on August 8, 1990 (45 **FR** 52803). Mature elderberry plants (*Sambucus spp.*) are suitable habitat for the Valley elderberry longhorn beetle. Valley elderberry longhorn beetles are very difficult to detect, so the USFWS uses evidence of occupancy in the form of exit holes in the stems of elderberry shrubs to determine presence.

The Districts did a good job with surveys for Valley elderberry longhorn beetle exit holes in elderberry plants within the FERC Boundary. Any action that could harm elderberry shrubs can potentially harm the Valley elderberry longhorn beetle. Elderberry shrubs within and adjacent to the FERC Boundary could be affected by vegetation management actions, ground disturbance and compaction, dust, and other actions related to new construction and operations and maintenance.

Sensitive Aquatic Species

Central Valley Fall- and Late Fall-run Chinook salmon ESU (O. tshawytscha) – The Central Valley fall- and late fall-run Chinook salmon ESU occurs in the lower Tuolumne River, downstream of La Grange Dam. Fall-run and late fall-run Chinook salmon ESU are not listed as under the ESA. The upper Tuolumne River was historical habitat for this species. Although no historical quantification has been found, based on elevation and upland habitat in other rivers in California, it is likely that fall- and late fall-run Chinook salmon spawned in the Tuolumne River at least as far upstream as where the Wards Ferry Bridge is today.

Rainbow trout – Resident native rainbow trout (*O. mykiss*). Wild, heritage stock *O. mykiss* are found upstream and downstream of all Project facilities, as well as upstream and downstream of DPLG Complex. Studies by Garza and Pearse (2008) and Pearse and Campbell (2017) indicate that the genetics of O. mykiss in the Tuolumne River are predominantly of Tuolumne River origin.

Benthic Macroinvertebrates – Aquatic benthic macroinvertebrate (BMI) assemblages are communities of aquatic macroinvertebrates that are an integral part of a stream's ecosystem, are important food sources for resident stream fish, and the quality of the BMI community and its structure reflects the degree of impairment that exists within a stream's ecosystem.

Sensitive Wildlife Species

Bald eagle and other MBTA Protected Migratory Birds – The southern bald eagle was listed as endangered under ESA in 1968; the listing was revised in 1978 by deleting the southern subspecies name to include all bald eagles. Bald eagles were delisted from the ESA in 2007 due to an increase in nesting pairs in the contiguous United States from an estimated 487 in 1963 to approximately 9,789 in 2007, however they remain federally protected by the Migratory Bird Treaty Act of 1918 (MBTA, 16 U.S.C. 703-712 and 50 CFR 10.13) and the Bald and Golden Eagle Protection Act (BGEPA,16 U.S.C. 668-668c). The BGEPA prohibits anyone, without a permit issued by the Secretary of the Interior, from "taking" bald eagles, including their parts, nests, or eggs and provides criminal penalties for persons who "take, possess, sell, purchase, barter, offer to sell, purchase or barter, transport, export or import, at any time or any manner, any bald eagle ... (or any golden eagle), alive or dead, or any part, nest, or egg thereof." BGEPA defines "take" as pursue, shoot, shoot at, poison, wound, kill, capture, trap, collect, molest or disturb. Under the BGEPA, "disturb" is further defined as agitate or bother a bald or golden eagle to a degree that causes, or is likely to cause, based on the best scientific information available (1) injury to an eagle, (2) a decrease in its productivity, by substantially interfering with normal breeding, feeding, or sheltering behavior, or (3) nest abandonment, by substantially interfering with normal breeding, feeding, or sheltering behavior (50 CFR 22.2 & 22.3).

Bald eagles are listed as endangered under the California Endangered Species Act (CESA, California Fish and Game Code §§ 86 and 2050-2085 and California Code Regulations title 14 §§ 783-783.8 and 786-786.8), which prohibits any person to import into and export out of the State, or take, possess, purchase, or sell within the State, any species or part or product thereof listed as a threatened or endangered species. Take is defined under Fish and Game Code Section 86 as hunt, pursue, catch, capture, or kill, or attempt to hunt, pursue, catch, capture, or kill. Bald eagles are also a State fully protected bird species pursuant to Fish and Game Code Section 3511, which prohibits take or possession of bald eagle unless authorized by CDFW for scientific research purposes only. Bald eagles are protected in California by Fish and Game Code Sections 3503 and 3503.5, and 3513, which make it unlawful to take, possess, or needlessly destroy the nest or eggs of any bird, including birds of prey, such as bald eagle. Additionally, bald eagles are identified by the USFWS as a Bird of Conservation Concern in the Sierra Nevada due to their status as a high conservation priority.

Bald eagles breed and overwinter in California in ice-free areas. Generally in California, bald eagle courtship and nest building begins in January, egg laying occurs in late February through March, incubation occurs from late February through early May, eggs hatch from late March through early May, the nestling period (before the eaglets are able to fly) occurs from late March

through late July, eaglets fledge from early June through late July, the post fledging period in which juvenile eagles are learning to hunt and fly extends from early June through August, and migration occurs in mid-July through August. In California, most bald eagles breed near reservoirs and select large conifers in relatively secluded locations to build nests. Bald eagle nests are usually located within one mile of key foraging areas. Generally, bald eagles will night roost in the stand of trees in which their nest is located during the nesting season and throughout the year. Night roosts may also be located near daytime hunting perches (Jackman and Jenkins 2004). Most nesting bald eagles in California remain in their territories during the winter or only travel short distances to nearby reservoirs. California is also host to numerous bald eagles from colder northern climates that experience freezing conditions during the winter, such as Alaska and Canada. Communal night roosting near winter foraging grounds is common by migrant bald eagles. Roosts can be large and include hundreds of eagles, however in California, roosts are generally used by only a few individuals (Jackman and Jenkins 2004).

Many of the reservoirs in California where bald eagles nest and overwinter host various recreational activities, including boating, hiking, fishing, camping, etc., and may be subject to regular operations and maintenance activities, all of which may occur for extended periods of time in close proximity to eagle nests. Individual bald eagles vary in their degree of sensitivity and habituation to disturbance. A variety of factors contribute to disturbance, including visibility from the nest, duration of activities, noise levels, extent of the area affected by an activity, an eagle's prior experiences with humans, and the type of activity. Eagles are most vulnerable to disturbance early in the nesting season (late winter/early spring) which can lead to abandonment of a nest site and/or eggs, especially when human activities are conducted too close to the nest (Jackman and Jenkins 2004 and USFWS 2007). Protection from disturbance that may disrupt or prevent nesting or adversely affect foraging is important when managing bald eagles populations in these locations (Jackman and Jenkins 2004). Protection measures often include nest buffers and seasonal restrictions (LOPs) for conducting work, recreational activities, and other human activities near the nest.

Project activities that have the potential to adversely affect nesting and wintering bald eagles in the Project area include:

- Recreation activities: boating, camping, hiking, angling, fishing, birdwatching.
- O&M activities: cleaning and pumping comfort stations and campground toilets, annual campground maintenance, repair and maintenance of Don Pedro Dam, repair and maintenance of boat ramps, docks, and launch and marina facilities, and repair and surface maintenance of roads and recreational trails.
- Inspection of Project facilities by foot vehicle, or helicopter.
- Modifications to existing Project facilities.
- Vegetation management: routine vegetation clearing at Project buildings and structures, roads and recreational trails, dam faces, and campgrounds; hazard tree felling and removal; fuels management; non-native invasive plant treatment; and any other vegetation management activities involving heavy equipment (*e.g.*, backhoe or tracked equipment) or loud mechanized equipment (*e.g.*, chainsaws, weed wackers, shredders, chippers, etc.).
- Collection, removal, transport, storage, and disposal of large woody material.

Bald eagle nesting surveys performed by the Districts in 2012 and 2013 identified one successful nest, one nest with unknown success and one failed nest on Don Pedro Reservoir. No surveys have been conducted for nesting bald eagles on La Grange Reservoir. Activities associated with

project operations, maintenance, construction or recreation may adversely affect, disturb and/or take bald eagles. The National Bald Eagle Management Guidelines (USFWS 2007, Attachment 2) report that recreational activities similar to those conducted in the Project Area (*e.g.*, boating, jet skis, hiking, camping, fishing, kayaking, and canoeing) have the potential to disturb nesting bald eagles. Bald eagles are protected by federal law under the Migratory Bird Treaty Act (MBTA), 16 U.S.C. 703, which is the cornerstone of migratory bird conservation and protection in the United States. The MBTA implements four treaties that provide for international protection of migratory birds. The MBTA protects most native species of birds in the United States, including those likely to occur in the Project area; a list of species protected by the MBTA can be found at https://www.fws.gov/migratorybirds/RegulationsPolicies/mbta/mbtandx.html.

The BGEPA authorizes the USFWS to permit the take of eagles for certain purposes and under certain circumstances, including scientific or exhibition purposes, religious purposes of Indian tribes, and the protection of wildlife, agricultural, or other interests, so long as that take is compatible with the preservation of eagles, 16 U.S.C. 668a. In 2009, the USFWS promulgated a final rule on two new permit regulations that, for the first time, specifically authorize the incidental take of eagles and eagle nests in certain situations under BGEPA (50 CFR 22.26 & 22.27).

The USFWS carries out its mission to protect wildlife and plant resources by fostering relationships with entities that have taken effective steps to avoid take, by encouraging others to implement measures to avoid take, and through investigations and enforcement when appropriate. Applicants are encouraged to work closely with the USFWS to identify available protective measures when developing project plans to safeguard wildlife and to implement those measures where applicable. Applicants are also strongly encouraged to apply for permits authorizing otherwise prohibited activity, including Special Purpose Utility (SPUT) permits for various actions involving migratory birds, and eagle programmatic take permits where eagle take is possible.

The development and implementation of an avian protection and/or management plan to avoid take of migratory birds, including bald and golden eagles, does not limit or preclude the USFWS from exercising its authority under any law, statute, or regulation. It is important that an avian projection and/or management plan identify and implement all reasonable, prudent and effective measures to avoid the take of migratory birds (including eagles). Ideally, a high quality, scientifically valid, and robust avian protection and/or management plan that is implemented in a timely and effective manner, and regularly reviewed and revised as needed, will maximize avoidance of species protected under our various laws while allowing for project development in the most environmentally conscientious ways practicable. Ultimately it is the responsibility of those involved with the planning, design, construction, operation, maintenance, and decommissioning of projects to conduct relevant wildlife and habitat evaluation and determine, which, if any, species may be affected, and to seek and obtain necessary permits to avoid liability.
The AFLA does not contain adequate protection measures for bald eagles. In addition, an avian protection plan has specific and different purposes under the MBTA and BGEPA, respectively, so a separate plan for eagles is recommended.

Special-Status Bat Species—Twenty-five species of bats are found in California, fourteen of which have a State or federal special-status designation. Many species of bats aggregate in

colonies. Colony size varies from species to species and can consist of just a few bats to several hundred or thousand. During the winter bats form hibernating colonies, and from spring to early fall form maternity colonies composed of females and their young. Bats select roosts based on diurnal and seasonal temperature patterns. During the maternity season, bats prefer warm, but thermally buffered environments and frequently use two different roosts during the day (for sleeping) and night (for resting and digesting food). During the winter season, bats prefer cool, thermally stable roosts to save energy while hibernating. Many winter hibernacula are also utilized as day roosts during the remainder of the year. Bats use a variety of habitats and manmade structures for roosting, including caves, hollow trees, exfoliating tree bark, damaged wood in snags, foliage of trees, rock crevices, bridges, buildings, old mine workings, silos, towers, and tunnels (H.T. Harvey & Associates 2004). Bats are an important part of an ecosystem as they eat large quantities of insects and other arthropods providing natural control of pest populations (Kasso and Balakrishnan 2013, and Kunz *et al.* 2011); one study by Whitaker (1995) estimated nearly 1.3 million insects are consumed annually by a colony of 150 big brown bats (*Eptesicus fuscus*).

Bats are very sensitive to anthropogenic impacts, both direct (*e.g.*, human presence) and indirect (*e.g.*, disturbances to the roost and surrounding habitat, including noise and vibrations) (Russo and Ancillotto 2015, and Jones *et al.* 2009). Research by Jung and Kalko (2011) has shown that bat species richness decreases with increasing human impact. Loss of roost habitat can be particularly harmful to bats since they utilize roosts during sensitive life history periods, including the maternity season and winter hibernating, and many roosts are used by successive generation of bats over many years. Disturbance to maternity colonies can cause bats to abandon young or fall to the ground where they are not usually retrieved and thus subsequently die (Sheffield *et al.* 1992). Additionally, female bats do not reach sexual maturity until age two and many species only have one young per year (H.T. Harvey & Associates 2004), so impacts to maternity colonies can decrease fecundity of individuals and populations as well as subsequent generations of bats. If disturbed during hibernation, bats may awake prematurely, and this can cause an elevation in body temperatures and promote the use of stored energy reserves, leaving insufficient energy to survive the rest of the winter. Changes in the microclimate of roosts due to removal of trees and other habitat degradation and alterations can make roosts unsuitable and contribute to a loss of roost habitat (Sheffield *et al.* 1992). Implementation of measures to protect roosting bats, especially during the maternity and winter hibernating seasons when bats are most sensitive to disturbance, is important when managing bat populations in a given area due to their low reproductive rate and roost site fidelity.

Project operations and maintenance activities conducted at Project structures (*e.g.* powerhouses, storage buildings, valve houses, and dams), recreational facilities, or other structures where Project staff has a routine presence have the potential to adversely affect bats and their roosting habitat, especially those facilities that provide suitable conditions for maternity colonies or winter hibernacula. In 2012, during the relicensing of the Project, the Districts conducted Study 4.2 – Special-Status Wildlife – Bats to determine if continued Project operation and maintenance has the potential to affect special-status bats. For this study, the Districts conducted initial reconnaissance surveys to look for signs of bat activity, followed by mist netting with acoustic sampling at Project facilities to determine the presence and distribution of bats in the Project area (TR-09 Special Status Wildlife – Bats Study).

During bat surveys conducted in 2012, the Districts identified nine species of special-status bats with the potential to occur within the Project boundary. The Districts prioritized four Project facilities for mist netting supplemented by acoustic sampling, including the swimming lagoon at the Fleming Meadows Campground in the Fleming Meadows Recreation Area, the spillway below Don Pedro Dam, camping area A in the Blue Oaks Recreation Area, and the camping area C in the Moccasin Point Recreation Area. Long-term acoustical monitoring was conducted at the base of Don Pedro dam, the spillway below Don Pedro dam, and at the powerhouse below Don Pedro dam.

Mist net sampling resulted in the capture of a total of seven bats of two different species (one bat escaped prior to identification). Nine bat species and three species groups were identified at the locations during acoustic sampling, including special-status species Townsend's big eared bat (*Corynorhinus townsendii*), both a California species of special concern and Forest Service sensitive species, and spotted bat (*Euderma maculatum*) and western red bat (*Lasiurus blossevillii*), both California species of special concern. Long-term acoustic monitoring detected eight species of bats, four of which were special-status species, including Townsend's big eared bat, spotted bat, western red bat, and pallid bat (*Antrozous pallidus*), a California species of special concern and Forest Service sensitive species. *Myotis* bats were not identified to species, but the group was acoustically detected at the locations, and could potentially include the fringed myotis (*Myotis thysanodes*), a California species of special concern and Forest Service sensitive species.

A single day roost was confirmed at the Fixed Wheel Gate building near Don Pedro Dam. A total of 32 structures were identified as night roosts. No maternity roosts were identified, although on page 5-7 of TR-09, the Districts indicate that day roosts could potentially be used as maternity roosts. No winter hibernacula were identified, although bats were detected in winter months, indicating that winter hibernacula likely are present in the Project boundary.

The Terrestrial Resources Management Plan included in the AFLA indicates that the Project will not impact any special-status bats, and proposes no measures to support bats within the Project boundary. The USFWS is concerned about potential affects to special-status bats that have been detected within the Project boundary. Potential effects include not only maintenance at Project facilities, but also human disturbance from recreationists. Bat signs were detected at a number of Project buildings within the recreation areas as well as other Project buildings, but the Terrestrial Resources Management Plan does not propose measures to support the bats using these facilities. The Districts should implement the USFWS recommendations found in Condition 13 contained within this letter.

Invasive/Noxious Plant Species Management

One of the USFWS's specific objectives is to ensure that invasive and noxious plants are eradicated or controlled so as to minimize the impacts of these particular plant species on the aquatic and terrestrial habitats of common, sensitive, and listed fish and wildlife species. Care should be taken when eradicating or controlling invasive or noxious plant species, that special status and listed plants are not adversely affected by control efforts.

COMMENTS ON THE AMENDED FINAL LICENSE APPLICATION (USFWS and BLM)

General:

The AFLA for the Project contains multiple documents and appendices. The USFWS major concerns with the AFLA are: (1) Analyses and conclusions do not fully address the range of effects of the Project; (2) effects to many listed and sensitive species, and special status species, affected by the Project are not included in proposed management plans; (3) proposed measures perpetuate the conditions in the lower Tuolumne River that put salmonid populations at risk; (4) the area in which effects were identified was unduly constrained; (5) the Project is part of an integrated water complex (DPLG Complex), and the interrelated actions of the DPLG Complex were inconsistently addressed. For example, the contribution of flows to the survival and viability of the Tuolumne River Chinook salmon is downplayed in the AFLA and often discounted. In place of the ecosystem function and salmonid benefit that would result from environmental flows, the AFLA focuses on experimental, unproven, or unsupportable measures as "Resource Protection Measures." Figure 1 illustrates the difference between the Tuolumne River, which does not provide environmental flows, and the Stanislaus River, which does provide environmental flows. Notice the significant disparity between the Chinook salmon populations in the two rivers.

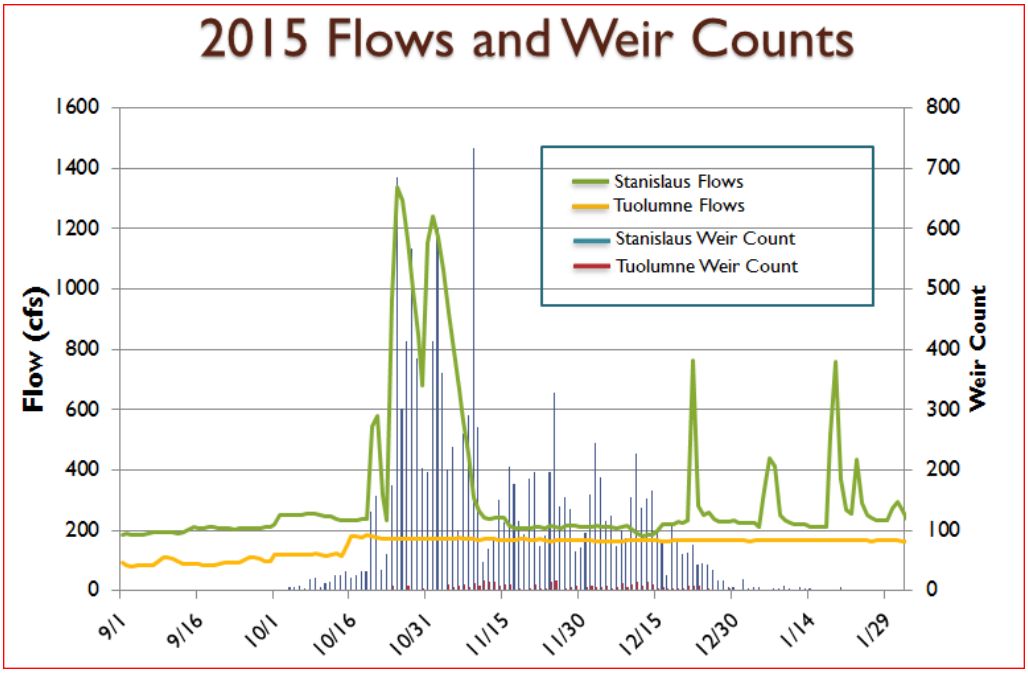


Figure 1. Comparison between the Stanislaus River and Tuolumne River flows and Chinook salmon counts at the fish-counting weirs in each river. General

Maps and Locations (BLM):

Please list and display the locations with the latitude and longitude locations on a GIS map for all facilities including roads, powerlines, poles, structures of any kind, dirt roads used by districts, toilet structures, boat ramps, the marina, boat docks, campsites, maintenance facilities of any kind, pipelines, trails, swimming areas, public drinking water systems, that are located on BLM land within or adjacent to the project boundary.

Please see specific comments on the sections identified below.

Recreation Resource Management Plan (BLM)

Blue Oaks Recreation Area has a campground road, eleven pull in trailer sites, at least one restroom facility, dumpsters, and drinking water spouts on BLM. Several other structures are also found on BLM land in Loops C and D. Please describe and display on a GIS map exact locations of these facilities, and the features that are located on BLM land.

Figure 1.3-4. Recreation facilities at the Moccasin Point Recreation Area.
Please describe and display on a GIS map exact locations of these facilities, and the features that are located on BLM land.

1.3.1.4 Ward's Ferry Bridge Whitewater Boating Take-Out Area
Currently the restroom facility is not open to the public. The facility does not meet current ADA standards, and it partially blocks users from accessing the river on the south side to carry out rafts. Parking off the shoulder is not adequate and needs to be paved, striped and a barricade of some sort needs to be placed so vehicles do not end up in the reservoir. The north side access road has eroded continuously to the point where if it is not fixed, the access road will be lost. The north and south side banks have been eroding away due to the ramp up and down out of the reservoir and from wakes caused by power boats. In one spot on the north side, a cement vehicle barricade was placed years ago to block vehicle access and is causing the road to sluff off the side of the bank.

1.3.1.5 Dispersed Shoreline Recreation Areas
The Districts identified 23 sites. Seventy percent of the sites exhibited low impact. Please identify those. Twenty two percent exhibited moderate impact and two sites exhibited high impact. Please identify where these sites are located and provide a definition of low impact, moderate impact, and high impact.

Exhibit E – Environmental Report (BLM and USFWS)

The USFWS appreciates that the Environmental Report (ER) looks at effects of the Project on fishery conditions in the lower Tuolumne River. Many of the conclusions in the ER are overstated, such as use of the word "demonstrates" when an analysis only "indicates" that a conclusion could be inferred.

Throughout the AFLA, the Districts indicate that monitoring of various conditions will occur. A summary of the specific monitoring efforts being proposed by the Districts would be helpful to evaluate the entire proposal.

ER Section 2.17 Fire Management Plan (BLM)
Districts will adhere to the Fire Management and Response Plan procedures filed by BLM when desiring to burn on BLM land.

ER Page 3-73, Section 3.4.1.7 With and Without-Dam Temperature Conditions - USFWS– This section, especially ER Figures 3.4-14 through Figure 3.4-20, clearly shows the impact that the Don Pedro Project and La Grange Project have on water temperatures in the lower Tuolumne River. The Projects result in warmer temperatures during egg incubation, fry emergence, and

juvenile rearing and outmigration time-periods. As these graphs are an average over 42 years and all water year types, they under-represent the impacts of the Project on water temperature during drier water year types. Higher water temperature have direct impacts to chinook salmon (*e.g.* thermal stress, mortality), but high temperatures may also contribute indirectly to other limiting factors such as incubation success, bass predation, and smolt survival during emigration, The first year of the fry emergence study (EA 1992) showed much lower egg survival (1-2%) than predicted based on gravel quality, and was attributed to mortality caused by high incubation temperatures (McBain and Trush, 2000).

ER Page 3-83, Section 3.4.2 Resource Effects of the Proposed Action -USFWS – The AFLA inappropriately limits the scope of the Action Area to only the hydropower infrastructure of the Project, and does not include the Project's impacts to flows, water temperature, or other impacts to the lower Tuolumne River. The ESA regulations (50 C.F.R. § 402.02) define Action Area as "all areas to be affected directly or indirectly by the Federal action and not merely the immediate area involved in the action." Although both listed and non-listed species will be affected by issuance of the license, we will use the term Action Area because it includes indirect effects of the license, including operation and maintenance, water delivery, recreation, and flood control. For the purpose of determining Project effects on listed species, the USFWS will use the "Action Area" as defined by 50 C.F.R. § 402.02.

ER Page 3-83, Section 3.4.3 Proposed Resource Measures -USFWS – This section should include the operations and management activities that the Districts propose to undertake as conditions of the new license for the Project for protecting, enhancing or mitigating impacts to resources that could be affected by the proposed Project. While the Districts incorrectly state that the Project has no adverse effects on water resources, they include flow and non-flow measures that appear to be mitigation for Project impacts, even though the Districts do not refer to them as such.

ER Page 3-83, Section 3.4.3.1 Gravel Mobilization Flows of 6,000 – 7,000 cfs -USFWS – The USFWS commends the Districts for attempting to increase coarse sediment transport flows. However, the Districts provide no information to indicate that flows of 6,000 – 7,000 cfs would actually mobilize gravel. Previous results of bed mobility modeling of the lower Tuolumne River suggest that flows greater than 7,000 – 8,000 cfs are necessary to mobilize gravel (McBain and Trush 2000). Therefore, should this measure be incorporated into the License, the USFWS recommends that the flows be increased to 7,000 – 8,500 cfs. The Districts describe their monitoring efforts in a separate section of the AFLA, therefore USFWS comments regarding monitoring will not be made in this Section.

ER Page 3-83, Section 3.4.3.2 Gravel Cleaning -USFWS– The USFWS questions the validity of using an experimental methodology to mitigate for Project effects, rather than a proven methodology such as gravel replenishment or providing instream flows that would result in removal of fine sediments from spawning gravels. In addition, gravel cleaning will not address the Project effects of diminished streambed mobilization flow, over 100 years of gravel retention by La Grange Reservoir, and nearly 95 years of gravel retention by the Old Don Pedro Dam. Without the dams in the river, the riparian floodplain would have recuperated from historical mining effects through redistribution of sediment and activated floodplain during winter and spring rainfall events.

ER Page 3-84, Section 3.4.3.3 Matching Funds for Water Hyacinth Removal -USFWS – The USFWS agrees that water hyacinth infestations cause adverse effects on aquatic biota. In addition, if rafts of water hyacinth are too dense, they may block passage of juvenile salmon downstream or lower dissolved oxygen levels causing mortality. When flows in the lower Tuolumne River were below 180cfs, water hyacinth were observed covering areas of the lower Tuolumne river from bank to bank. Therefore, the minimum instream flows the Districts are proposing downstream of river mile (RM) 25.5 may result in increased water hyacinth infestations. The Districts have not analyzed how their flow proposal may increase water hyacinth infestations in the lower Tuolumne River. Nor have the Districts indicated how they arrived at $50,000 per year for removal, or if providing $50,000 per year to the California Division of Boating and Waterways (CDBW) would be sufficient to help control water hyacinth, especially if the Districts' AFLA flow proposal is adopted. As the yearly contribution does not increase based on inflation, less and less removal can be done over time. The USFWS believes that increased base flows during the summer months in addition to non-flow mechanisms are needed to effectively control water hyacinth and reduce negative impacts to aquatic biota, including salmonids.

ER Page 3-85, Table 3.4-21 -USFWS – The AFLA proposed flows in the lower Tuolumne River do not include components of a natural hydrograph that benefit salmonids and riparian ecosystem function. The five components of a natural hydrograph in the eastern Central Valley are: (1) fall or winter freshets (first inundation flows of the wet season), (2) winter storm/peak flows, (3) spring snowmelt flows, (4) snowmelt recession flows, and (5) summer base flows. The AFLA flows do contain a summer base flow, but the ecosystem benefits of the other components of the hydrograph are not realized. The purported benefit to aquatic resources is overstated, unless water temperature is the only consideration.

ER Page 3-85 Early Summer Flows (June 1–June 30) -USFWS – The Districts' Salmonid Study Report (W&AR-05) indicates that juvenile Chinook salmon are still present in portions of the lower Tuolumne River through June. Therefore, the USFWS does not support the Districts' proposal to drastically decrease water flows downstream of RM 25.5 beginning June 1 of each year and lasting until October 15. In addition to direct adverse impacts to rearing and outmigrating juvenile salmon, flows this low will have a deleterious effect on other native fish species and migratory birds that use the lower Tuolumne River corridor. The USFWS is also concerned that flows this low may encourage increased water hyacinth growth.

ER Page 3-87 Late Summer Flows (July 1–October 15) -USFWS – The USFWS does not support the Districts' proposal to drastically decrease water flows downstream of RM 25.5 beginning June 1 of each year and lasting until October 15. Although salmon are not expected to be in the river during this timeperiod, flows this low will have a deleterious effect on other native fish species and migratory birds that use the lower Tuolumne River corridor. The USFWS is also concerned that flows this low may also encourage increased water hyacinth growth.

The natural hydrograph included short duration, small magnitude fall floods during this time period and have been eliminated by Project operations. This portion of the natural hydrograph has been replaced by a pulse flow in October that serves to attract upstream salmon migrants. The Districts' stated purpose of the proposed fall pulse in early October is to flush spawning gravels of accumulated algae, debris, and fine materials with a flow of approximately 1,000 cfs in the area between La Grange Dam and the infiltration gallery. However, the Districts have not

provided documentation if these flows will result in the desired outcome of gravel cleaning. Furthermore, the USFWS believes that these flows are insufficient to serve as an attraction pulse.

ER Page 3-87 Fall-Run Chinook Spawning Flows (October 16–December 31) -USFWS – Proposed minimum streamflows during the spawning season do not incorporate historical streamflow variability. Steady, nonfluctuating flow releases may produce the undesirable consequence of limiting spawning to the center of the channel as opposed to margin habitat, encouraging salmon to construct their redds on top of pre-existing redds (redd superimposition), and increasing the vulnerability of egg pockets to scour during moderate or large floods (McBain and Trush 2000).

ER Page 3-87 Fall-Run Chinook Juvenile Rearing (March 1–April 15) -USFWS – Juvenile salmonids need inundated riparian floodplain for foraging, predator avoidance, and growth. This portion of the AFLA flow proposal does not appear to provide that function because the proposed flows are too low to engage floodplain areas. As river flows increase above bankfull discharge and overbank habitats become accessible, the amount of available salmonid rearing habitat in the lower Tuolumne River has been shown to increase with increasing flows (TID/MID 2007, Report 2006-7). The number of acres of riparian floodplain habitat accessible to juvenile salmonids has not been quantified in the AFLA.

Mesick *et al.* (2008) found that adult Tuolumne River fall-run salmon had significantly declined since the 1996 FERC Settlement Agreement and modified Articles 37 and 58 of the existing license. They also found that winter and spring flows affected juvenile salmon survival in the Tuolumne River. Mesick and Marston (2007) found that instream flow releases in the Tuolumne River, from February 1 through June 15, as gauged at La Grange explained approximately 82% of the variation in Tuolumne River fall-run Chinook salmon recruitment. They also found that factors outside of the Tuolumne River explained very little variation in the adult fall-run Chinook salmon recruitment in the Tuolumne River.

In looking at the Stanislaus River data, Mesick *et al.* (2008) found that when flows were high between February and June the juvenile to smolt survival averaged 84%. The rotary screw traps in the Tuolumne River are not set up to measure juvenile to smolt survival, so the Stanislaus River must act as a surrogate in this regard (Attachment 1—USFWS 2004).

The results of Mesick *et al*. (2008) and Mesick and Marston (2007) are consistent with recent findings of increased juvenile salmonid survival as a result of increased flows (Zeug *et al*. 2014, Sturrock *et al*. 2015) and access to activated vegetated floodplain and riparian areas (Hayes *et al*. 2008, Jeffres *et al*. 2008, Limm and Marchetti 2009, Woodson *et al*. 2013).

ER Page 3-89 Outmigration Pulse Flows (April 16–May 31) -USFWS – A natural hydrograph does not provide a pulse flow from April 16 through May 31, but rather an extended inundation of the floodplain riparian edge when snow melt swells the river, followed by a recession of the hydrograph. Juvenile salmonids take advantage of these higher spring flows to forage, grow, and avoid predation. The cue for outmigration comes with a slow recession (*e.g.,* one inch per day) which cues juvenile salmonids to leave the floodplain.

Snowmelt floods have been eliminated from the annual hydrograph by Project operations, and replaced with spring-time pulse flows intended to stimulate smolt outmigration. The importance of high spring flows during outmigration on smolt survival has been shown for the Tuolumne

River (USFWS 1987; Kope and Botsford 1990; USFWS 1992; EA Engineering 1997; CDFG 1998). The AFLA flow proposal does include more water compared to Base Case for outmigrating Chinook salmon, but it may not provide flows of great enough magnitude and duration for juveniles to access floodplain habitats.

ER Page 3-88 Outmigration Base Flows (April 16–May 15) and *Outmigration Base Flows (May 16–May 31) -USFWS* – It is not clear how the Districts justified lower flows from April 16 – May 15 compared with the slightly higher flows during May 16 – May 31.

ER Page 3-89 3.4.3.5 Flow Hydrograph Shaping -USFWS – As stated, this measure is extremely vague and may not result in riparian generation. Spill events may not correspond with water years that support riparian generation. The USFWS recommends that the Districts provide a biologically relevant recession rate that would encourage riparian recruitment and survival. The USFWS is suggesting that starting on the last day of the salmonid rearing flows, flow recession rates in wet years should be no greater than one inch per day, to allow riparian tree seedlings to survive.

ER Page 3-91, last paragraph continuing onto Page 3-92 -USFWS – The Districts correctly state that historical activities such as gravel and gold mining have resulted in modifications to the habitat that have led to increased predation of salmonids by non-native predatory species. However, Project operations have eliminated the addition of coarse sediments to the river and have also reduced the magnitude and duration of high flows, preventing river recovery and contributing to high predation rates.

ER Page 3-99 – Red Hills Roach- BLM – The Red Hills roach is not listed as endangered under the California Endangered Species Act as stated in sentence #1. The Red Hills roach is listed as a California Fish Species of Special Concern as well as a BLM sensitive species.

ER Page 3-108, last paragraph -USFWS – In this section the importance of lost anadromy in the Tuolumne River is not addressed. Any anadromous species attempting to outmigrate—such as Chinook salmon, *O. mykiss*, and Kokanee salmon—would be crushed by the Don Pedro turbines if the fish attempted to outmigrate through the powerhouse intake. In addition, the study was not conducted during the drought years, when the reservoir level was low and the risk of entrainment and mortality of outmigrating salmonids was higher.

An example of successful outmigration is the response of the Chinook salmon population in the lower Tuolumne River following engagement of the spillway in 1997. Approximately 20,000 adult Chinook salmon from this cohort returned to the lower Tuolumne River to spawn. No effort was made to determine the differential contribution of upper Tuolumne River and lower Tuolumne River natal origin fish in this cohort. Successful outmigration through the spillway should not be ruled out.

ER Page 3-143, Juvenile Rearing Habitat Availability -USFWS – The claim made that rearing habitat is not limiting for juvenile salmon in the lower Tuolumne River is inconsistent with contemporary science on juvenile salmonid rearing habitat (Hayes *et al.* 2008, Jeffres *et al.* 2008 Limm and Marchetti 2009, NMFS 2014b, Opperman 2012, Opperman *et al.* 2010, Sommer *et al.* 2001). By focusing on the pressures that juvenile salmonids face (*i.e.,* predation and starvation) when they do not have adequate rearing habitat, the adverse effects of dams and hydropower on Chinook salmon and steelhead trout are obscured.

Inundated floodplain in spring enhances juvenile salmonid rearing, emigration, and survival (Hayes *et al.* 2008, Jeffres *et al.* 2008 Limm and Marchetti 2009, NMFS 2014b, Opperman 2012, Opperman *et al.* 2010, Sommer *et al.* 2001). This is largely because winter and spring high flows resulting in floodplain inundation make invertebrate prey bioavailable to salmonids. The longer the period of inundation, the more the aquatic food web is activated and the more food becomes available to juvenile salmonids. When organic matter in the floodplain becomes saturated with winter and spring flows it is conditioned and utilized by shredders (*i.e.*, amphipods, isopods, stoneflies, caddisflies, and some mayflies), which are common prey species for both adult and juvenile salmonids. Shredders also convert organic matter (*e.g.*, leaves, twigs, and woody debris) into fine particulate organic matter that is in turn used by invertebrate "conditioners" and "collectors" farther downstream. Short and Maslin (1977) found that the fine particulate organic matter contribution made by shredders contributed significantly to the food resource base for the invertebrate "collectors" that are also important prey for juvenile and adult salmonids. Consequently, the ecological chain of shredders, conditioners, and collectors allows the riparian ecosystem to provide prey biomass to both the main channel and to off-channel areas in a positive and enhanced feedback system.

There are many studies showing the positive relationship between salmonid growth and survival when juvenile salmonids have access to off-channel areas and floodplains (*e.g.*, Bellmore *et al.* 2013, Jeffres *et al.* 2008, Katz *et al.* 2017, Sellheim *et al.* 2016, Hayes *et al.* 2008, Limm and Marchetti 2009, NMFS 2014b, Opperman 2012, Opperman *et al.* 2010, Sommer *et al.* 2001, Sturrock *et al.* 2015, and Zeug *et al.,* 2014). To provide full expression of the BMI food web, engaged floodplain habitat should be inundated annually for between 30 and 90 days to allow for primary productivity derived from inundated habitat to be realized throughout most of the lower Tuolumne River. A maximum inundation period is needed for the establishment of benthic macroinvertebrate guilds [shredders, conditioners, collectors (Poff and Zimmerman 2010, Short and Maslin 1977)] that are the prey base for juvenile salmonids (Allan *et al.* 2003).
In addition to providing critical rearing habitat, elevated flows in spring also decrease energetic expenditure for emigrating salmonids and decrease the risk of predation, thereby improving passage in the Lower Tuolumne River. Turbidity provides cover from predators (Gregory 1993, Gregory and Levings 1998), and may cue emigration of juvenile salmonids and immigration of adult spring-run Chinook salmon into upstream holding habitat (Jager and Rose 2003, Jager *et al.* 1997, Stevens and Miller 1983).

The AFLA flows, with the pulse-flow overlay, can lead to a drop in flows prior to juvenile salmonids being large enough to survive the predator fields in the lower Tuolumne. In the spring, drops in flow that that occur prior to the end of the natural spring-inundation period trigger juvenile salmonids to leave the dewatered riparian edge and seek food and shelter downstream. This is likely to result in juvenile fish leaving the system at small sizes that reduce their chances of surviving outmigration, as indicated by studies looking at otoliths from fish collected from within the Central Valley tributaries (Sturrock and Johnson 2013, Sturrock *et al.* 2015). The need for annual and undisrupted connectivity with the riparian floodplain is to avoid cohort failure or low salmonid recruitment in the lower Tuolumne River (*e.g.*, low returns of Tuolumne River salmonids).

ER Page 3-216, Section 3.6.2 Resource Effects USFWS and BLM – The subjective removal of an aspect of Project effects from consideration is a systemic problem throughout the AFLA. This section incorrectly excludes the effects of hydropower generation on listed species. Analysis of

effects of the Don Pedro Project should include all aspects of Project operation. The Don Pedro Project portion of the DPLG Complex is well-described in the preface of the ER, specifically:

> "The Don Pedro Project provides water storage for irrigation and municipal and industrial (M&I) use, flood control, hydroelectric generation, recreation, and natural resource protection (hereinafter, the "Don Pedro Project"). The environmental analysis contained in this AFLA considers all the components, facilities, operations, and maintenance that make up the Don Pedro Project and certain facilities proposed to be included under the new license. The Don Pedro Project is operated to fulfill the following primary purposes and needs: (1) to provide water supply for the Districts for irrigation of over 200,000 acres of Central Valley farmland and M&I use, (2) to provide flood control benefits along the Tuolumne and San Joaquin rivers, and (3) to provide a water banking arrangement for the benefit of the City and County of San Francisco (CCSF) and the 2.6 million people CCSF supplies in the Bay Area. The original license was issued in 1966. In 1995, the Districts entered into an agreement with a number of parties, which resulted in greater flows to the lower Tuolumne River for the protection of aquatic resources."

The full range of effects of the entire Project must be considered in both NEPA and ESA analyses.

Through ESA consultation with the USFWS, the Commission must ensure that the entire Don Pedro Project does not jeopardize listed species. The removal of reservoir fluctuations from consideration does not provide the Commission with complete information from which to make informed decisions. For example, the definition of Action in 50 CFR 402.02 is "all activities or programs of any kind authorized, funded, or carried out, in whole or in part, by Federal agencies in the United States..." The issuance of a license for hydropower generation under the Federal Power Act by the Commission fits within this definition, requiring that FERC consult with the FWS under the ESA. If the effects of the Project and DPLG Complex are not included in the AFLA, the Commission will not have adequate information to make a decision pursuant to NEPA or to conduct ESA consultation.

Resource Effects-(BLM)
Water level fluctuations and the effects to special-status plants and animals should be analyzed in the FLA.

ER Page 3-217, 3.6.2.1 Special-Status Plants- USFWS and BLM – Both the USFWS and BLM consider it highly likely that many aspects of the Project have adverse effects on listed plants. However, this section of the AFLA states that "these plants are not adversely affected by current operations," without providing any information to support the statement other than the areas where the plants are actually found (in the below normal maximum water surface elevation) are outside of the boundary. This section also does not consider the impacts of project-generated recreation and O&M on listed plants. There is no evidence to back up the Districts' stated position in this section; the Commission must consider that the project results in adverse effects to listed plants.

It has not been shown that these species have not been adversely affected by current operations, and pre-inundation data is needed in order to compare what these populations looked like before operations were started. No analysis was conducted to analyze effects on special-status plant species from water level fluctuations due to current operations.

ER Page 3-217, 3.6.2.2 Wetland and Riparian Habitats- USFWS and BLM – This section does not address inundation of vegetation during high water periods, and it does not address hydrologic fluctuations. Inundation of aquatic and riparian vegetation is a well-known effect of hydrologic fluctuations. It is unclear whether these Project effects are not being addressed because there is evidence that there is no aquatic or riparian vegetation at the edge of Don Pedro Reservoir. Supporting evidence would be useful in this section.

ER Page 3-218, first paragraph - USFWS and BLM– This section has summarily discounted the "primary potential causes of stress on wetland habitats associated with the Project" identified in ILP studies by stating that "These disturbances are not associated with the Don Pedro Project." These are two diametrically opposed statements. It is very clear that both human use and noxious weeds are closely associated with the Project and often co-occur in high use areas. In addition, the cattle grazing associated with the Project may have both beneficial and adverse effects on listed species. It is important to know the level of these impacts in order to have an ESA consultation based on all of the relevant information. Human use and noxious weeds are both associated with the Don Pedro Project and their effects should be analyzed.

ER Page 3-221, third paragraph -USFWS – This section incorrectly states that the Sierra Nevada yellow-legged frog elevation range is above 6000 feet. This species occurs at 4500 feet and higher and the Districts should update this information.

ER Page 3-223, fifth and sixth paragraphs -USFWS – This section states that Don Pedro Reservoir "…rarely supports (western pond turtle)." However, the field surveys and incidental sightings indicate that at least a small population of the species occurs within the reservoir. Additionally, this section indicates that nesting habitat is "common." Although the western pond turtle occurs within the Project boundary, no management measures are proposed to support the species. The Districts should collaborate with the USFWS, BLM, and CDFW to determine appropriate management actions to support the western pond turtle within the Project boundary.

ER Page 3-232, first paragraph -USFWS – This section states that "…maternity roosts and winter hibernacula are likely within the study area or vicinity, but none occur at facilities or areas affected by O&M." No information is given on where the maternity roosts and winter hibernacula are present within the Project boundary. This information is necessary for the Service and Commission to evaluate potential impacts to special-status bats within the Project boundary. The Commission should require measures in any issued license that will protect special-status bats that may be impacted by Project activities. See USFWS recommended measures included in the Environmental Setting and Project Impacts section of this letter.

ER Page 3-233, third paragraph-USFWS – This section posits that western pond turtle recruitment is low within Don Pedro Reservoir, and that low recruitment is the result of predation by introduced predatory fish and bullfrogs on western pond turtles. However, no measures are proposed for the management of nonnative fish and bullfrogs within the Aquatic Invasive Species Management Plan. The Districts should collaborate with the BLM, USFWS, and CDFW to determine appropriate management actions to control bullfrogs within the Project boundary which will support western pond turtles.

ER Page 3-241, top paragraph-USFWS and BLM – Hydrologic fluctuations have an effect on Red Hills (California) vervain (USFWS 2012). The known effect of hydrologic fluctuations on the Red Hills vervain should be included in this paragraph. In addition, the following text should

be added to this paragraph (as quoted from the Don Pedro ESA and CESA-Listed Plants Study Report): "Observed potential stressors around the Red Hills (California) vervain included cattle grazing and recreation near the population in Poor Man's Gulch. In addition, barbed goatgrass was observed near both occurrences."

ER Page 3-241, fourth paragraph -USFWS – This section states that the USFWS is reviewing the listing of the beetle. On September 17, 2014, the USFWS issued a withdrawal of the proposed rule to remove the beetle from the Federal list of endangered and threatened wildlife (79 **FR** 55879). The Districts should update their information to reflect that the beetle is listed as threatened. Additionally, it appears that the Districts are utilizing the historical guidelines for beetle surveys. The Districts should refer to the 2017 guidelines for the beetle (USFWS 2017a) for survey protocols and mitigation guidance.

ER Page 3-244 [California Tiger Salamander] Occurrence and Habitat within the Don Pedro Project Boundary-USFWS – This section should point out that no surveys for the California tiger salamander were conducted as part of the ILP. Lack of surveys does not constitute absence of this species.

ER Page 3-247 [California Red-Legged Frog] Occurrence and Habitat within the Don Pedro Project Boundary -USFWS – This section should point out that no protocol-level surveys for the California red-legged frog were conducted as part of the ILP. Lack of surveys does not constitute absence of this species.

ER Page 3-250 [Kit Fox] Occurrence and Habitat within the Don Pedro Project Boundary –- USFWS -This section should point out that no kit fox surveys were conducted as part of the ILP. Lack of surveys does not constitute absence of this species.

ER Page 3-251, Section 3.8.5.1 Effects of the Proposed Action -USFWS and BLM – This section incorrectly surmises that the Districts' Preferred Plan would have no effect on reservoir water surface elevations. Daily, weekly, and monthly decisions are made by the Districts that have a direct effect on water surface elevations. The adverse effects to listed species from Project operations, including reservoir water surface elevations, recreational use, pest control, and maintenance activities have not been included. These adverse effects should be addressed in this section. In particular, the potential effects of Project operations on special status and listed species should be clearly identified.

The ESA regulations on what constitutes an Action are very explicit (see 50 CFR 401.02). Not considering all of the effects of the Project is misleading.

ER Page 3-252, top paragraph- USFWS and BLM– The following language should be added, in order to protect federal trust resources: "The Licensee will use only those herbicides and pesticides approved for use on BLM lands. In addition, a Pesticide Use Proposal (PUP) must be approved by the BLM prior to the use of herbicides on BLM lands. The Districts will not apply herbicides or pesticides in potential listed-species habitat without a biological opinion exempting the incidental take of those applications."

ER Page 3-252, second paragraph under Recreation Area Maintenance- USFWS and BLM – Language should be added to this section noting that prescribed fire is not approved for use on BLM land until a site-specific BLM EA and Burn Plan is completed.

ER Page 3-253, Layne's Ragwort and California Vervain -USFWS and BLM– This section misrepresents the potential adverse effects of reservoir surface elevation on listed plants. This section should be reworded to explain that an effects analysis was not conducted to analyze effects on special-status plant species from water level fluctuations due to current operations.

ER Page 3.255, 3.8.6 Proposed Resource Measures- USFWS and BLM– With the exception of the Valley elderberry longhorn beetle measures, the Terrestrial Resource Management Plan does not contain adequate measures to project ESA- and CESA-listed species. There are no proposed resource measures concerning annual consultation with the USFWS or BLM, annual employee training, annual review of special-status species lists and assessment of new species on federal lands, and consultation regarding new ground disturbing activities on federal lands. There are no best management practices specific to special-status plants and no avoidance measures for the San Joaquin kit fox, California tiger salamander, or California red-legged frog. The Terrestrial Resources Management Plan also states "The Districts will consult with the BLM to develop specific usage plans for areas surrounding known occurrences of special-status plants with the potential for being directly affected by activities within the Project Boundary (Table 2.3-1)." These specific usage plans and best management practices specific to special-status plants must be included in the Terrestrial Resources Management Plan to provide adequate protection for special-status plants.

ER Page 5-9, Resource Protection Measure-1(RPM-1): Augment Current Gravel Quantities Through Course Sediment Management Program -USFWS – The USFWS appreciates that the Districts have recognized the need to mitigation for loss of sediment in the lower Tuolumne River that is caused by the Project and the DPLG Complex. This measure conflates spawning gravel and course material, such as cobbles, under a single definition of "course sediment." Missing from this section is an explanation of how spawning gravels become mobilized into mining pits and no longer accessible to spawning salmonids. In order to mitigate for the Project's retention of sediment, course sediment management should include the use of course materials or cobble and gravel mixes to fill in the mining pits and then top them with spawning gravel.

There is no explanation as to why the proposed augmentation should only occur in the first five river miles downstream of La Grange Dam instead of all areas where spawning could occur, only provides for gravel augmentation totaling 55,600 yd^3 when the Project withholds 18,800 yd^3 per year, or while the Districts only plan on augmenting during the first 10 years of the license instead of over the entire term of any issued license. The analytical methods for selecting a curtailed mitigation scenario are not explained.

ER Page 5-10, Resource Protection Measure-2(RPM-2): Provide Gravel Mobilization Flows of 6,000 to 7,000cfs-USFWS – There is no provision in this measure for what the remediation would be if this measure failed to mobilize gravel adequately. This measure is inconsistent with analyses by McBain and Trush (2000, 2004) whose bed-mobility monitoring of the lower Tuolumne River suggests that flows greater than 7,000 – 8,000 cfs are necessary to mobilize gravel in most reaches.

ER Page 5-11, Resource Protection Measure-3(RPM-3): Improve Instream Habitat Complexity - USFWS – As described earlier, this measure is likely to benefit predators in the lower Tuolumne River with no ecological benefit to juvenile salmonids. Placing boulders in the river is not

consistent with the collective body of science on the relationship between woody material and salmonids (*e.g.,* Cederholm *et al*. 2000, Crispin *et al*. 1993, Harmon *et al*. 1986, Shirvell 1990, Wipfli and Baxter 2010). Boulders are likely to create more predator habitat, because they provide velocity shelter to predators without providing the structural diversity of riparian vegetation in instream LWM (crowns or root wads of fallen trees) that juvenile salmonids are associated with (Dolloff 1983). Boulders do not provide the biomass or structure to support the ecological web of aquatic invertebrates that support juvenile salmonid foraging (Allan *et al*. 2003, Cederholm *et al*. 2000, Cummins *et al*. 1989, Pozo *et al*. 1997, Ward and Stanford 1995).

This measure does not adequately represent the size of wood available in Don Pedro Reservoir for juvenile salmonid restoration in the lower Tuolumne River. For example, Figure 2 shows wood being burned at Don Pedro Reservoir (image from W&AR-12, O*ncorhynchus mykiss* Habitat Survey Amended Study Report) juxtaposed with a juvenile salmonid habitat restoration action in the Mattole River. The sizes of the wood in the two images are comparable.

This measure does not take into account the large amount of wood that would become available for restoration purposes during wood flow events. For example, the 2006 wood-flow event resulted in approximately 952,000 cubic feet of LWM and woody debris captured by Don Pedro Reservoir (W&AR-12) and the 2017 wood-flow event resulted in at least that amount of floating LWM and woody debris. Figure 3 shows a large raft of LWM and woody debris downstream of the Wards Ferry Bridge, but is only a small percent of the LWM and woody debris on the reservoir in 2017.

The Districts' conclusion that sufficiently sized pieces of LWM are not captured in Don Pedro Reservoir is faulty. Their conclusion is based on a one-time survey in 2012 of 305 pieces of wood left over from 2011. In 2011, the Districts estimated the amount of wood captured by the Reservoir to be 67,778 cubic feet. The Districts estimate that on average, 169,039 cubic feet of wood are captured by Don Pedro Reservoir, with a maximum annual amount of 952,000 cubic feet captured in the years 2005 - 2013. Not only was the amount of wood captured in 2011 much less than the maximum, but it was even less wood than average captured by the Reservoir. Furthermore, 305 pieces only represented a very small fraction of the total wood that was captured that year, only consisted of materials that were not disposed of during the initial removal, and is not a representative sample of the material that may be available for restoration purposes.

Wood Burn Pile at Don Pedro Reservoir

Juvenile Salmonid Habitat Restoration in Mattole River

Figure 2. Side by side images showing the comparable sizes of wood being burned at Don Pedro Reservoir to the wood used for juvenile salmon habitat restoration in the Mattole River. The burning wood image is from W&AR-12 (Figure 4.1-2 Burning debris raft), and the juvenile salmonid habitat restoration image is a USFWS photograph taken in April 2016.

Figure 3. Large woody material and woody debris on Don Pedro Reservoir in 2017, near Wards Ferry Bridge. Notice the large amount of pieces that would be suitable for juvenile salmonid habitat restoration.

R Page 5-12, Resource Protection Measure-4(RPM-4): Gravel Cleaning -USFWS – Gravel cleaning is experimental and is not likely to address the Project effects of diminished streambed mobilization flow and sediment depletion by Don Pedro Dam and the DPLG Complex.

ER Page 5-13, Resource Protection Measure-5(RPM-5): Contribute to CB&Ws Efforts to Remove Water Hyacinth -USFWS – Water hyacinth is associated with warm and stagnant waters, where it thrives and perpetuates. Because water hyacinth evapotranspiration rates increase the loss of water (Godfrey 2000), control of water hyacinth may be in the best interest of the Districts. However, if flows are maintained to support salmonid survival (consistent with USEPA 2003), it is unlikely that water hyacinth will become established in all but dry and critically dry water years. Removal of water hyacinth from in-water bridges and abutments, early in the season, is expected to prevent water hyacinth mats from forming—if there are adequate flows. Herbicide application to water hyacinth has been documented to result in mats of dead plants that set up future water hyacinth mats and are impediments to navigation. This measure may not have a benefit to aquatic resources, and consultation on the effects of herbicides on steelhead trout should be considered.

ER Page 5-14, Resource Protection Measure-6(RPM-6: Construct a Fish Counting and Barrier Weir-USFWS – The USFWS is not opposed to predator control *per se*, but the proposed Predator Control Program is likely to result in an enhanced predator field downstream of the proposed weir that depresses juvenile salmonid recruitment and survival. Downstream of the weir is not a

closed system, so the level of effort to keep this stretch of river free of migrating predators could be one or two orders of magnitude greater than the effort proposed. The first five years of sporadic predator removal, without the concomitant restoration of juvenile rearing habitat to support juvenile salmonid growth and predator avoidance, should not be expected to generate a positive population-level response in juvenile salmonid survival or adult return rates.

In a letter to the California Fish and Game Commission, Professors Moyle and Bennett (*in litt.* 2010) opined that "reducing the striped bass population . . . is most likely to have a negative effect" on Chinook salmon. Moyle and Bennett (*in litt.* 2010) also stressed that "attempting to reduce striped bass and other predator populations is unlikely to make a difference in saving endangered fishes, and will serve only to distract attention from some of the real problems." Grossman (2016) likewise concluded that removing striped bass will result in "little reduction in predation mortality" for Chinook salmon.

The USFWS recognizes that striped bass are a major predator on juvenile salmonids; however, we are concerned that the 6 to 12 inch size class of striped bass that are the heaviest predators on juvenile salmonids will be released when the large size-class of striped bass is removed from the River—even if only in a limited reach. In addition, striped bass were introduced into California in 1882, but the most dramatic declines in salmonids have occurred since the construction of Central Valley reservoirs and operations of the Central Valley Project and State Water Project. Mitigating for the Project effect of loss of juvenile salmonid rearing habitat and loss of natural hydrograph components is likely to have a greater benefit to juvenile salmonid survival, because it will providing safer migration corridors than are currently available in the Tuolumne River in all but the wettest years.

ER Page 5-16, Resource Protection Measure-7(RPM-7): Predator Control and Suppression - USFWS – The level of effort made by DWR to reduce predators in Clifton Court Forebay (DWR 2017) was substantially greater than that proposed by the Districts and that effort did not significantly reduce striped bass predation on juvenile salmon (DWR 2017). This measure focuses on a single stressor (predation) that is unlikely to be reduced using the proposed methods. This measure does not consider enhancing ecosystem conditions in the lower Tuolumne River that can support sufficient juvenile growth and survivorship—such as habitat restoration and flow enhancement, which could contribute to mitigating for the adverse effects of Don Pedro and La Grange Dams by providing juvenile salmonids refugia from predation.

Not considering the weir, which should be recognized as deleterious to salmonids, the 5 to 15 days of proposed effort during the 135 day period of outmigration for fall-run Chinook salmon and steelhead trout (February 1 through June 15) is inadequate. The proposed predator removal would only target 10 percent of the predators during 11 percent of the outmigration period. This level of predator removal would leave juvenile salmonids vulnerable to predation approximately 99% of the time.

ER Page 5-18, Resource Protection Measure-8(RPM-8): Superimposition Reduction -USFWS – W&AR-05 found that "The potential for redd superimposition, documented in previous studies, is low under current conditions." Fall-run Chinook salmon returns from 2008 to 2016 ranged between 187 and 1,926 returning adult spawners, with an average of 728 return spawners. If half of those are females, and not considering pre-spawn mortality, an average of 364 adult females returned to the Tuolumne River to spawn. Superimposition is not likely to be a population-level

concern until escapement, in turns of returning adult spawners, is measured at above 10,000. Additionally, W&AR-05 reported that superimposition in the Stanislaus River, which often has more than 2 orders of magnitude greater returning adult Chinook salmon than the Tuolumne River, was 2%.

Exhibit E Appendix E-1, Attachment C: Predator Control and Suppression Plan for the Lower Tuolumne River (USFWS)

The Predator Control and Suppression Plan (PCSP) fails to address the lack of floodplain refugia for juvenile salmonids in the lower Tuolumne River and that predator fields (mining pits) are maintained by Project flows and sediment retention. Research on the Tuolumne River (USFWS 2014) has shown a significant correlation between floodplain activation and in-river survival of juvenile salmonids. Floodplain activation flows allow juvenile salmonids to avoid exposure to predators and has the added benefit of providing food for juvenile salmonid growth—allowing them to avoid predation. Removal of predator habitat by filling in the deep-water pools to reduce predator fields and hot spots could significantly reduce predator abundance in the Tuolumne River and would not require the direct removal of predators. Providing floodplain rearing habitat and filling in the mining pits are two methods that would be expected to have a greater, and measurable, effect on juvenile salmonid survival by reducing predation. The PCSP should include tangible ecosystem and salmonid enhancement and protection measures.

Predator removal efforts on a much larger scale than those proposed in this plan have been shown to have no reduction in striped bass predation on Chinook salmon (Grossman 2016, DWR 2017). When DWR removed 6,151 predatory fish weighing approximately 7,200 lbs (3.26 metric tons) from Clifton Court Forebay, they did not detect any reductions in salmon mortality (DWR 2017). In the first two years of that predator removal study, DWR did not find a statistically significant difference in Chinook salmon loss from predators (DWR 2016, DWR 2017).

Many of the measures in the PCSP range from having the potential to measurably adversely affect salmonids, such as electrofishing during outmigration, to having little to no potential for a measurable benefit to salmonids, such as a public sport-fishing derby. In addition many of the supplemental actions are wholly experimental. While the weir is designed to keep striped bass out of the river upstream from the infiltration gallery, it can also act as a partial migration barrier to Chinook salmon and steelhead trout and is likely to result in a predator field becoming established on the downstream side.

PCSP Page 2-2, Section 2.2 Overview of Proposed Actions – The USFWS is not opposed to predator control and suppression as part of an integrated pest management plan; however, none of the methods proposed in *Table 2.2-1* would be expected to have a measurable benefit to Chinook salmon or steelhead trout.

PCSP Page 2-3, Section 2.2.2 Striped Bass – The construction of the predator exclusion weir will add an additional impediment to salmonid migration in the Tuolumne River. In addition, striped bass are likely to congregate there and consume the juvenile salmonids migrating downstream. This is of particular concern in both dry and critically dry water years and where the flow of the river goes through the fish ladder, allowing for concentrated predation.

The use of a fyke net for 15 days would only cover 10% of the juvenile outmigration period for steelhead trout and Chinook salmon and would remove the large striped bass that forage on smaller bass, which are the primary predators of the smallest salmonid outmigrants.

Although the fish ladder is intended to keep out striped bass, it must be wide enough to allow for adult Chinook salmon passage. Because of this design feature, smaller striped bass may still be able to pass. If that occurs they will be able to prey heavily on juvenile salmonids.

PCSP Page 2-4, Section 2.3 Predator Removal Targets – Targeting only 10% of the predator population for 15 days cannot be expected to result in a measurable benefit to juvenile salmonids. The outmigration (juvenile rearing) period for steelhead trout and fall-run Chinook salmon spans the period from February 1 through June 15. A 10% removal of predators over 15 days of the 135-day outmigration would results in a calculated reduction of predation pressure of approximately 1% during the entire juvenile rearing period. The low percentage of reduction of predation pressure, coupled with the shoreline electrofishing and minnow traps that may result in death or injury of juvenile salmonids, cannot be expected to result in a substantial or measurable benefit to salmonids.

PCSP Page 2-10, Section 2.6.2 Salmon Survival – The USFWS supports the use of paired rotary screw trap monitoring to monitor the effects of the Project on juvenile salmonids. We recommend using trapping methodology consistent with the USFWS 2008 Draft *Rotary Screw Trap Protocol for Estimating Production of Juvenile Chinook Salmon* (Attachment 3) and the 1997 USFWS *Comprehensive Assessment and Monitoring Program (CAMP) Implementation Plan* (Attachment 4).

PCSP Page 2-11, Section 2.7 Adaptive Management – This section misuses the term "adaptive management" which presupposes that a management action will have a measurable effect, something that the proposed PCSP is not likely to have. A plan with no recourse for failure and no measurable benefit does not give the Commission the latitude to protect the lower Tuolumne River fishery through license conditions. The "feedback loops" in the PCSP do not provide any recourse for failure of the plan.

PCSP Page 2-13, Section 2.8.1.1 Boat Electrofishing – This section is missing a description of how electroshocked salmonids will be handled, particularly during the electrofishing sessions that coincide with the juvenile salmonid rearing period. The night electrofishing that is targeted at >150 mm fish is likely to be very hard on the 35-80 mm salmonids. Electrofishing during the outmigration period from February 1 to June 15 is likely to have adverse effects to juvenile salmonids in the form of spinal injuries (Sharber and Carothers 1988), cardiac disturbance (Schreer *et al*. 2004), direct and delayed mortality (Henry *et al.* 2004, Mitton and McDonald 1984, Schreck *et al*. 1976), and is likely to be more severe for post emergent fishes (Henry and Grizzle 2006).

Water control decisions, such as pulse flows, may cue juvenile salmon to migrate and pass through lower Tuolumne River predator fields. It is not clear how the electrofishing events will be timed to reduce the number of migrating juvenile salmonids exposed to treatment.

PCSP Page 2-14, Section 2.8.1.2 Predator Exclusion Weir – The proposed weir is likely to result in a concentrated predator field of striped bass. Without lowering and activation of the riparian floodplain, juvenile salmonids will not have a safe path past predator fields. If a weir is built, it

should be a temporary weir and only installed and operated in dry and critically dry water years. In addition, it should include measures for juvenile salmonids to safely pass, such as a bypass reach.

The existing counting weir is essential for monitoring the effects of the Project on adult spawning returns (escapement). It should be made clear in this section that the existing fish seasonal counting weir will be kept in operation until a decision is made by the fisheries agencies that a new location would be preferred.

The proposed weir may increase head over the infiltration galleries. A map of the impoundment area upstream of the weir should be provided in the PCSP, to assist in determining the effects of the weir on resident *O. mykiss* in the vicinity of the infiltration galleries.

PCSP Page 2-14, Section 2.8.1.3 Public Sport Fishing Derby – Although this measure can generate public interest and enthusiasm, it is not likely to result in a measurable benefit to salmonids. The discrete reach of river that will be fished during the derby would only be a fraction of the predator habitat. In addition, bass are migratory, so the removal of bass will allow bass territories the fishing derby reach to be recolonized by other bass.

PCSP Page 2-15, Section 2.8.1.4 Fyke Trapping – Fyke trapping will target large striped bass. Large striped bass are consummate predators and feed on small and mid-sized striped bass. Removal of the larger striped bass will release the population pressure that they put on their own species. It is the small and mid-sized bass that are the heaviest foragers on small juvenile salmonids.

PCSP Page 2-15, Section 2.8.2. Supplemental Actions – Of the six supplemental actions, two have regulatory constraints and four are experimental. The potential adverse effects to salmonids should be better described in this section.

PCSP Page 2-15, Section 2.8.2.1 Shoreline electrofishing – This methodology is untested and unproven; however, it is likely to put extreme, adverse pressure on juvenile salmonid abundance during the outmigration period. It is not clear how the electrofishing events will be timed to reduce the number of migrating juvenile salmonids exposed to treatment or how the stunned juvenile salmonids will be handled.

PCSP Page 2-16, Sections 2.8.2.2 through 2.8.2.5 – All of these methods are untested and unproven in the field, and adverse effects to juvenile salmonids are not addressed.

Exhibit E Appendix E-5: Woody Debris Management Plan (USFWS)

In the February 26, 2014, USFWS comment letter on the Draft License Application and Updated Study Report, we informed the Commission that surveys for California red-legged frog presence had not occurred and that both FPA and ESA consultation with the USFWS had not occurred. When potential habitat for a listed species is not surveyed, the USFWS must give the benefit of the doubt to the species and assume the habitat is occupied. At issue are the adverse effects that wood stockpiling and burning would have on the California red-legged frog, and how those actions could preclude implementation of Recovery Task #1.7 from the *Recovery Plan for the California Red-legged Frog (Rana aurora draytonii)* (USFWS 2002). For the purpose of ESA

consultation, the USFWS requests the Commission begin formal section 7 consultation with the USFWS pursuant to 50 CFR 402.14.

As discussed earlier, bullfrogs are a significant and widespread threat to California red-legged frogs. Juvenile California red-legged frogs tend to disperse from their rearing habitat to other bodies of water. Wood stockpiling may result in the establishment of large bullfrog populations and may attract California red-legged frogs that disperse toward Don Pedro Reservoir and into the FERC Boundary. If wood piles at Don Pedro Reservoir become occupied by California red-legged frogs, wood burning could result in killing of California red-legged frogs.

Don Pedro Reservoir is in the Piney Creek Core Area, of Recovery Unit 1, for the California red-legged frog and is near the Tuolumne River Core Area of Recovery Unit 1 (USFWS 2002). Wood stockpiling provides artificial habitat for California red-legged frogs and bullfrogs. There is no mention in the Woody Debris Management Plan of how adverse effects to the California red-legged frog and the Piney Creek Core Area will be avoided.

Exhibit E Appendix E-6 Terrestrial Resource Management Plan

(USFWS) This document is missing management actions to address potential adverse effects to the San Joaquin kit fox, California tiger salamander, and California red-legged frog. Specifically, rodent control measures that may result in take of San Joaquin kit foxes or California tiger salamanders should have burrow-specific monitoring, avoidance of burrows occupied by these species, and mitigation for lost refugia. Wood stockpiling and burning, which could result in take of California red-legged frogs, should be phased out in this plan and replaced with rapid wood removal and off-site storage (*e.g.,* not on BLM land and greater than one mile from Don Pedro Reservoir. The USFWS comments on the Biological Assessment specifically address these issues.

(USFWS) The phrase "Project Boundary" appears to be referring to the FERC Boundary, but this is unclear. In addition, the "Project Boundary" does not include the proposed infiltration galleries that are part of the Don Pedro Project and the DPLG Complex. Effects to terrestrial species from operating and maintaining the infiltration galleries should be considered in the Terrestrial Resource Management Plan (TRMP).

The USFWS and BLM are recommending a stand-alone Bald Eagle Management Plan in order to be consistent with bald eagle management on other reservoirs.

(USFWS) Due to the fact that the Don Pedro and La Grange projects are operated and maintained as an integrated water complex, plans that are relevant to both the Don Pedro and La Grange portions of the DPLG Complex should be addressed comprehensively and not as separate plans.

TRMP Page 1-2, last sentence -USFWS and BLM – "Project vicinity" should be defined.

TRMP Page 2-1, Vegetation Management (item 5)- USFWS and BLM – Bi-annual employee training may not be adequate to minimize the possibility that Project O&M would adversely affect special status species. Both the employee training and the agency consultation to review noxious weed and special-status plant species lists should occur annually. This would help minimize the possibility that project O&M would adversely affect special status species.

TRMP Page 2-2, Best Management Practices- USFWS and BLM – The Best Management Practices (BMPs) listed in this section do not fully protect sensitive or listed plants. The following BMPs should be added:

- Annual employee training for staff (employees and contractors), which will include information on recognition of special-status species, the location of existing occurrences of sensitive resources and areas to be avoided. Newly hired staff will be trained before working in those areas.
- Implementing buffers around sensitive areas.
- Flagging or fencing of sensitive areas with a site- and resource-specific buffer prior to any vegetation management activities, including noxious weed treatments, and removing the flagging when the work is complete.
- Posting signs telling recreationists to "Stay on the Trail to Preserve Rare Plants and Their Habitat" when trails created by hikers and horseback riders go through special-status plant habitat. Especially within the Red Hills Area of Critical Environmental Concern at Kanaka Point where there is "evidence of a walking trail in the vicinity of all Layne's butterweed occurrences" and in Poor Man's Gulch where equestrian trail riding "takes place in the vicinity of several occurrences of Layne's butterweed/ragwort and Red Hills/California vervain" (Special-Status Plants Study Report, p. 6-1).
- Monitoring for new weed occurrences in special status plant areas, such as Kanaka Point, where distaff thistle is growing along the footpath that leads to Layne's butterweed occurrences.
- Emphasis on manual control activities (such as hand trimming or weed whacking), when noxious weeds are in special status plant areas, such as at Kanaka Point, where there is yellow starthistle in close proximity to Layne's butterweed.

TRMP Page 2-4 and 2-5, Table 2.2-2 -USFWS and BLM – This table should include the four yellow starthistle populations (2013 Don Pedro Noxious Weeds Study Report, p. 5-4) that were found on Kanaka Point next to a day use recreational area (in the same vicinity as the Federally threatened Layne's butterweed populations) within the Red Hills Area of Critical Environmental Concern. According to Table 2.2-1 these populations would qualify under List C species management method "consideration of localized treatment near sensitive resources."

The weeds on Kanaka Point are an indirect effect of the day use parking area off Jacksonville Road and threaten the ESA species in the Red Hills ACEC. BLM is mandated to "Conserve and/ or recover ESA-listed species and the ecosystems on which they depend" and "To ensure that actions authorized on BLM administered lands do not contribute to the need to list any sensitive plant species under the provisions of the ESA and to initiate proactive conservation measures that reduce or eliminate threats to BLM sensitive plant species to minimize their need for listing under the ESA (BLM Handbook 6840.06 -- Special Status Plant Management, 2012).

TRMP Page 2-5, Section 2.3.1 Special-Status Plant Monitoring -USFWS and BLM – When plants are listed under the ESA, any declines in numbers or occurrences can affect the status of the species. The threshold for increased monitoring should not be substantial declines in special status species occurrences. Increased monitoring, if needed, should be a decision made collaboratively with BLM. The USFWS should be consulted if there are any declines in listed plant occurrences or populations.

TRMP Page 2-6, Section 2.3.2 Special-Status Plant Projection- USFWS and BLM – The Districts should consult with BLM when the potential for both direct and indirect effects to special-status plants are suspected or expected. The USFWS should be consulted with for direct or indirect effects to ESA-listed plants. The 0.5 acre threshold for initiating pre-project review is not protective of ESA-listed plants. Site specific surveys are needed for any ground-disturbing activities where BLM or the USFWS has determined that ESA-listed plants may occur.

BMPs for protection of special-status plants should include but are not limited to the following:

- Annual employee training for staff (employees and contractors), which will include information on recognition of special-status species, the location of existing occurrences of sensitive resources and areas to be avoided. Newly hired staff will be trained before working in those areas.
- Implementing buffers around sensitive areas.
- Flagging or fencing of sensitive areas with a site- and resource-specific buffer prior to any vegetation management activities, including noxious weed treatments, and removing the flagging when the work is complete.
- Posting signs telling recreationists to "Stay on the Trail to Preserve Rare Plants and Their Habitat" when trails created by hikers and horseback riders go through special-status plant habitat. Especially within the Red Hills ACEC at Kanaka Point where there is "evidence of a walking trail in the vicinity of all Layne's ragwort occurrences" and in Poor Man's Gulch where equestrian trail riding "takes place in the vicinity of several occurrences of Layne's ragwort and California vervain" (Don Pedro Special-Status Plants Study Report, p. 6-1).
- Monitoring for new weed occurrences in special status plant areas, such as Kanaka Point, where distaff thistle is growing along the footpath that leads to Layne's ragwort occurrences.
- Emphasis on manual control activities (such as hand trimming or weed whacking), when noxious weeds are in special status plant areas, such as at Kanaka Point, where there is yellow starthistle in close proximity to Layne's ragwort.

TRMP Page 2-6, Table 2.3-1- USFWS and BLM – The label on this table should include recreational use at Don Pedro Reservoir in addition to Don Pedro Project activities due to the risk of indirect effects from recreation and noxious weeds on special-status species. The following special-status plant occurrences should be added to the Table based on their known proximity to roads, day use areas, footpaths and equestrian trails: Red Hills onion occurrences 676 and 678; Mariposa clarkia occurrence 391; Mariposa cryptantha occurrences 72 and 73; Layne's ragwort occurrences 91, 621, 677 and 679; and California vervain occurrence 700.

TRMP Page 4-1, Section 4.0 Bald Eagle Management USFWS and BLM– This section is not adequate for protecting nesting bald eagles from being molested or disturbed during the majority of years. Nest abandonment may occur in years when protective measures are not based on nest activity.

TRMP Page 4-8, Section 4.2 Bald Eagle Surveys and Monitoring-USFW and BLM – The number of surveys in a year is adequate, but not the number of years in which surveys are to occur. The protective measures described in this section only apply to 10 out of 40 years of the license term; therefore, there would be no protection provided for bald eagles in 75% of the years of the license. Bald eagles can be molested or disturbed by lack of protection from disturbance in their

nesting areas. Adult eagles that are molested or disturbed can become agitated to the extent that they abandon their nest, which leads to starvation of their chicks.

TRMP Page 4-8, Section 4.3 Bald Eagle Protection- USFWS and BLM – This section overstates the level of protection that would be afforded to bald eagles by the Districts. Not surveying bald eagle nests and not providing buffers in 75% of the term of the license should not be described as a reasonable effort to protect bald eagles. This section emphasizes exemptions from bald eagle protection measures and the measures described earlier are not fully protective.

TRMP Page 4-9, Section 4.3.1 Establishment of Buffers- USFWS and BLM.- The buffer around bald eagle nests should be changed to ¼ mile as out of 3 nests found occupied in 2012, one nest successfully fledged young, one nest was unconfirmed, and one nest failed. The ¼ mile buffer around bald eagle nests has been adopted in other relicensing and this would remain consistent with other relicensing measures. If it has been established that a bald eagle pair is successful with the 660-foot-radius buffer, then the Districts should get agreement from BLM (on BLM administered land) and the USFWS to establish a site-specific buffer reduction.

TRMP Page 4-9, Section 4.3.3 Use of Rodenticides – USFWS – It is unclear in this section whether the Districts plan to apply rodenticides outside of developed recreation areas or outside of the FERC Boundary. Our interpretation of the Project Boundary includes District lands outside of the FERC Boundary. If rodenticide application on District lands is anticipated—and because of the potential adverse effects of rodenticides on San Joaquin kit foxes, California tiger salamanders, and bald eagles—that application should be addressed in this TRMP and the Commission should assure that ESA consultation on rodenticide application associated with the DPLG Complex is completed prior to issuance of the licenses.

A paragraph should be added to this section that states:

> The Districts will not use burrow fumigants or rodenticides on Federal land, or allow usage of burrow fumigants or rodenticides on Federal land, unless authorized by the Authorized Officer for application on BLM lands. Additionally, the Districts will not use burrow fumigants or rodenticides in potential San Joaquin kit fox habitat or California tiger salamander habitat, or allow usage of burrow fumigants or rodenticides in San Joaquin kit fox habitat, until either ESA § 7 consultation is completed or a permit is issued under ESA § 10, whichever is applicable.

TRMP Page 4-9, Section 4.3.3 Use of Rodenticides – BLM – A sentence should be added to this section that states:

> The Districts will not use burrow fumigants or rodenticides on Federal land, or allow usage of burrow fumigants or rodenticides on Federal land, unless authorized by the Authorized Officer for application on BLM lands.

TRMP Page 6-1, Section 6.0 Employee Training and Agency Consultation- USFWS and BLM – Employee training and consultation with BLM and USFWS should occur every year, at a minimum.

TRMP Page 6-1, Section 6.1 Employee and Contractor Training- USFWS and BLM– Employee and contractor training should occur annually, at a minimum. A provision should be included in

this section for providing training to new employees and contractors prior to any action that they might be involved in that could adversely affect listed or sensitive species. Both employees and contractors should be trained to identify both noxious weeds and special status species, in order to protect employees and contractors from the liability of take and to protect special status species from O&M activities.

TRMP Page 6-1, Section 6.1 Annual Reporting and Agency Consultation -USFWS– For clarity, add "annually" to the first sentence.

TRMP Page 6-2, Section 6.3 Special Status Species List Review- USFWS and BLM– If a species or critical habitat is listed during the intervening year, between the annual consultations, there is no provision for consultation on effects to the species or critical habitat from Project actions, including O&M, monitoring, or implementing safety measures or emergency procedures. A species list can be easily obtained on the USFWS website. The guidance for obtaining a species list can be found at https://www.fws.gov/sacramento/es_species/lists/es_species_lists-overview.htm
In order for the species list to be considered current, the Districts should update their species list at least every 120 days. A current species list, combined with knowledge of effects to species, would help the Districts and the Commission avoid making an ESA §7(d) commitment of resources or from having actions that result in take.

Section 9 of the ESA and Federal regulation pursuant to section 4(d) of the ESA prohibit the take of endangered and threatened species, respectively, without special exemption. Take is defined as to harass, harm, pursue, hunt, shoot, wound, kill, trap, capture or collect, or to attempt to engage in any such conduct. Harass is defined by USFWS regulations at 50 CFR 17.3 as an intentional or negligent act or omission which creates the likelihood of injury to wildlife by annoying it to such an extent as to significantly disrupt normal behavior patterns which include, but are not limited to, breeding, feeding, or sheltering. Harm is defined by the same regulations as an act which actually kills or injures wildlife. Harm is further defined to include significant habitat modification or degradation that results in death or injury to listed species by significantly impairing essential behavior patterns, including breeding, feeding, or sheltering. Incidental take is defined as take that is incidental to, and not the purpose of, the carrying out of an otherwise lawful activity. Under the terms of section 7(b)(4) and section 7(o)(2), taking that is incidental to and not intended as part of the agency action is not considered to be prohibited taking under the ESA provided that such taking is in compliance with the terms and conditions of an Incidental Take Statement.

Considering the potential need for surveys is not a protective measure, and this language should be removed and replaced with: "If the species is likely to occur on lands affected by Project-related operations or maintenance activities, surveys will be conducted and if the species is found then appropriate resource protection measures will be implemented."

The following paragraph was in the Draft Vegetation Management Plan (April 2014) but has been removed from this plan. It should be reinserted in the Terrestrial Resource Management Plan:

> "Additionally, beginning the second calendar year after license issuance, the Districts will annually review BLM and CDFA noxious weed lists. In the event a noxious weed species is newly added to the BLM list and is also a CDFA A- or B-listed noxious weed,

the Districts will conduct an assessment of the potential for the species to occur or invade lands in the Project Boundary, and to recommend appropriate surveys or resource protection measures. Assessment results and findings will be included in the Districts' annual agency consultation report."

Exhibit E Appendix E10 Applicant-Prepared Biological Assessment for Terrestrial Species (USFWS)

The phrase "Action Area" should be globally replaced with the phrase "FERC Boundary" throughout this document (see comment, below, regarding Section 2.3 definition of Action Area).

BA Page 2-1, Section 2.1, paragraph 3 – The first sentence of this paragraph provides an adequate summary of the "larger action" that is described in 50 CFR 402.02.

BA Page 2-1, Section 2.1, paragraph 4 – This section does not pertain to terrestrial species. In addition, the paragraph can be interpreted as overstating the protective nature of the Districts' proposed flow actions.

BA Page 2-2, last paragraph – Although this paragraph included "protection of special status plants" in the list of measures to protect and enhance resources, the Terrestrial Resource Management Plan does not provide adequate protection of special status plants. Biennial employee training is not adequate. There are no best management practices, nor have "usage plans" been developed for protection of known occurrences of special status plants.

BA Page 2-3, Section 2.2, paragraph 1 – This section reduces the scope of the effects being considered in the BA by conflating the definitions of interrelated and interdependent actions and limiting the analysis to just interdependent actions. What is missing is consideration of interdependent actions, or those actions "that are part of a larger action and depend on the larger action for their justification" (50 CFR 404.02). In this case the larger action is simply summarized as the integrated operations the Don Pedro and La Grange Projects (DPLG Complex). All of the integrated actions within the DPLG Complex are interdependent, including Don Pedro Reservoir coordinated flood flow management, hydropower generation, the Districts' irrigation and M&E deliveries, and protection of aquatic resources in the lower Tuolumne River. Without the dams in the DPLG Complex, there would not be hydropower generation at the scale and magnitude of the existing action.

BA Page 2-3, Section 2.2, paragraph 3 – The last sentence of this paragraph should be revised to show that coordinated flood flow management, the Districts' irrigation and M&E demands, recreation at Don Pedro and La Grange reservoirs, and lower Tuolumne River flows are interrelated and that hydropower generation at Don Pedro and La Grange powerhouses is dependent upon management decisions made by the Districts in order to meet the primary and secondary purposes of the Project.

BA Page 2-3, Section 2.3 – This section reduces the scope of the Action Area and does not include the area potentially affected by direct and indirect effects of operating the Project or the DPLG Complex, including decisions made on coordinated flood flow management, the Districts' irrigation and M&E demands, and protection of aquatic resources in the lower Tuolumne River that are summarized in paragraph 3 on page 2-1.

BA Page 4-13, Section 4.3.2, paragraph 1 – Protocol-level surveys of the California red-legged frog were not conducted within the FERC boundary or the Action Area affected by the Project, which is typically considered up to one mile from the reservoir edge. California red-legged frogs can disperse greater than one mile from breeding and foraging habitat and Don Pedro Reservoir and the DPLG Complex would constitute a dispersal barrier and potential population sink. Lack of surveys does not equate to lack of occurrences of California red-legged frogs. It should be pointed out very early in this section that surveys were not conducted, rather than focusing on the lack of documentation of occurrence for the species.

BA Page 4-15, second paragraph – "Human-made agricultural ponds" should not be considered marginal habitat for the California red-legged frog, because such ponds constitute optimal habitat throughout the majority of the species' range.

BA Page 4-15, last paragraph – Field surveys, often referred to as reconnaissance, should not be confused with protocol-level surveys. Potential habitat should not be referred to as "marginal." Cattle grazing should not be considered a stressor, because appropriate range management is often an indicator that potential habitat is occupied by California red-legged frogs. Analysis of effects should include the fact that Don Pedro and La Grange reservoirs act as a dispersal barrier for California red-legged frogs, due to the high levels of predation by fishes that the frogs would be likely to encounter. In addition, the bare edges of Don Pedro reservoir do not provide California red-legged frogs cover from aerial predation or desiccation. Wood stockpiling and burning should be added as a potential source of take of California red-legged frogs.

It is highly likely that many of the 59 potential California red-legged frog locations within the FERC Boundary are occupied by the species. Until protocol-level surveys are done of these sites, they should be considered occupied for the purpose of ESA consultation. Lack of observations during reconnaissance should not be confused with lack of scientific data.

BA Page 4-16, Section 4.4.2 – Protocol-level surveys of the California tiger salamander were not conducted within the FERC boundary or the Action Area affected by the Project, which is typically considered up to 1.3 miles from the reservoir edge for this species. Lack of surveys does not equate to lack of occurrences of California tiger salamanders. It should be pointed out very early in this section that surveys were not conducted, rather than focusing on the lack of documentation of occurrence for the species.

It is highly likely that many of the rodent burrows within the FERC Boundary and on the Districts' and BLM land are occupied by other wildlife, including California tiger salamanders. It is also highly likely that many of the 40 potential breeding ponds within the FERC Boundary and 247 potential breeding ponds within the area affected by the Project are occupied by California tiger salamanders.

BA Page 4-18, second paragraph – Use of burrow fumigants by the Districts or their contractors, or by their permission or agreement, could result in take of California tiger salamanders. In addition to direct mortality, ground squirrel suppression is likely to result in less upland refugia being available for California tiger salamanders and should be considered a stressor on the species and the local population.

BA Page 4-21, Section 4.6.2 – The CNDDB should not be considered an appropriate data base for determining absence, because it is updated infrequently and submissions are voluntary. The USFWS is aware that detections of listed species frequently go unreported.

This section confuses the recognition of ground squirrel burrows used for San Joaquin kit fox dispersal with those used for more permanent denning, such as natal dens. It is very difficult to detect short-term occupancy by kit foxes, and large burrows should not be the sole factor in determining kit fox use. There is also no analysis of ground squirrel occupancy over time, and changes in prey availability that may have occurred from rodenticide use and burrow fumigation.

This section is misleading about the level of effort that went into surveying for kit foxes. It appears the surveys only focused on potential natal dens and not on other forms of refugia typically used by San Joaquin kit foxes during dispersal, such as culverts, abandoned pipelines, roadbeds, and banks in water detention basins. No effort was made to use contemporary survey techniques, such as using dogs that are trained to detect kit foxes by scent. The "extensive terrestrial surveys" were simply field reconnaissance during daylight hours. Kit foxes are nocturnal, and no night surveys or call surveys were conducted.

BA Page 5-1, Section 5.1, paragraph 1 – This paragraph should be revised to report that the Project may affect the Layne's butterweed, Red Hills vervain, California red-legged frog, California tiger salamander, San Joaquin kit fox, and Valley elderberry longhorn beetle.

BA Page *5-1, Section 5.2* – Although flood control, water delivery, and recreation are not dependent on licensing under the FPA, the hydropower generation from the Project and the DPLG Complex would not be possible without the height and capacity of Don Pedro Dam and Reservoir.

BA Page 5-2, paragraph 1 – This paragraph incorrectly states that Project uses are not interrelated and interdependent with a FERC license for hydropower generation. This paragraph should be amended to reflect that the interrelated actions of the Project and DPLG Complex have effects to listed species and identify that hydropower generation timing and amounts are dependent upon the flow timing and amount decisions made relative to the Project and DPLG Complex.

BA Page 5-2, Section 5.3 – The NEPA definition for cumulative effects is different than the ESA definition for cumulative effects. This section of the BA inappropriately uses the NEPA definition. For the purpose of ESA consultation, the BA should use the ESA definition of cumulative effects.

BA Page 5-2, Section 5.3.1, second sentence – This sentence is not factually correct. By using the NEPA definition of cumulative effects, incorrectly characterizing the Action Area, and not considering FERC's authority under the FPA and within the FERC Boundary, a faulty conclusion has been made regarding Project effects. This sentence should be revised to address the direct and indirect effects to listed species that may occur from Project O&M.

BA Page 5-3, second paragraph – The methodology for checking ground squirrel burrows for occupancy by California tiger salamanders and San Joaquin kit foxes prior to fumigating should be described here. Fumigants kill all wildlife in burrows and the effect of loss of a keystone species, such as the California ground squirrel, should be discussed.

BA Page 5-3, Section 5.3.1.3 – The methodology for safely and expeditiously removing logs from reservoirs has changed over time. The adverse effects to California red-legged frogs from wood stockpiling and burning are discussed above, in our ER and BA comments.

The importance of woody material for supporting juvenile salmonid rearing and foraging is now well known. This O&M action should be modified for conserving anadromous salmonids as well as California red-legged frogs.

BA Page 5-3, Section 5.2.2 – The second sentence of this section is incorrect and should be reworded to reflect the potential adverse effects of O&M on the Layne's butterweed, Red Hills vervain, California red-legged frog, California tiger salamander, San Joaquin kit fox, and Valley elderberry longhorn beetle.

BA Page 5-3, Section 5.3.2.1 – Regarding Project effects to the Layne's butterweed and Red Hills vervain, the statement that "These plants are not currently adversely affected by water surface elevation related to the Don Pedro Project's primary purposes of water supply and flood control" is unsubstantiated and unfounded. It has not been shown that these species have not been adversely affected by current operations, and pre-inundation data is needed in order to compare what these populations looked like before operations were started. No analysis was conducted to analyze effects on special-status plant species from water level fluctuations due to current operations. The third sentence of the first paragraph of this section is incorrect and should be deleted.

BA Page 5-5, Section 5.3.2.2 – Without having surveyed for the California red-legged frog or California tiger salamander, it is premature to determine that there is no potential for O&M or recreation to have adverse effects on the species. As described earlier, wood stockpiling and burning could result in take of California red-legged frogs and burrow fumigation could result in take of California tiger salamanders. Rare use of the spillway means that the potential adverse effects resulting from the spillway activating are infrequent but not unlikely. This section should be revised to reflect that distinction.

BA Page 5-5, Section 5.3.2.4 – This section is misleading about the level of effort that went into surveying for kit foxes (see comments on Section 4.6.2, above). Rodent control and burrow fumigation are likely to adversely affect the San Joaquin kit fox in two ways. First, ground squirrels are an important prey item for the San Joaquin kit fox, and removing available prey can reduce the survival probability for dispersing kit foxes. Second, kit foxes, especially juvenile foxes, may not enlarge ground squirrel burrows while crossing the Districts' and BLM land. Only looking for ground squirrel burrows that have been enhanced by kit foxes as natal dens is likely to miss ground squirrel burrow use by dispersing kit foxes. The only way to prevent take of kit foxes, prior to using burrow fumigants, is to check the burrow for kit fox occupancy prior to fumigating. Wildlife cameras or burrow cameras can be used to accomplish this.

BA Pages 6-1 to 6-2, Table 6.0-1 – The effect determinations in this table are incorrect. At a minimum, they should all be changed to "May Affect." In all instances where O&M or recreation may result in take of listed animals, including but not limited to burrow fumigation, wood stockpiling, burning, and herbicide use, formal ESA consultation pursuant to 50 CFR 402.14 should be initiated.

It is misleading to claim that noxious weed management is a benefit to ESA-listed plant species and that ESA-listed plants do not exist in the drawdown zone. Hydrologic fluctuations are mentioned as having an effect on Red Hills (California) vervain (in the Environmental Report), yet no effects analysis from hydrologic fluctuations was included in the Environmental Report. This omission should be rectified.

The Terrestrial Resource Management Plan does not provide adequate protection of special status species. The Biennial employee training is not adequate. There are no best management practices, nor have "usage plans" been developed for protection of known or potential occurrences of listed species or special status plants. These deficiencies should be addressed.

USFWS RECOMMENDATIONS, TERMS AND CONDITIONS, AND PRESCRIPTIONS

The USFWS seeks to ensure that appropriate levels of resource protection are incorporated in any new license; and the Section 10(j) Conditions and Section 10(a) Recommendations presented here will protect, mitigate, and enhance fish and wildlife resources in the Project area. The USFWS expects that ESA issues will be addressed through the Commission's compliance with Section 7 of the ESA.

Federal Power Act Section 18

Reservation of Section 18 Authority Article

Authority is reserved for the Department to prescribe the construction, operation, and maintenance of fishways at the Project, including measures to determine, ensure, or improve the effectiveness of such prescribed fishways, pursuant to Section 18 of the FPA, as amended, during the term of the Project license.

Justification for Reservation of Section 18 Authority Article

Pursuant to Section 18 of the FPA, the Commission shall require the construction, maintenance, and operation by a Licensee at its own expense of such fishways as may be prescribed by the Secretary of the Interior or the Secretary of Commerce, as appropriate (16 U.S.C. § 811). The Secretary of the Interior is exercising the Department's Section 18 authority through the inclusion in the license of a separate license article that reserves the Department's authority to prescribe fishways, over the term of the license, pursuant to Section 18 of the FPA.

Fish passage would provide Chinook salmon and steelhead trout access to historical spawning habitat upstream of the DPLG Complex. The anadromous populations of these species cannot be sustained in the Tuolumne River without fish passage. Construction and operation of fish passage creates jobs, and successful fish passage maximizes the wild fish production that contributes to both commercial and recreational harvest.

Historically, spring-run Chinook salmon spawned in the headwaters of the Tuolumne River. The collapse of the Tuolumne river spring-run Chinook population began with construction of the La Grange Dam, the lowest dam in the DPLG Complex. The reproductively-viable Chinook salmon that were stocked in Don Pedro Reservoir, prior to 2013, have established an adfluvial population that spawns in the upper Tuolumne River watershed (Hutchins and Charles 2016).

Summer temperatures in the lower Tuolumne River are not adequate to support spring-run Chinook salmon, but the adfluvial population in the upper Tuolumne River watershed indicate that there continue to be water temperatures that support Chinook salmon holding and maturation upstream of Don Pedro Dam.

La Grange Dam prevents upstream migration of Chinook salmon and steelhead trout, and Don Pedro Dam prevents downstream migration of these species. Providing downstream and upstream passage would ensure that Chinook salmon and steelhead trout are able to complete their anadromous life-cycle and return from the ocean to the Tuolumne River to reproduce the next generation of fish. In addition to recovering Chinook salmon and steelhead trout populations in the Tuolumne River, providing fish passage for anadromy of salmonids affected by the Project and the DPLG Complex would enhance ecosystem productivity in the watershed by significantly increasing marine derived nutrients, and would contribute to the stability of the West Coast salmon fishery.

USFWS Federal Power Act Section 10(j)

FPA § 10(j) USFWS Condition 1: Develop and Implement a Streamflow and Reservoir Level Compliance Monitoring Plan

A. The Licensees shall, within the first 6 months of the new license term, develop and implement a Streamflow and Reservoir Level Compliance Monitoring Plan that includes Don Pedro Reservoir and the lower Tuolumne River. The plan shall be developed in consultation with the USFWS, NMFS, CDFW, and SWRCB. The Plan shall include descriptions of:
    1. Locations where the Licensees monitor compliance to the requirements in the license related to streamflows and reservoir levels.
    2. Equipment used by the Licensees to monitor compliance to the requirements in the license related to streamflows and reservoir levels.
    3. How the equipment used by the Licensees to monitor compliance to the requirements in the license related to streamflows and reservoir levels is deployed, set (*e.g.*, frequency of data collection), operated and calibrated.
    4. How data are retrieved from the equipment used by the licensees to monitor compliance to the requirements in the license related to streamflows and reservoir levels, including frequency of data downloads, quality assurance/quality control procedures, and data storage.
    5. How the Licensees make streamflow and reservoir level data available to FERC, agencies and the public.
    6. How the Licensees will report streamflow and reservoir level data to FERC, and update the Plan as needed in the future.
B. The Licensees shall add an additional minimum instream flow compliance point in the lower Tuolumne River. The new compliance point should be located in the river up to 1,500' downstream of their existing and proposed infiltration galleries.

***Justification for FPA § 10(j) Condition* 1: Develop and Implement a Streamflow and Reservoir Level Compliance Monitoring Plan**

The AFLA filed with the Commission does not include a streamflow and reservoir compliance monitoring plan. Article 8 in FERC's Form L-5 Standard Articles, states in part:

"The Licensee shall install and thereafter maintain gages and stream-gaging stations for the purpose of determining the stage and flow of the stream or streams on which the project is located, the amount of water held in and withdrawn from storage, and the effective head on the turbines; shall provide for the required reading of such gages and for the adequate rating of such stations; and shall install and maintain standard meters adequate for the determination of the amount of electric energy generated by the project works."

Compliance with minimum instream flows requires accurate and reliable gaging and is integral to the protection of aquatic biota in the Don Pedro Reservoir and the lower Tuolumne River, including special status fish species such as fall/late-fall Chinook salmon (*O. tshawytscha*) and steelhead trout (*O. mykiss*).

The Licensees have proposed the use of infiltration galleries to divert additional water out of the Tuolumne River. Therefore, the existing gaging system to monitor minimum instream flows is insufficient. A new gage located just downstream of their new diversion should be installed as a compliance point. The compliance point should monitor streamflow in the Tuolumne River itself as minimum instream flows are based on needs of aquatic biota using the river.

This Condition provides that the Licensees would develop and implement a Plan that includes a description of the gages, including equipment, location, maintenance, review of data, and publication of data that Licensees would use to document compliance with streamflow and reservoir level requirements in the new FERC license.

FPA § 10(j) USFWS Condition 2: Maintain Minimum Streamflows in Lower Tuolumne River to Conserve Salmonids and Ecosystem Function

A. Beginning within the first 90 days of the new license term, Licensees shall annually determine the applicable water year type as described in Table 1 of this condition. Licensees shall use this determination to implement articles and conditions of the license that are dependent on water year type and that concern flows in the lower Tuolumne River. Water year types for this condition shall be based on the unimpaired inflow to the La Grange gage.

Table 1: Water Year Type Classification for the lower Tuolumne River.

Water Year Type	**Thousands of Acre Feet**
Wet	Equal to or greater than 2,725
Above Normal	Equal to or greater than 2,000 and less than 2,725
Below Normal	Equal to or greater than 1,400 and less than 2,000
Dry	Equal to or greater than 1,075 and less than 1,400
Critically Dry	Equal to or greater than 830 and less than 1,075
Super Critically Dry	Less than 830 TAF

1. The water year type shall be modified when multiple dry and critically dry year water year types occur in sequence as follows:
    i. If a Dry year (according to inflow) is preceded by any combination of two or more Critically Dry or Super Critically Dry years, it becomes a Critically Dry year.
    ii. If a Critically Dry year (according to inflow) is preceded by a Critically Dry year, it becomes a Super Critically Dry year.
2. Licensees shall update water year types within three days of the issuance of DWR Bulletin 120 or its successor in February, March, April and May of each year. The May water year type shall apply until the February update in the following water year. It is the intent of these recommendations that the percent-of-unimpaired flow requirements be one full month's duration in those months in which they are required. Example: if the April DWR Bulletin 120 is released on April 10 and indicates a Dry water year, and that water type is applied by Licensees on April 13, Licensees would be obligated to continue the required Dry year release for April through May 12.

B. Licensees shall meet the minimum streamflows in the lower Tuolumne River as shown in Table 2 of this condition. These streamflows shall be measured at the indicated gages, which are located downstream of the releases from La Grange Dam and downstream of the infiltration gallery (see USFWS proposed Condition 1). Licensees shall record minimum streamflow at all gages as required by Article 8 of FERC's Form L-5, Standard Articles.
    1. Licensees will release the percent of unimpaired flow as applicable with no three day running average being less than 40% of unimpaired, and no seven day running average being less than 50% of unimpaired.
    2. Minimum streamflows in this condition shall mean the 3-day running average of average daily streamflows, with the 15-minute flows not less than 90 % of the specified flow requirement in Table 2 in this condition. In addition, 15-minute flows shall not be less than the applicable flow requirement specified in Table 2 for more than 48 consecutive hours.
    3. Minimum streamflows in this condition may be temporarily modified for short periods, as necessary for powerhouse outages required for inspections and maintenance purposes, upon approval of the Commission.
    4. Minimum streamflows may be temporarily modified due to an emergency. An emergency is defined as an outage due to an event that is reasonably out of the control of the Licensees and requires the Licensees to take immediate action, either unilaterally or under instruction of law enforcement, emergency services, California ISO or other regulatory agency staff, including actions to prevent or reduce the imminent loss of human life or damage to property. An emergency may include, but is not limited to: natural events such as earthquakes, landslides, storms, or wildfires; vandalism; malfunction or failure of transmission lines or Project works; or other public safety incidents. If the Licensees temporarily modify the requirements of this condition due to an emergency, the Licensees shall make all reasonable efforts to promptly resume performance of the requirements, and shall notify the USFWS, NMFS, CDFW, and the SWRCB within 48 hours of the start of the modification. The Licensees shall provide notification to the Commission as soon as possible but no later than 10 days after such incident.
    5. If any of the minimum flow requirements in the Licensees' water right permits are temporarily modified by the SWRCB or its Deputy Director for Water Rights, and

if the Licensee, NMFS, USFWS and CDFW agree, then the Licensees may make corresponding temporary modifications to the requirements in this condition. The Licensees shall provide notification to the Commission as soon as possible but no later than 10 days after such temporary modifications are made.

C. Licensees shall provide a riparian recession flow in AN, BN, and Dry Water Year types.
   1. Recession flows apply only in AN, BN and Dry years.
   2. Recession flows provide a multi-day rampdown to baseflow from the flow value on the final day of any water year ("Recession Initiation Flow Value") on which minimum flows are determined by a percent of unimpaired flow.
   3. Recession rate is 180 cfs/day when the Recession Initiation Flow Value is greater than or equal to 1400 cfs, and shall remain at that rate until the daily flow value is equal to or less than 1400 cfs.
   4. Recession rate for flows equal to or less than 1400 cfs is meant to require a drop in stage height of 9 cm/day for the first 6 days, and 3 cm/day thereafter, until baseflow is reached.
   5. If the Recession Initiation Flow Value is equal to or less than 1400 cfs, or otherwise once the flow value becomes equal to or less than 1400 cfs in the course of the implementation of the 180 cfs/day recession, Licensees shall ramp down according to the values in Table 3 below. If the Recession Initiation Flow Value is less than or equal to 1254 cfs, then Licensees shall initiate the rampdown at the smallest value greater than the Recession Initiation Flow Value, and ramp down each day according to the descending values on the table.

Table 2. Minimum Streamflows in cubic feet per second (cfs) for the Don Pedro Hydropower Project by date and Water Year Type, which is defined in Table 1.

Date	Wet	Above Normal	Below Normal	Dry	Critically Dry	Super Critically Dry
LOWER TUOLUMNE RIVER – BELOW LA GRANGE DAM (COMPLIANCE POINT: LA GRANGE - USGS STREAMFLOW GAGE 11289650)						
October 1-November 30[1]	300[1]	300[1]	300[1]	300[1]	300[1]	300[1]
December 1-January 31	300	300	300	300	300	300
February 1-29	Whichever is greater: 50% unimpaired flow or 300 cfs	Whichever is greater: 50% unimpaired flow or 300 cfs	Whichever is greater: 50% unimpaired flow or 300 cfs	300	300	300
March 1-31	Whichever is greater: 50% unimpaired flow or 300 cfs	Whichever is greater: 50% unimpaired flow or 300 cfs	Whichever is greater: 50% unimpaired flow or 300 cfs	Whichever is greater: 50% unimpaired flow or 300 cfs	300	300
April 1-30[2]	Whichever is greater: 50% unimpaired flow or 300 cfs	Whichever is greater: 50% unimpaired flow or 300 cfs	Whichever is greater: 50% unimpaired flow or 300 cfs	Whichever is greater: 50% unimpaired flow or 300 cfs	300[2]	300[2]
May 1-31	Whichever is greater: 50% unimpaired flow or 300 cfs	Whichever is greater: 50% unimpaired flow or 300 cfs	Whichever is greater: 50% unimpaired flow or 300 cfs	300	300	300
June 1-30	Whichever is greater: 50% unimpaired flow or 300 cfs	300	300	300	300	300
July 1 – September 30	300	300	300	300	300	300
LOWER TUOLUMNE RIVER – BELOW INFILTRATION GALLERIES (COMPLIANCE POINT: WITHIN 1,500' DOWNSTREAM OF INFILTRATION GALLERIES (SEE PROPOSED CONDITION 1) NO GAGE CURRENTLY EXISTS)						
October 1-November 30[1]	300[1]	300[1]	300[1]	300[1]	300[1]	300[1]
December 1-January 31	300	300	300	300	300	300
February 1-29	Whichever is greater: 50% unimpaired flow or 300 cfs	Whichever is greater: 50% unimpaired flow or 300 cfs	Whichever is greater: 50% unimpaired flow or 300 cfs	300	300	300
March 1-31	Whichever is greater: 50% unimpaired flow or 300 cfs	Whichever is greater: 50% unimpaired flow or 300 cfs	Whichever is greater: 50% unimpaired flow or 300 cfs	Whichever is greater: 50% unimpaired flow or 300 cfs	300	300
April 1-30[2]	Whichever is greater: 50% unimpaired flow or 300 cfs	Whichever is greater: 50% unimpaired flow or 300 cfs	Whichever is greater: 50% unimpaired flow or 300 cfs	Whichever is greater: 50% unimpaired flow or 300 cfs	300[2]	300[2]
May 1-31	Whichever is greater: 50% unimpaired flow or 300 cfs	Whichever is greater: 50% unimpaired flow or 300 cfs	Whichever is greater: 50% unimpaired flow or 300 cfs	300	300	300
June 1-30	Whichever is greater: 50% unimpaired flow or 300 cfs	300	300	300	300	300

July 1 – September 30	200	200	200	200	200	200

[1] See Fall Pulse Flows section and requirement in Table 3 below.
[2] See Spring Pulse Flows section and requirement in Table 4 below

Table 3: Recession Values Equal to or Less than 1400 cfs

Day	Flow	Day	Flow
1	1400	14	612
2	1254	15	584
3	1157	16	556
4	1068	17	527
5	979	18	499
6	890	19	499
7	801	20	471
8	771	21	443
9	742	22	414
10	720	23	386
11	697	24	358
12	669	25	330
13	640	26	301

D. Licensees shall provide a Fall pulse flow, as described in Table 4, which shall be released in coordination with fall pulse flows that occur on other San Joaquin River Tributaries, including the Stanislaus and Merced Rivers.

Table 4: Fall Pulse flows for the lower Tuolumne River to be released in addition to minimum instream flows.

Water Year Type	**Acre Feet**
Wet	20,000
Above Normal	20,000
Below Normal	15,000
Dry	15,000
Critically Dry	10,000
Super Critically Dry	7,500

E. Licensees shall provide a spring pulse flow, as described in Table 5 to be managed by a technical committee.

Table 5: Spring pulse flows for the lower Tuolumne River to be released in addition to minimum instream flows.

Water Year Type	**Acre Feet**
Critically Dry	35,000

Super Critically Dry	12,500

Justification for FPA § 10(j) Condition 2: **Maintain Minimum Streamflows in Lower Tuolumne River to Conserve Salmonids and Ecosystem Function**

Licensees propose using the San Joaquin 60-20-20 Index to set water-year types. This would have the advantage of potentially keeping the water-year types the same as those on the Merced and the Stanislaus (although Merced ID has proposed a different system in the relicensing of the Merced River Project). The 60-20-20 Index also looks at the previous year's Index.

There are several general downsides of the 60-20-20 Index. One is that it is based on hydrologic conditions in all three watersheds (Stanislaus, Tuolumne and Merced), rather than being specific to the Tuolumne. The value of a watershed-specific water-year type outweighs the convenience of having the same water-year type designation in all three major San Joaquin tributaries in any given year. 60-20-20 also places great emphasis on April-July runoff (the "60" in 60-20-20). Instead, the USFWS chose the estimated 50% exceedance value for annual flow at La Grange to determine water year type. We believe the annual value is the better value to use than the 60-20-20 emphasis on inflow from April-July.

Dry year sequences are the periods of greatest stress on the system, both in terms of available water and in terms of planning. For this reason, we propose inclusion of a Super Critically Dry year water-year type that would be triggered either by extremely low inflow or when there are two or more Critically Dry years in a row.

The minimum instream flows in the AFLA are not sufficient to support salmonid holding, spawning, and rearing in the lower Tuolumne River. Mesick et al (2008) and Mesick (2010) noted that CV fall-run Chinook salmon (and likely other salmonids) face a high risk of extinction in the Tuolumne River due to inadequate instream flows that affect water temperatures, blockage of substrate transport, and severely impaired holding, spawning, and rearing habitats in the lower Tuolumne River. Mesick et al. (2008) found that adult Tuolumne River fall-run salmon had significantly declined since the 1996 FERC Settlement Agreement and modified Articles 37 and 58 of the existing license. They also found that winter and spring flows affected juvenile salmon survival in the Tuolumne River. Mesick and Marston (2007) found that instream flow releases in the Tuolumne River, from February 1 through June 15, as gaged at La Grange, explained approximately 82% of the variation in Tuolumne River fall-run Chinook salmon recruitment. They also found that factors outside of the Tuolumne River explained very little variation in the adult fall-run Chinook salmon recruitment in the Tuolumne River. Increased minimum instream flows throughout other parts of the year also provide flows for steelhead and other native fish species in the lower Tuolumne River and San Joaquin River such as lamprey and sturgeon.

The AFLA proposed flows in the lower Tuolumne River do not include components of a natural hydrograph that benefit salmonids and riparian ecosystem function. The five components of a natural hydrograph in the eastern Central Valley are: (1) fall or winter freshets (first inundation flows of the wet season), (2) winter storm/peak flows, (3) spring snowmelt flows, (4) snowmelt recession flows, and (5) summer base flows. A natural hydrograph provides important environmental conditions and cues that are essential to salmonid reproductive behavior and to population sustainability. The AFLA flows do not provide the components of the natural hydrograph that would provide timely migration cues and foraging habitat for juvenile salmonids in the floodplain and other areas outside of the main channel.

Inundated floodplain in spring enhances juvenile salmonid rearing, emigration, and survival (Hayes *et al.* 2008, Jeffres *et al.* 2008 Limm and Marchetti 2009, NMFS 2014b, Opperman 2012, Opperman *et al.* 2010, Sommer *et al.* 2001). This is largely because winter and spring high flows resulting in floodplain inundation make invertebrate prey bioavailable to salmonids. The longer the period of inundation, the more the aquatic food web is activated and the more food becomes available to juvenile salmonids. When organic matter in the floodplain becomes saturated with winter and spring flows it is conditioned and utilized by shredders (*i.e.*, amphipods, isopods, stoneflies, caddisflies, and some mayflies), which are common prey species for both adult and juvenile salmonids. Shredders also convert organic matter (*e.g.*, leaves, twigs, and woody debris) into fine particulate organic matter that is in turn used by invertebrate "conditioners" and "collectors" farther downstream. Short and Maslin (1977) found that the fine particulate organic matter contribution made by shredders contributed significantly to the food resource base for the invertebrate "collectors" that are also important prey for juvenile and adult salmonids. Consequently, the ecological chain of shredders, conditioners, and collectors allows the riparian ecosystem to provide prey biomass to both the main channel and to off-channel areas in a positive and enhanced feedback system.

There are many studies showing the positive relationship between salmonid growth and survival when juvenile salmonids have access to off-channel areas and floodplains (*e.g.*, Bellmore *et al.* 2013, Jeffres *et al.* 2008, Katz *et al.* 2017, Sellheim *et al.* 2016, Hayes *et al.* 2008, Limm and Marchetti 2009, NMFS 2014b, Opperman 2012, Opperman *et al.* 2010, Sommer *et al.* 2001, Sturrock *et al.* 2015, and Zeug *et al.,* 2014). To provide full expression of the BMI food web, engaged floodplain habitat should be inundated annually for between 30 and 90 days to allow for primary productivity derived from inundated habitat to be realized throughout most of the lower Tuolumne River. A maximum inundation period is needed for the establishment of benthic macroinvertebrate guilds [shredders, conditioners, collectors (Poff and Zimmerman 2010, Short and Maslin 1977)] that are the prey base for juvenile salmonids (Allan *et al.* 2003).

The importance of high spring flows during outmigration on smolt survival has been shown for the Tuolumne River (USFWS 1987; Kope and Botsford 1990; USFWS 1992; EA Engineering 1997; CDFG 1998) and for other Central Valley rivers as well (Brandes and McLain. 2001). Studies on the Tuolumne River under FERC-mandated 1971 and 1986 study plans determined which factors influenced the rate and magnitude of changes in population size of the San Joaquin system Chinook salmon. The severity of mortality during smolt outmigration was inversely related to discharge. They hypothesized that high spring discharge reduced mortality by reducing water temperature, reducing predation by increasing turbidity and water velocity, diluting pollutants, and reducing the proportion of smolts entrained in delta water export facilities.

In addition to providing critical rearing habitat, elevated flows in spring also decrease energetic expenditure for emigrating salmonids and decrease the risk of predation, thereby improving passage in the Lower Tuolumne River. Turbidity provides cover from predators (Gregory 1993, Gregory and Levings 1998), and may cue emigration of juvenile salmonids and immigration of adult spring-run Chinook salmon into upstream holding habitat (Jager and Rose 2003, Jager *et al.* 1997, Stevens and Miller 1983).

While developing an alternative flow proposal to the AFLA flows, the USFWS attempted to work within the general framework that the State Water Resources Control Board (SWRCB) has established for its ongoing San Joaquin Flow and Salinity proceeding, otherwise known as Phase

I of the Update of the Bay-Delta Water Quality Control Plan. This framework bases flow requirements on release of a percent of the February-June unimpaired inflow to major San Joaquin tributary reservoirs, including Don Pedro and La Grange Reservoirs on the Tuolumne River.

The USFWS is recommending minimum flows to be based on the 50% of unimpaired flow during February through June depending on the water year type. Under current operation of the Project, these flows are not being met. Instead, during April, May and June, the medians are 22%, 12% and 9% of unimpaired flow, and include values as low as 2% of unimpaired flow in June 1991. Rather than requiring that minimum flows be based on unimpaired flows during February through June in all water year types, the USFWS is recommending eliminating the use of percent unimpaired for some months, as described in Table 2. The USFWS considered the relative benefit and losses of eliminating certain months from the default February through June percent-of-unimpaired requirement. The USFWS principally considered: (1) the lifestages of salmon and *O. mykiss* that benefit from flow in each month; (2) the relative biological benefit that derives from the hydrology under the percent-of-unimpaired requirement in each month; and (3) downstream conditions in each month.

Requiring 50% of unimpaired streamflows, in all months and all water year types, would provide less in-river biological benefits, especially in drier water years, and at a relatively high water cost. During wet water year types, high June flows may extend the in-river rearing period and increase outmigrant size of juvenile Chinook salmon. Therefore, the percent unimpaired requirement was kept for the entire February – June time period for wet water year types. Monitoring data also indicates that most salmon outmigration is done by the end of May and suggests that March and April are good months to emphasize in Dry-year flow management. Furthermore, water temperature data suggests that water temperature objectives for the lower Tuolumne River may be difficult to meet in May in drier water years. Eliminating the percent-of-unimpaired requirement in some months, depending on the water year type, provides more water for storage and irrigation while still protecting the needs of juvenile salmonids.

The natural hydrograph included short duration, small magnitude fall floods that have been eliminated by Project operations. This portion of the natural hydrograph has been replaced by a recommended pulse flow in October. Pulse flows have long been used to help partially mitigate for changes in hydrology that occur following the construction of a dam as described in numerous scientific studies. They are meant to mimic natural hydrologic processes for habitat creation and maintenance and/or elicit migration and spawning of fish. Banks (1969) cites Calderwood (1908), when referencing the first recorded incidence of freshets (pulse flows) being used in 1888 to “bring salmon up from the sea” to spawn. Although salmonid response to attraction flows is well documented in both historical and contemporary scientific literature, no research has been conducted on the use of hydropower-released pulse flows in the Tuolumne River specifically.

The upstream migration of salmon is influenced by the level of water flow. Jonsson *et al*. (1990) found that with high water flow in the fall, the amount of migrating adult Atlantic salmon increased with higher water flow. Van den Berghe and Gross (1989) found that coho salmon migration increased with higher stream levels. Adult Atlantic salmon have been observed entering freshwater during fall high flows and remained at the downstream end of the estuary during lower flow periods (Saunders 1960). Atlantic salmon in England were observed entering freshwater during high flow periods, while low flow delayed the movement into freshwater

(Potter 1988). Mantua *et al*. (2010) indicate that as streamflows decrease from decreased snowpack spring melt, the reproductive success of Washington salmon runs may decrease. Hayes (1953) studied freshets and their effects on Atlantic salmon in Nova Scotia, and he concluded that natural freshets were capable of increasing upstream movement when other factors were favorable and reducing flow followed by an increase in flow can also increase upstream movement.

The USFWS's proposed Fall Pulse Flows when combined with the base flows are increased compared to the AFLA flows. These pulse flows are meant to attract upstream salmon migrants, and the timing of the pulse flow releases should be determined by a technical committee. The technical committee should coordinate the release of these flows with other fall pulse flows on the Merced, Mokelumne, and Stanislaus Rivers to maximize benefits to the San Joaquin River and through the Delta. The proposed fall pulse may serve other biologically relevant purposes including to flush spawning gravels of accumulated algae, debris, and fine materials. However, no research has been conducted on the use of hydropower-released pulse flows for these purposes in the Tuolumne River specifically.

In Critically Dry years and Super Critically Dry years, taking a percent-of-unimpaired flow in the February – June time period causes the system to run out of water. Therefore, rather than require a percent-of-unimpaired flow during these water year types, the USFWS is instead recommending a spring pulse flow. In Critically Dry years, the USFWS recommends that a 35,000 AF block of water be added to the 300 cfs base flow. In Super Critically Dry water years, the USFWS recommends that a 12,500 AF block of water be added to the 300 cfs base flow. Decisions regarding the timing and duration of this pulse flow should be made by a technical committee. Spring pulse flows are not expected to result in floodplain rearing habitat. Instead, spring pulse flows during these water year types are meant to facilitate successful outmigration of juvenile salmonids.

Gradual recession of spring flows allow for riparian tree recruitment and establishment (Braatne *et al.* 2007, Dykaar and Wigington 2000, Everitt 1995, Fenner *et al.* 1985, Howe and Knof 1991, Hughes and Rood 2003, Mahoney and Rood 1993, Mahoney and Rood 1998, Rood *et al.* 2003, Rood *et al.* 2005, Scott 1967, SYRCL 2016). Fremont cottonwood (*Populus fremontii*) is the species of primary concern because it would naturally dominate the riparian over-story and include individuals of size representing significant local sources of large wood and other features of aquatic habitat. Following the period of seed dispersal, flow recession greater than 2.5 cm/day is considered lethal to cottonwood seedlings because the roots cannot grow fast enough to keep up with the declining water table (Mahoney and Rood 1998, Stillwater Sciences 2006, Stella and Battles 2010). This condition is necessary to avoid project impacts on riparian recruitment.

Ramping Rates year-round should be implemented in a manner that minimizes risk of juvenile stranding and minimizes drastic fluctuations in flow related to water transfers or deliveries (Bradford *et al*. 1995, Bradford 1997). When, possible decreases in flow should be done at night when juveniles are assumed to move out and forage (Bradford *et al*. 1995).

The USFWS has provided lower base flows downstream of the Licensees' existing and proposed infiltration galleries from July 1 – September 30 (Table 2). Should the Licensees want to divert more than 100 cfs from their infiltration galleries or divert water for an extended period of time, minimum instream flows at the new compliance point must still be met. Furthermore, minimum

instream flows requirements must be met regardless if the Licensees are operating the infiltration galleries.

FPA § 10(j) USFWS Condition 3: Restore and Enhance Juvenile Salmonid Rearing Habitat in the Lower Tuolumne River

A. Licensees shall, within the first two calendar years of the new license term, develop a Lower Tuolumne River Habitat Restoration and Enhancement Plan in consultation with CDFW, USFWS, NMFS, SWRCB ("Agencies"), and a qualified restoration ecologist. The Plan shall include the restoration and enhancement of functioning juvenile salmonid rearing habitat in the lower Tuolumne River from La Grange Dam down to the confluence with the San Joaquin River, through implementation of specific restoration and enhancement measures that include addition of areas of floodplain inundation, planting of riparian vegetation, and installation of large woody material as described below. The plan shall include implementation and effectiveness monitoring. The plan shall be submitted to the Agencies for review and approval prior to submitting the final plan to the Commission and shall be implemented upon approval of the Commission. The plan shall consist of the elements outlined below.

Restoration and Enhancement Measures

1. Identification of Restoration Areas

   i. Licensees shall identify restoration areas for salmon fry and juvenile rearing habitat that, in combination with the flow requirements of the new license, the number of acre-days of inundation at flow levels greater than 1000 cfs, between February 1 and June 15 under the hydrology of the 1971-2012 period of record, would have been as follows:
      a. In Above Normal years, a median of at least 100,000 acre-days;
      b. In Below Normal years, a median of at least 65,000 acre-days;
      c. In Dry years, a median of at least 36,000 acre-days.

   ii. Licensees shall identify areas of existing floodplain areas for planting of riparian vegetation.

   iii. Licensees shall identify areas suitable for placement of LWM.

2. Restoration and Enhancement of Existing Floodplain Habitat

   i. Licensees shall restore and create additional floodplain habitats suitable for salmon fry and juvenile rearing that, in combination with the flow requirements of the new license, the number of acre-days of inundation at flow levels greater than 1000 cfs, between February 1 and June 15 under the hydrology of the 1971-2012 period of record, would have been as follows:
      a. In Above Normal years, a median of at least 100,000 acre-days;
      b. In Below Normal years, a median of at least 65,000 acre-days;
      c. In Dry years, a median of at least 36,000 acre-days.

   ii. Licensees shall plant 520 acres of existing sparsely vegetated floodplain surfaces ranging in elevations that are inundated at flows of 3,000 cfs to 9,000 cfs with a cottonwood/willow dominated riparian plant mix derived

from local cuttings and seeds at an appropriate density and distribution as determined by the restoration ecologist and in consultation with the Agencies.

3. Enhancement of Large Woody Material Resources

   i. Licensees shall place a total of 1,600 pieces of LWM from La Grange Dam down to the confluence with the San Joaquin River.
   ii. LWM will be placed at an appropriate distribution, density, and configuration as recommended by the restoration ecologist and in consultation with the Agencies.
   iii. LWM pieces shall be placed within or adjacent to floodplain lowering and planting sites where feasible.
   iv. A minimum of 10% of LWM pieces (160 pieces) shall be secured or embedded in the bank to provide at least partial inundation at 300 cfs upstream of the Licensees' existing Infiltration Gallery and 200 cfs in areas downstream of the Infiltration Gallery.
   v. All pieces of LWM shall be a minimum of 24 inches in diameter and 18 feet in length. A minimum of 50% of LWM pieces shall have a crown or rootwad attached.
   vi. The total number of pieces of LWM may be supplemented by existing pieces of LWM meeting the size criteria.

Implementation of Restoration and Enhancement Measures

4. Licensees shall conduct restoration and enhancement measures, as described in 2 above, at no less than two sites in each of reaches RM 51.7 – 40, RM 40 – 21.5, and RM 21.5 to the confluence with the San Joaquin River, for a minimum total of six restoration sites. Site locations shall be designed so that approximately 33% of the total restored/enhanced area is located in each reach after adjusting for the different lengths of each reach. Sites shall be a minimum of 5 acres in size.
   i. Within 5 years of the new license, Licensees shall initiate implementation of restoration and enhancement measures on at least 50% of the total proposed acreage, with implementation located at a minimum of one site in each reach, with those sites fully implemented by Year 10 of the new license. The remaining acreage shall be initiated by Year 15 and fully implemented by Year 20 of the new license.

5. The Licensees shall place 50% of LWM pieces by Year 5 of the new license and the remaining LWM pieces shall be placed by Year 10 of the new license. The Licensees shall attempt to distribute the LWM equally among the following reaches RM 51.7 – 40, RM 40 – 21.5, and RM 21.5 to the confluence with the San Joaquin River.

Large Woody Material Monitoring and Replenishment

6. The Licensees shall conduct a LWM census no later than 3 years after issuance of a new license to assist in making initial decisions regarding LWM placement. A census shall also be conducted in License Year 10 and every 10 years thereafter,

until a new license is issued. The purpose of the census is to determine if the presence and function of LWM may be changing under the influence of new license terms and conditions and identify if LWM should be replenished.

i. The census shall include documenting all unrooted wood meeting minimum size requirements of greater than 3 ft in length and 4 inches diameter at the large end that are located within the channel bed up to areas that would be inundated at 5,000 cfs.

ii. A map, including a GIS database, should be developed after each census along with a report.

7. The Licensees shall replenish LWM downstream of La Grange Dam down to the confluence with the San Joaquin River within three years after completion of each LWM census, beginning with the LWM census that occurs in License Year 10 and every 10 years thereafter, until a new license is issued.

i. The Licensees shall replenish the LWM up to 1,600 stable pieces that meet the minimum size criteria.

ii. The Licensees shall also replace any of the 160 LWM pieces secured in the bank that are no longer in place.

Performance Metrics

8. The Licensees shall meet the following performance metrics for all areas planted with riparian vegetation:

i. Minimum of 50% survivorship of each riparian plant species 5 years following implementation.

ii. Minimum of 15% canopy cover after 5 years and 65% canopy cover after 10 years of native riparian plant species.

iii. Less than 5% nonnative tree and shrub species and 10% nonnative grass species after 10 years.

Monitoring

9. Implementation Monitoring

i. During the implementation phase of restoration and enhancement activities, Licensees shall provide written progress reports to the Agencies describing restoration and enhancement activities, including riparian planting and LWM placement, which were completed during the previous year at the annual Ecological Group meeting (as described in 10(j) Condition 12).

ii. Within 60 days of full implementation of restoration/enhancement sites and placement of LWM, Licensees shall conduct implementation (*i.e.*, "as-built") monitoring for each restoration/enhancement and LWM site. Licensees shall summarize the results of implementation monitoring in a report and provide the report to the Agencies for review within 60 days of completion of monitoring.

10. Effectiveness Monitoring

i. The Licensees shall conduct effectiveness monitoring to assess: (1) floodplain inundation and geomorphic processes at the restored/enhanced floodplain sites; (2) survivorship of planted riparian species, riparian canopy

cover, and riparian species recruitment at the restored/enhanced floodplain sites; (3) presence and function of LWM from La Grange Dam down to the confluence with the San Joaquin River within and outside of the restored/enhanced floodplain planting sites; (4) terrestrial subsidies inputs from the restored/enhanced floodplain planting sites; and (5) juvenile salmonid use of restored/enhanced floodplain habitats and LWM placement sites.

ii. Effectiveness monitoring of restoration and enhancement sites shall commence one year following full implementation of each site for a period of ten years or until riparian habitat performance metrics have been achieved.

iii. Effectiveness monitoring for LWM placement sites and subsequent LWM replenishment sites shall commence one year following placement, for a period of 3 years.

iv. Licensees shall present the results of effectiveness monitoring to the Agencies annually at the Ecological Group meeting (as described in 10(j) Condition 12) and provide a summary of effectiveness monitoring in a report provided to the agencies for review and comment within 60 days following completion of monitoring.

Plan Revisions

11. At the annual Ecological Group meeting (as described in 10(j) Condition 12), the Licensees and/or members of the Ecological Group shall present any proposed changes to the Lower Tuolumne River Habitat Restoration and Enhancement Plan, including, but not limited to: performance metrics, the amount of LWM replenished, monitoring triggers and frequency, monitoring methods, and/or discontinuing the replenishment of LWM.

    i. Any changes to the plan shall be collectively agreed to by Licensees, USFWS, CDFW, and SWRCB prior to Licensees filing a revised Plan with the Commission for approval.

Justification for FPA § 10(j) Condition 3: Restore Juvenile Rearing Habitat in the Lower Tuolumne River:

There is a wide body of literature that describes how river regulation, especially dams, has adversely impacted river hydrology, geomorphology, and aquatic life throughout the world (Graf 2006, Kondolf 1997, Novak *et al.* 2016, Poff *et al.* 2007). There is also a wide body of literature describing how dams and water diversions negatively impact salmon populations (Quinones *et al.* 2015, Yoshiyama *et al.* 1998). Central Valley spring-run Chinook and steelhead trout are listed as threatened under the ESA and their status on the Tuolumne River is in decline. The need for annual connectivity with the riparian floodplain is to avoid cohort failure or low salmonid recruitment in the lower Tuolumne River (*e.g.*, low returns of Tuolumne River salmonids).

Riparian forests provide important resources that provide and support invertebrate prey for salmonids. The primary energetic driver of riparian ecosystem function is organic matter from riparian vegetation and riparian insects (Allan *et al*. 2003, Cederholm *et al*. 2000, Cummins *et al*. 1989, Pozo *et al*. 1997, Ward and Stanford 1995). Terrestrial invertebrates from riparian forests fall into or interface with the river where they can be directly preyed upon by salmonids. This

in-fall of insect biomass is considered a "terrestrial subsidy" to salmonid bioenergetics. In addition, plant detritus that falls into streams and rivers from terrestrial riparian vegetation provide food for benthic invertebrates, stimulating invertebrate food production. Terrestrial subsidies in the form of invertebrates and leaves are essential components of salmonid food supplies (Mason and MacDonald 1982, Nakano and Murakami 2001, Nakano *et al.* 1999, Wipfli 1997). Both aquatic and terrestrial-derived invertebrates are partially or fully dependent upon the plant biomass provided by riparian vegetation. Energy in the form of plant detritus and invertebrate biomass from riparian vegetation has been found to support 50 to 80 percent of salmonid biomass in some systems (Allan *et al.* 2003, Kawaguchi *et al.* 2003). In rivers with high canopy closure in the riparian overstory (*i.e.,* 95% to 97%), bioavailability of terrestrial invertebrates is greatest in the summer, when benthic macroinvertebrate bioavailability generally tapers off (Nakano and Murakami 2001). Because of this difference in seasonal bioavailability, terrestrial invertebrates are the primary food source for rearing and over-summering salmonids.

Regulated rivers often lack riparian floodplain and riparian overstory because of a suite of conditions that severely limit riparian regeneration and diminish or constrain the area available for tree establishment. The lower Tuolumne River is notably lacking in both riparian floodplain and riparian overstory. Project flows have not only reduced both the area and duration of inundation, thereby decreasing the availability of rearing habitat, but have also reduced the quality of habitat available in the bank and floodplain zone by suppressing the riparian community. A river's flow regime affects the ability of that river to recruit large overstory trees and to support diverse riparian structure and composition (Bovee and Scott 2002, Lytle and Poff 2004, Poff *et al.* 2007, Poff and Zimmerman 2010, Richter and Richter 2000). Furthermore, the positive relationship between a natural flow regime and the establishment of riparian plants such as cottonwoods has been well-documented (*e.g.*, Braatne *et al.* 2007, Busch and Smith 1995, Carlisle *et al.* 2010, Fenner *et al.* 1985, Mahoney and Rood 1998, Naiman and Décamps 1997, Opperman *et al.* 2010, Poff *et al.* 2007, Rood *et al.* 2003). Once flows that support riparian-regeneration have been incorporated into the license, it may take greater than the life of the license to see the ecological function of the restored riparian forest fully realized on the lower Tuolumne River; however, riparian plantings and restoration would be expected to significantly accelerate the return of this ecological function to the lower Tuolumne River. Therefore, planting of riparian vegetation at different floodplain elevations is an appropriate mitigation measure.

The amount of optimal juvenile salmonid rearing habitat available on the lower Tuolumne River is much less than what is needed. Based on empirical data and peer-reviewed scientific literature, the Emigrating Salmonid Habitat Estimation (ESHE) model calculates the amount of rearing habitat needed for a target number of juvenile salmonids. This robust model has been widely used in the Central Valley including in: the San Joaquin "Minimum Floodplain Habitat Area for Spring and Fall-Run Chinook Salmon" (SJRRP 2012) report, the Central Valley Flood Protection Plan Conservation Strategy (CDWR 2017), and efforts by the State of California to develop goals and objectives for San Joaquin tributaries. The ESHE model estimates acreage of habitat required to support a target population assuming that each of the acres is 100% suitable; however, perfect habitat suitability is never found in the real world, so ESHE habitat estimates must be expanded based on an estimate of habitat suitability . The ESHE model found that the amount of rearing habitat needed to support CVPIA salmon doubling goals in the lower Tuolumne River is 2,700 acres at 30% habitat suitability (Cramer Fish Sciences, Unpublished Data).

The Project contributes to the lack of salmonid rearing habitat availability and to that rearing habitat's low quality. Mesick (2009) concluded that, during managed flow releases, the rearing habitat in the Tuolumne River can support the progeny of no more than about 434 adult fall-run Chinook salmon. Increasing the availability of productive rearing habitat is a priority for improving the condition of listed salmonid populations in Tuolumne River (NMFS 2014b). The recommended measures, in conjunction with the USFWS's flow proposal (*i.e*. USFWS proposed Condition 2), were developed in order to increase the quantity and quality of rearing habitat. The USFWS recognizes that historical land uses (*e.g.*, logging, hydraulic mining, and dredger mining) and other dams on the Tuolumne have also contributed to the lack of optimal rearing habit. However, the recommended mitigation measures are based on quantifiable ways in which the Project alters the lower Tuolumne River and these recommended mitigation measures do not include any additional actions that would be necessary to mitigate for legacy or non-Project impacts.

The USFWS did an analysis to quantify the amount of floodplain inundation under different flow scenarios in order to identify the impact of the Project on inundation (Attachment 5). The USFWS computed median inundation, expressed as cumulative acre-days, in areas that become inundated at flows greater than 1,000 cfs for Without Project (77,640 acre-days), DPP-1 (7,563 acre-days), and USFWS (30,176 acre-days) hydrological scenarios. When inundation from DPP-1 flows is compared to without project hydrology, median inundation is reduced by 85% for all

water year types. When inundation from USFWS flows (USFWS Condition 2) is compared to without project hydrology, median inundation is reduced by 62% for all water year types.

USFWS Condition 2 does provide an increase in flows, but it does not fully mitigate for Project related decreases in inundation. An additional median 47,464 cumulative acre-days are necessary to mitigate for Project related reductions in inundation. The USFWS also identified that 520 acres would need to be planted to mitigate the Project's inundation reductions resulting from lower flows and provide necessary components for high quality rearing habitat. The 520 acres represents 62% (the % decrease in inundation when USFWS flows are implemented) of the 839 acres adjacent to the lower Tuolumne River that are within the area of floodplain that becomes inundated at 1,000 - 5,500 cfs. Increasing the quantity and quality of existing rearing habitat, in conjunction with the increased flows from USFWS Condition 2, was chosen to mitigate for these reductions in inundation. The increased flows from USFWS Condition 2 would enhance connectivity with floodplain habitats necessary for rearing juvenile salmonids by increasing both the frequency and duration of inundation.

This measure includes planting sparsely vegetated floodplain surfaces with a cottonwood/willow dominated riparian plant mix derived from local cuttings and seeds. This measure is designed to result in a suite of positive effects necessary for increased juvenile salmonid rearing opportunities, such as increases to macroinvertebrate productivity and availability, cover and foraging habitat, shade, large woody debris inputs, and geomorphic heterogeneity (cbec 2013, Hayes *et al.* 2008, Jeffres *et al.* 2008 Limm and Marchetti 2009, NMFS 2014, Opperman 2012, Opperman *et al.* 2010, Sommer *et al.* 2001). Planted cuttings tolerate both inundation and bed mobilization better than seedlings, and riparian plantings at higher flow elevations result in increased riparian canopy, increased deposition of fine sediment and organic material, and increased hydraulic cover and rearing habitat (SYRCL 2013, SYRCL 2016). The Big Bend Floodplain Protection and Habitat Restoration Project on the Tuolumne River has successfully restored 240 acres of floodplain that now inundates at flows >4,000 cfs, and has been used by

juvenile salmon (Hayden *et. al.* 2006). While it would be more efficient for the Licensees to implement actions that would increase cumulative acre-days and floodplain riparian plantings at the same site, there is no requirement to do so.

Restoration and enhancement actions should occur on reaches throughout the lower Tuolumne River. The restored and enhanced rearing habitat should be available near spawning habitats so that newly emergent fry can reach it. In addition, the rearing habitat should also be available in areas downstream of spawning grounds so that juveniles have opportunities for growth prior to and during emigration. Therefore, this condition states that surface lowering should occur in equal amounts in all three reaches.

Large woody material of a size capable of influencing hydraulic and geomorphic conditions in the channel is severely limited in the lower Tuolumne River. Surveys of the Tuolumne River found that instream woody material is sparse (W&AR-12). An average 169,039 cubic feet of LWM are captured by the Don Pedro Reservoir each year (W&AR-12). The Don Pedro Reservoir captured an estimated 952,000 cubic feet of wood material in 2006 (W&AR-12). In 2017, Don Pedro Recreation Area staff said that approximately 40 acres of large woody debris was floating in the reservoir (McCarthy 2017).

Key pieces for engineered log jams are logs greater than 18 inches in diameter and greater than 16 feet in length. Key pieces for toed-in or embedded LWM are logs greater than 24 inches in diameter and greater than 18 feet in length (from trunk base to log end), with a root wad or crown attached. Based on other studies of LWM abundance in Central Sierra Nevada Streams, (*e.g.* Ruediger and Ward 1996) over 1,600 pieces of stable LWM (average of 2 pieces per 100m) would be expected in the lower Tuolumne River from just downstream of La Grange Dam to the confluence with the San Joaquin River (51.7 river miles).

In addition to the Project blocking the passage of LWM at Don Pedro Dam, Project flows have suppressed the riparian community and thereby limited the production and availability of LWM in the lower Tuolumne River. The Project significantly reduces the frequency and magnitude of high flows in the lower Tuolumne River, which in turn limits wood transport, and reduces geomorphic processes that often provide local sources of wood to the channel through channel migration, bank erosion, and exhumation of wood buried in floodplains. While other historic anthropogenic impacts have likely contributed to the lower Tuolumne River being nearly devoid of in-channel wood, the ongoing Project effects of eliminating upstream wood inputs and inundation of over 51 miles of former riparian habitat are two factors that impede the ability of the lower Tuolumne River to develop properly functioning habitat related to LWD.

The USFWS's preferred mitigation for the Project's reductions to LWM is the addition of LWM, such that there are a total of 1,600 key pieces of LWM in the lower Tuolumne River from La Grange Dam to the confluence with the San Joaquin River. The basis of this measure is an inventory and analysis of 17 streams located in California's Stanislaus National Forest (Ruediger and Ward 1996). Ruediger and Ward (1996) only included sites at 2^{nd} – 5^{th} order streams, but the lower Tuolumne River is a 6^{th} order stream (Attachment 6). Using results from Ruediger and Ward (1996), the USFWS estimated that the average stable LWM in a 6^{th} order stream would be approximately 2.0 stable pieces/100m. Using this calculation, 1,664 pieces of stable LWM would be present in the lower Tuolumne. The addition of LWM is expected to enhance aquatic habitat by increasing habitat heterogeneity, providing velocity refuges for juvenile salmonids, enhancing macroinvertebrate substrata, adding structural complexity to the channel by modifying local

hydraulics and sediment transport, and providing bank protection (*i.e*. Roni *et. al.* 2014; Ruediger and Ward, 1996; Abbe and Montgomery, 1996; Dolloff 1983; Bryant *et al.* 2005). The addition of LWM, located in areas that are inundated at minimum instream flows, would provide necessary habitat during critically dry water years, when floodplain inundation is not expected to occur. A recent study found that salmon density in California's Central Valley is higher in streams that have more in-stream habitat structure, like undercut banks and woody debris, and that are characterized by relatively low temperatures (Albertson *et. al.* 2013).

Establishment of riparian regeneration flows, combined with the USFWS flow proposal, will restore one of the missing components of the natural hydrograph. However, once those flows have been incorporated into the license, it may take the life of the license to see the ecological function of a riparian forest realized on the Tuolumne River. Therefore, the habitat mitigation measures described by this condition are expected to significantly accelerate the return of ecological function associated with a riparian corridor to the lower Tuolumne River.

The Project perpetuates the decline of fall-run Chinook salmon returns. Low return numbers and failure to support or restore fish populations are the result of low quality juvenile rearing habitat, lack of LWM and instream cover, reduced invertebrate food sources, and lack of access to floodplain habitat. Reduced marine-derived nutrients further contribute to the negative feedback loop that is likely further holding back the restoration of the lower Tuolumne River system.

The goal of terrestrial subsidies monitoring is to assess the contributions of terrestrial invertebrates into the lower Tuolumne River in response to riparian restoration. Both direct canopy sampling and pan-trap sampling are effective means of quantifying terrestrial invertebrate inputs into rivers and stream.

The AFLA does not contain a flow recession that would be expected to allow for riparian species seedling growth and establishment. Even with a recession flow that supports riparian regeneration, a full riparian canopy would be expected to take 50 to 100 years to return to the Tuolumne River without restoration and enhancement of the riparian corridor. We recognize that restoration actions done in partnership with other interested parties can lower the cost to the Districts, and we encourage such partnerships.

The flow schedule ultimately required by the Commission may reduce the amount of floodplain habitat creation that is required under the acre-days of inundation criterion. For example, if the Commission requires the USFWS's flow proposal as a license condition, then flows alone would have attained a median of 30,176 acre-days of inundation per year over the 1971-2012 period of record, without any physical manipulation of habitat. The Licensees would then be required to lower floodplains to attain an additional median value of 47,464 acre-days of inundation per year above and beyond what flows are attaining alone (Attachment 5).

In summary, the Project has reduced the amount of floodplain habitat available and has also reduced the quality of habitat available by suppressing the riparian community, limiting the production and availability of large woody material, hydraulic cover and food resources for salmonids. The mitigation measures proposed, and summarized in Table 6, are based on analyses of impacts and on restoration concepts that are already being successfully implemented on the lower Tuolumne River. Completion of this mitigation plan, in conjunction with the other License conditions, will result in productive juvenile salmonid rearing habitat in the lower Tuolumne River.

Table 6. Summary of proposed restoration and enhancement measures and corresponding rationale.

Restoration and Enhancement Measure	Rationale
Create additional floodplain habitats to attain an additional 47,464 acre-days of inundation at flows >1,000 cfs between February 1 and June 15	Mitigates for Project-related inundation losses by increasing the amount of floodplain habitats available in the lower Tuolumne River.
	Mitigates for Project-related inundation losses by increasing habitat suitability of floodplain surfaces.
Plant 520 acres of existing sparsely vegetated floodplain surfaces that become inundated at elevations of 3,000 cfs to 9,000 cfs with a cottonwood/willow dominated riparian plant mix	Also mitigates for past suppression of the riparian community caused by the Project and currently impacting habitat in the lower Tuolumne River
	Mitigates for Project blocking wood passage at Don Pedro Dam
Place a minimum of 1,600 pieces of LWM in the lower Tuolumne River from La Grange Dam to the confluence with the San Joaquin River and replenish at regular intervals	Also mitigates for past suppression of the riparian community caused by the Project and currently impacting habitat in the lower Tuolumne River.
	Provides necessary instream rearing habitat during critically dry water year types

FPA § 10(j) USFWS Condition 4: Develop and Implement Coarse Sediment and Gravel Replacement and Restoration Plan

A. Over the lifetime of the License (anticipated to be 40 years), the Licensees shall be responsible for adding 752,000 cubic yards (yd^3) of coarse and spawning-sized gravels within the 28-mile reach of the gravel-bedded portion of the lower Tuolumne River that extends from below La Grange Dam to approximately RM 24 (where Geer Road crosses the lower Tuolumne River) to mitigate for the estimated 18,800 yd^3 of coarse sediment and gravel that is withheld by the Project each year.
   1. Within the first 15 years of the license, the Licensees shall be responsible for placing 564,000 yd^3 of the total volume to fill in the bedload traps/special pools and to create or restore spawning habitat.
      i. bedload traps/special pools may be filled in with coarse gravels and then overlain with suitable sized spawning gravels
   2. After the initial volume is placed, the Licensees shall be responsible for placing the remaining 188,000 yd^3 to support a no net loss of spawning habitat for the remainder of the License term.

B. The Licensees shall, within the first three full calendar years of the new license term, develop a Sediment Enhancement Plan in consultation with the USFWS, NMFS, CDFW, and SWRCB. The plan shall be collectively agreed to by the Licensees, USFWS, NMFS, CDFW, and SWRCB prior to the Licensees filing the Plan with the Commission for approval. The Plan shall contain details regarding material placement, monitoring, and reporting, as described below.

Placement

1. The Districts shall use the Tuolumne River Coarse Sediment Plan (McBain & Trush 2004) as guidance to identify locations for placement of coarse and spawning-sized gravels and prioritization.

2. Gravel/cobble shall be transported and placed in the river by means deemed safe and feasible by the Licensees. Gravel/cobble shall be obtained from a clean source and appropriate measures shall be implemented during collection, transport, and placement to prevent the potential introduction and/or spread of invasive species and to minimize impacts to special-status species, water quality, and other sensitive resources.

Monitoring

3. The Licensees shall conduct baseline monitoring no more than one year prior to gravel/cobble placement. Baseline monitoring shall occur between spring runoff and November and include facies mapping and quantification.
4. Following placement of gravel/cobble, monitoring shall occur up to three times in each 10-year period of the new license, as triggered by a flow event of 7,000 cfs or more. If less than two of these events occur within the 10-year period, then monitoring would occur during year 10. The Licensees shall monitor the distribution of gravel/cobble.

Reporting

5. The Licensees shall file with the Commission, and provide to the USFWS, NMFS, CDFW, and SWRCB, a report describing the implementation of gravel/cobble placement and the results of baseline monitoring by March 15 of the year following initial gravel/cobble placement. Additionally, the Licensees shall file with the Commission, and provide to the USFWS, NMFS, CDFW, and SWRCB, reports describing the results of gravel/cobble monitoring post-placement, by March 15 of every year following a monitoring event. The Licensees shall provide the results of gravel/cobble monitoring to the Ecological Group at the meeting described in USFWS proposed Condition 12 during years in which reports are due.

Plan Revisions

6. At the annual Ecological Group meeting (as described in 10(j) Condition 12) of the year following completion of the each 10-year monitoring period, the Licensees shall present an evaluation of gravel/cobble enhancement effort, including a summary of the results of the 10-year monitoring period. At the meeting, the Licensees and/or members of the Ecological Group shall present any proposed changes to the Plan, including, but not limited to: the amount of gravel to be placed, monitoring triggers and frequency, and/or monitoring methods. Any changes to the plan shall be collectively agreed to by the Licensees, USFWS, NMFS, CDFW, and SWRCB prior to the Licensees filing a revised Plan with the Commission for approval.

***FPA § 10(j) Justification for Condition 4*: Develop and Implement Coarse Sediment and Gravel Replacement and Restoration Plan**

Suitable spawning habitat in the Tuolumne River has been substantially reduced due to historical and ongoing anthropogenic influences including dam construction, in-river aggregate mining, in-river gold dredging mining, and the conversion of floodplain habitat for agricultural uses. These historical and ongoing impacts, most of which are due to the dams, have adversely affected salmon holding, spawning, and rearing habitats as follows: (1) reduction of available spawning area; (2) loss of coarse sediment and LWD recruitment into the remaining spawning reaches, (3) reduction of flow magnitude reducing sediment movement through available habitat, (4) channel incision disconnecting floodplain and riparian habitats from the main channel and reducing channel gradient over time, and (5) in channel pits created by mining activity.

The Project and the DPLG Complex have directly resulted in the reduction of available suitable spawning habitat for salmonids by blocking access to spawning habitat in the upper river and blocking the transport of gravel into downstream reaches. By blocking sediment passage and reducing bed-mobilizing flows, the Project and the DPLG Complex have prevented the in-channel mining pits from filling in via natural mechanisms. The annual bedload sediment deficiency from the Projects' capture was estimated to be an average of 18,800 yd^3 per year (McBain and Trush 2004). The loss of coarse sediment inputs (because of dam blockage) has decreased estimated salmon and trout spawning habitat by 75% of its historical amounts (McBain and Trush, 2004).

The Districts' proposed Gravel Augmentation Plan in the P-2299 AFLA is inadequate because it does not provide sufficient benefit to anadromous fishes. The Licensees proposal includes a one-time augmentation of coarse and spawning gravel to just the first 5 RM downstream of La Grange Dam, and does not include replenishment later in the License term. The volume of augmentation the Licensees propose (55,600 yd^3) is less than 10% of the total volume of coarse sediments and gravels the Project is estimated to withhold over the course of the License duration (752,000 yd^3). The Licensees' proposal would only partially address a few riffles and one special pool and their plan does not address the remaining lack of gravel within the numerous riffles and special pools within the gravel-bedded reach of the lower Tuolumne River.

Augmentation should occur throughout the entire life of the License so that bedload pits or special pools get filled in and spawning riffles get periodically renewed with new spawning gravel over time. The Projects' dams block approximately 18,800 yd^3 of bedload (coarse and spawning gravels) and this annual amount must be input back into the river downstream of La Grange Dam so that habitat is not further degraded. The availability of suitable spawning gravel below dams is necessary to mitigate and minimize direct, indirect, and cumulative impacts of a Project's facilities and operations on sediment movement and deposition, river geometry, channel characteristics, and BMI communities. Suitable spawning habitat typically consists of gravels of a size that are movable by females during redd construction, low levels of fine sediment accumulation, and gravel permeability sufficient to allow minimum intra-gravel dissolved oxygen and water velocity requirements of salmonid eggs (Kondolf 2000a; 2000b; Merz and Setka 2004).

The USFWS's recommended gravel augmentation plan includes mitigating for the entire volume of sediments being withheld by the Projects, provides for replacement and restoration of coarse sediments and gravels within the entire gravel-bedded reach, and provides for augmentation over the entire length of the License term. Furthermore, the implementation of spawning habitat augmentation projects is feasible and proven. Previous gravel augmentation projects on the Tuolumne River between 2002 and 2011 have placed a total of 44,750 cubic yards of gravel for enhancements of spawning habitat for adult Chinook salmon/ *O. mykiss* (Stillwater Sciences, 2013).

McBain and Trush (2004) mapped and prioritized the large bedload traps (or "special pools" - *e.g.*, pits or depressions in the channel bed) in the lower Tuolumne River as a result of in-channel mining. These bedload traps interrupt the continuity of downstream sediment transport because they trap the majority of sediment input from upstream reaches, which has the potential to minimize the effect of spawning gravel augmentations if they mobilize into one of the traps. Therefore, these bedload traps must be filled in with coarse gravels and then overlain with

suitable spawning gravels. The placement of coarse and spawning gravels should occur concurrently and has the added advantage of using aggregate much coarser than spawning sized material to line the bottom and begin to fill in the bedload traps, which could represent a significant cost saving.

In order to acquire sufficient source material in a cost-effective manner, McBain and Trush (2004) identified and quantitated the amount of available materials along the Tuolumne River corridor. Their report provided a sediment source inventory: prioritizing sources, refining volume estimates, and linking sources to different augmentation sites. The recommended strategy is to purchase materials from commercial suppliers or acquire mineral rights to undeveloped coarse sediment sources (*e.g.*, dredger tailings) that can be developed for future restoration projects. The benefits of this approach are considerable. First, this strategy reduces the potential conflict with the use of commercially- permitted aggregate reserves. Second, these source sites can often be restored to higher quality habitat (*e.g.*, revegetated floodplain and wetland habitat) while simultaneously avoiding additional floodplain pit mining. Lastly, purchasing and developing a source of sediment dedicated to coarse sediment and gravel augmentation can substantially lower the cost of the sediment and make floodplain restoration activities from USFWS Condition 3 much more cost effective.

FPA § 10(j) USFWS Condition 5: Salmonid Monitoring

A. The Licensees shall monitor salmonids in the lower Tuolumne River in order to quantify the effects of project flows on salmonid populations.

B. The Licensees shall, within the first three full calendar years of the new license term, develop a Salmonid Monitoring Plan in consultation with the USFWS, NMFS, CDFW, and SWRCB. The plan shall be collectively agreed to by the Licensees, USFWS, NMFS, CDFW, and SWRCB prior to the Licensees filing the Plan with the Commission for approval. At a minimum, salmonid monitoring in the lower Tuolumne River shall include:

1. Measurement of fall-run Chinook salmon escapement by conducting annual carcass surveys, from October 1 through December 31, consistent with the modified Jolly-Seber methodology described in the CDFW 2012a *Central Valley Chinook Salmon In-River Escapement Monitoring Plan* (Attachment 7), taking GPS locations for each carcass.
2. Morphometric measurements of 100% of the Chinook salmon carcasses downstream of the Fish Counting Weir at RM 24.5. The morphometric measurements shall include: Scale, otolith, and coded-wire-tag collection; length; sex; egg-count in females; and pre-spawn mortality.
3. Morphometric measurements of the first 500 Chinook salmon carcasses found upstream of the Fish Counting Weir, plus morphometric measurements of 5% of the next 500 to 1000 Chinook salmon carcasses found upstream of the Fish Counting Weir.
4. Paired rotary screw traps: One at RM 5.3 (Grayson RST) and one at RM 29.8 (Waterford RST), operated in a manner consistent with the 1997 USFWS *Comprehensive Assessment and Monitoring Program (CAMP) Implementation Plan* (Attachment 4) and the USFWS 2008 Draft *Rotary Screw Trap Protocol for Estimating Production of Juvenile Chinook Salmon* (Attachment 3). For fall-run Chinook salmon, operation of the traps shall occur annually from February 1

through June 15. The rotary screw traps must be maintained in working order and stationed to provide adequate trap capture efficiencies at all flows.

5. The operation and maintenance of the existing Seasonal Counting Weir at RM 24.5.
6. Snorkel surveys prior to each LWM placement action, within the area of the LWM placement and the 10 meters upstream and downstream of the placement. Two snorkel surveys should occur in the placement area following LWM placement: The first during the second week following placement and the second prior to spring flows returning to minimum instream flows in the calendar year following LWM placement.
7. Annual reporting of the results of salmonid monitoring to the USFWS, NMFS, and CDFW.

Justification for FPA § 10(j) Condition 5: **Salmonid Monitoring**

Monitoring of salmonids in the lower Tuolumne River is necessary to ascertain how the implementation of new license terms affects salmonid populations. The lack of adequate spring flows from the Project and the DPLG Complex has led to a significant reduction in fall-run Chinook salmon returning adult spawners (Figure 1). Using modified Jolly-Seber methodology described in the CDFW 2012a *Central Valley Chinook Salmon In-River Escapement Monitoring Plan* (Attachment 7) is a way to ensure that escapement estimates of returning adult salmon are consistent with data collected on other rivers. By using the same methodology across watersheds, the returns to the lower Tuolumne River can be compared to returns in other rivers, which can separate out the effects of cross-Delta survival and marine conditions.

Length and sex can be quantified at the Fish Counting Weir, allowing the morphometric data upstream of the weir be a form of sub-sampling that is then applied to the remaining fish that pass at the weir. Collection of morphometric data downstream of the Fish Counting Weir is necessary because it is the only way to adequately estimate escapement for that part of the fall-run Chinook population. In addition, the morphometric data collected upstream of the Seasonal Counting Weir from a subset of fish can be used to calibrate the escapement estimates for downstream of the weir.

Paired rotary screw traps measure juvenile salmonid recruitment and survival within the river. The upstream screw trap is downstream of the majority of fall-run Chinook salmon spawning in the lower Tuolumne River, making it a good device for measuring initial juvenile salmonid recruitment. The downstream screw trap is then used to measure the differential survival within the river. The USFWS CAMP protocol allows the Tuolumne River data to go into a numeric platform that can be used to compare Tuolumne River salmonid recruitment and juvenile survival to other rivers where the data is collected in a similar manner and imported into the CAMP database.

The Seasonal Counting Weir is an excellent way to get initial data on returning salmonids, and provides an accurate count of escapement upstream of the weir. By using a Seasonal Counting Weir, less effort needs to go into collecting morphometric data upstream of the weir.

Juvenile salmonids respond rapidly and favorably to placement of LWM and woody debris below the waterline. Collecting data before and after placement of LWM will allow the Licensees to make informed decisions on the locations for placement of LWM and on the techniques that provide the juvenile salmonid habitat and population response.

FPA § 10(j) USFWS Condition 6: Develop and Implement Water Temperature Monitoring Plan

A. The Licensees shall, within the first year of the new license term, develop and implement a Water Temperature Monitoring Plan that includes the Project's reservoir, Project impoundments and Project-affected reaches of the lower Tuolumne River. The plan shall be developed in consultation with the USFWS, NMFS, CDFW, and SWRCB. The Plan shall include descriptions of:
    1. Methods that will be used to monitor and analyze water temperature.
    2. Locations at which water temperature monitoring will occur and the frequency with which it will occur.
    3. How the Licensees will report water temperature data to FERC, and update the Plan as needed in the future.

B. At a minimum, the Plan should include water temperature monitoring in the following locations:
    1. Between RM 52.0 - 47.5 (La Grange Dam to Basso Bridge),
    2. Between RM 47.5 - 39.5 (Basso Bridge to Roberts Ferry),
    3. Between RM 39.5 – just upstream of the infiltration gallery, and
    4. Downstream of the infiltration galleries – confluence with the San Joaquin River

Justification for FPA § 10(j) Condition 6: **Develop and Implement Water Temperature Monitoring Plan**

The AFLA filed with FERC does not include a water temperature monitoring plan. Water temperature is one of the more important ecological parameters in the Project Area. It is necessary to accurately monitor the Project's effects on water temperatures to identify possible effects of water temperatures and flows on salmonids and other aquatic organisms using the Project's Reservoirs, Project's impoundments, and Project-affected reaches of the lower Tuolumne River.

It is recognized that water temperature is a significant stressor, or limiting factor, for salmonids in this river. The U.S. Environmental Protection Agency (USEPA), pursuant to Clean Water Act Section 303(d) and 40 CFR 130.7(d)(2), listed the lower Tuolumne River as impaired for suitable water temperatures for CCV steelhead and all other salmonids, based on USEPA's 2003 Water Temperature Criteria (USEPA 2003).

Implementation of this condition would result in a long-term record of water temperature conditions in the Project Area that would be useful as general information and if needed to help explain any ecological perturbations observed during the license term.

FPA § 10(j) USFWS Condition 7: Establish Riparian Regeneration Flows in the Lower Tuolumne River

A. The Licensees shall develop and implement a spring time flow recession downstream of La Grange Dam at a down-ramping rate of no greater than 2.5cm per day until the summer base flow for that water year is reached.
    1. USFWS recommended 10(j) Condition 2 includes a recession flow to support riparian vegetation.

Justification for FPA § 10(j) Condition 7: **Establish Riparian Regeneration Flows in the Lower Tuolumne River**

The Project and DPLG Complex has historically operated without a flow recession that would allow the riparian forest to regenerate during the years when riparian regeneration is most likely to occur. Riparian forests are an important source of prey biomass for salmonids, because terrestrial invertebrates from riparian forests fall into or interface with the river where they can be preyed upon by salmonids. This in-fall of insect biomass is considered a "terrestrial subsidy" to salmonid bioenergetics.

Terrestrial subsidies are an important component of salmonid food supply, especially in summer (Mason and MacDonald 1982, Nakano and Murakami 2001, Nakano *et al*. 1999, Wipfli 1997). Like benthic macroinvertebrates, terrestrial-derived invertebrates (TI) are partially or fully dependent upon the plant biomass provided by riparian trees. The riparian tree energy and biomass contributes to the food chain, and TI inputs contribute to 50 to 80 % of salmonid biomass (Allan *et al*. 2003, Kawaguchi *et al*. 2003). In rivers with riparian overstory with high canopy closure (*i.e.,* 95 to 97 %), bioavailability of TI is greatest in the summer, when benthic macroinvertebrate bioavailability has tapered off (Nakano and Murakami 2001). Because of this difference in seasonal bioavailability, TI is the primary food source for rearing and over-summering salmonids.

Fremont cottonwood is the primary source of terrestrial subsidies for salmonids, and it would naturally dominate the riparian over-story and include individuals of size representing significant local sources of large wood and other features of aquatic habitat. Following the period of seed dispersal, flow recession greater than 2.5 cm/day is considered lethal to cottonwood seedlings because the roots are not able to grow fast enough to keep up with the declining water table (Amlin and Rood 2002, Mahoney and Rood 1998, Stillwater Sciences 2006, Stella and Battles 2010).

Gradual recession of spring flows allow for riparian tree recruitment and establishment (Braatne *et al.* 2007, Dykaar and Wigington 2000, Everitt 1995, Fenner *et al.* 1985, Howe and Knof 1991, Hughes and Rood 2003, Mahoney and Rood 1993, Mahoney and Rood 1998, Rood *et al.* 2003, Rood *et al.* 2005, Scott 1967, SYRCL 2016). Rapid flow recession during the late-spring and summer put seedlings at risk of desiccation. Over time, this results in a decrease of riparian overstory and diversity.

The essential life-history stage of juvenile rearing has not been adequately addressed in the AFLA. There has been a lack of attention to the riparian component of prey production, as well as an absence of discussion about how flows affect juvenile salmonid rearing habitat and how the limited access of juvenile fish to the floodplain may affect juvenile salmonid survival in the lower Tuolumne River.

Riparian regeneration flows in the lower Tuolumne River are necessary to avoid Project and DPLG Complex impacts on riparian recruitment and to regenerate the riparian overstory that salmonids depend upon.

FPA § 10(j) USFWS Condition 8: Federally Listed Species Conservation and Consultation

Consultation

A. The Licensees shall prepare a Draft Biological Assessment to correct the deficiencies identified in our comments on the September 2017 *Applicant-Prepared Biological Assessment for Terrestrial Species* by addressing the potential impacts of the Project and DPLG Complex on the San Joaquin kit fox, California red-legged frog, California tiger salamander, Valley elderberry longhorn beetle, Layne's butterweed, and Red Hills vervain.

B. The revised Draft Biological Assessment shall evaluate the potential impact of the proposed Project and DPLG Complex on listed species and their habitats, without discounting the effects of flood control, water delivery, recreation, O&M, or changes in reservoir level. The revised Draft Biological Assessment shall be submitted to the USFWS and BLM for review and approval. The Licensees shall incorporate comments from the USFWS and BLM into a Final Biological Assessment and submit the document to the Commission for review and approval.

C. The revised Draft Biological Assessment shall:
    1. Include procedures to minimize adverse effects to listed species.
    2. Ensure Project-related activities meet restrictions included in site management plans for special status species.
    3. Develop implementation and effectiveness monitoring of measures taken or employed to reduce effects to listed species.

D. The Licensees shall not proceed with O&M actions in listed-species habitat until ESA consultation with the USFWS is concluded for the following species:
    1. San Joaquin kit fox
    2. California red-legged frog
    3. California tiger salamander
    4. Valley elderberry longhorn beetle
    5. Layne's butterweed
    6. Red Hills vervain

E. If any new species is listed or critical habitat is designated in the Action Area, the Licensees shall initiate informal ESA consultation with the USFWS to develop measures to avoid adverse effects to the species. The Licensees shall generate a new species list every 120 days (https://ecos.USFWS.gov/ipac/) for the length of the new license. Should a new species become listed, the Licensees shall have five business days from the date they generated the new species list to contact the FERC Coordinator at the Bay-Delta Fish and Wildlife Office at (916)-930-5603.

F. For newly listed species, if the USFWS and BLM determine that the species is likely to be affected by Project operations, the Licensees shall develop and implement a study plan in consultation with the USFWS and BLM to reasonably assess the effects of the Project on the species. The Licensees shall prepare a Draft Biological Assessment and include objectives, methods, results, recommended resource measures where appropriate, and a schedule of implementation. The Licensees shall provide the Draft Biological Assessment to the USFWS and BLM for review and approval. The Licensees shall file the Final Biological Assessment report, including evidence of consultation, with the Commission and shall implement those resource management measures required by the Commission.

G. If a listed-species or critical habitat affected by the Project is outside of the FERC Boundary and is not aquatic, the Licensees shall consult with the USFWS whether a section 7 nexus exists with another federal agency or if an ESA section 10 Habitat Conservation Plan and permit is needed.

H. Beginning the first full calendar year after license issuance, and in consultation with the USFWS and BLM, the Licensees shall annually review the current list of special status plant and wildlife species (any species that are Federal or State rare, threatened, endangered, on BLM-sensitive lists) that might occur in the Project area directly affected by Project operations. When a species is added to one or more of the lists, the USFWS and BLM, in consultation with Licensees, shall determine if the species or un-surveyed suitable habitat for the species is likely to occur in the Action Area affected by Project operations.

I. The Licensees shall initiate formal ESA consultation with the USFWS for future planned use of pesticides within the Project Area.

Avoidance

J. The Licensees shall not use burrow fumigants or rodenticides on Federal land, or allow usage of burrow fumigants or rodenticides on Federal land, unless authorized by the Authorized Officer for application on BLM lands.

K. The Licensees shall not use burrow fumigants or rodenticides in San Joaquin kit fox habitat or California tiger salamander habitat, or allow usage of burrow fumigants or rodenticides in San Joaquin kit fox habitat, until either ESA § 7 consultation is completed or a permit is issued under ESA § 10, whichever is applicable.

L. The Licensees shall follow Elderberry Longhorn Beetle Conservation Guidelines (USFWS 1999a) and the protocols from USFWS (2017a).

M. The Licensees shall contact the FERC Coordinator with the Bay-Delta FWO in event of a spill of hazardous materials (as defined by Licensees-proposed Condition WR1) to determine if emergency consultation is necessary for potential effects to listed species.

Conservation

N. The Licensees shall comply with the terms and conditions of any biological opinion issued by the USFWS on the Project or DPLG Complex actions.

O. The Licensees shall allow for conservation actions for listed species to occur within the Project Areas.

***Justification for § 10(j) Condition 8*: Federally Listed Species Conservation and Consultation**

Formal ESA consultation with the USFWS has not been conducted for any of the ESA-listed species potentially affected by the Project and the DPLG Complex. The USFWS and BLM's concerns regarding any ESA issues associated with the Project would be addressed through the Commission's compliance with Section 7 of the ESA. Federally-listed species and fish and wildlife resources potentially affected by the Project are noted earlier in the *Affected Resources* Section of this letter. The requirement for ESA consultations would help ensure that Project activities, including flood control, water delivery, recreation, O&M, and changes in reservoir level do not adversely affect federally listed species or their habitats, or that take of listed-species has been exempted from section 9 of the ESA.

San Joaquin kit fox – The San Joaquin kit fox can be adversely affected by rodent control and insecticide use. Direct effects, such as suffocation or poisoning, could occur from ground-squirrel and other rodent control.

If structures or Project facilities are baited for rats or mice, dispersing kit foxes could feed on the impaired rodents and become susceptible to vehicle strikes. Anti-coagulants affect both

cognition and vision. For example, 87% of road-killed kit foxes in the Bakersfield area had anticoagulants in their blood (McMillin *et al.* 2008).

If ground-squirrel burrows are occupied by dispersing San Joaquin kit foxes, the foxes could be asphyxiated from burrow fumigation and closure. By removing the refugia of ground-squirrel burrows, kit foxes could be preyed on by coyotes. The Project and DPLG Complex are dispersal barriers that are likely to cause San Joaquin kit foxes to be increasingly vulnerable to starvation and predation if adequate ground squirrel habitat is not present on both the north and south sides of the Project. Loss of ground-squirrels for prey and burrows for cover is likely to decrease San Joaquin kit fox survival during dispersal.

California red-legged frog – California red-legged frogs are likely to be adversely affected by woody material stockpiling and burning in two ways: (1) Bullfrogs, well-known as predators to California red-legged frogs (USFWS 2004), become established in reservoirs and their populations increase in areas with bank cover, such as wood piles; (2) Dispersing California red-legged frogs are likely to be attracted to wood piles and are likely to be eaten by bullfrogs or burned during O&M debris burning.

The California red-legged frog may be adversely affected by herbicide and pesticide use within the FERC Boundary and Action Area. Like other amphibians, California red-legged frogs can be adversely affected by both the active and inert ingredients of herbicides and pesticides (Babalola 2016, Cauble and Wagner 2005, Comstock *et al.* 2007, Folmar *et al.* 1979, Giesy *et al.* 2000, Howe *et al.* 2004, Hoy *et al.* 2015, King and Wagner 2010, Lanctota *et al.* 2014, Lanctota *et al.* 2013, Magbanua *et al.* 2013, Mann and Bidwell 1999, Myers *et al.* 2016, Perez *et al.* 2007, Relyea 2005a, Relyea 2005b, Relyea 2005c, Relyea 2012, Relyea *et al.* 2009, Gaido *et al.* 1997, Soto *et al.* 1991, Trumbo 2005).

Chytrid disease is a threat to California red-legged frogs, because it results in 98 to 100% mortality. Chyrid fungus is easily spread by contact and could be introduced into California red-legged frog habitat from recreational activities.

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. The Camp Far West sewage treatment pond had emergent vegetation, but the sewage treatment Pond at Don Pedro is treated with herbicides. Removal of emergent vegetation from potential California red-legged frog habitat is likely to adversely affect the species.

California tiger salamander – California tiger salamanders spend 10 to 11 months of the year in ground squirrel burrows, and they are dependent on ground squirrel burrows for cover and protection from desiccation. Without access to ground squirrel burrows, California tiger salamander populations are not able to persist. In addition, burrow fumigation and burrow collapsing used in ground-squirrel control is likely to cause California tiger salamanders to die from asphyxiation.

Valley elderberry longhorn beetle – Any loss or damage of elderberry plants could adversely affect the valley elderberry longhorn beetle, because the species is dependent on the plant for their survival.

Layne's butterweed – Some small populations of Layne's butterweed occur below the normal maximum water level of Don Pedro Reservoir. As a basal sprouting plant, Layne's butterweed can be killed or destroyed if inundated for too great a period of time. The species also occurs near three recreational facilities, and recreation is a recognized threat to the species. It is unknown whether roadside spraying of herbicides is the reason that the species is not found along Project roads, but this potential threat from O&M activities should not be discounted.

Red Hills vervain – Potential stressors around the Red Hills vervain include cattle grazing and recreation near the population in Poor Man's Gulch. In addition, barbed goatgrass (an invasive species from Eastern and Mediterranean Europe) was observed near both occurrences within the FERC Boundary, and competition from invasive alien vegetation is a threat to the species.

USFWS FPA § 10(j) Condition 9: Revise the AFLA Woody Debris Management Plan Include Rapid LWM and Woody Debris Removal

A. Revise the AFLA Woody Debris Management Plan to address safe and expeditious wood-removal in Don Pedro Reservoir when the volume exceeds 5,000 cubic yards of woody debris entering Don Pedro Reservoir in any one year. The Licensees shall include the following conditions in the revision:
    1. The wood shall be removed from Don Pedro Reservoir using an excavator placed on dry land and loading the wood from the water onto trucks.
    2. The wood shall be hauled off-site promptly and transported to a lumber yard, chipping facility, or storage area for wood used in lower Tuolumne River salmonid habitat restoration.
    3. Whenever the volume of LWM and woody debris in Don Pedro Reservoir exceeds 5,000 cubic yards, and during or immediately following Rapid LWM and Woody Debris Removal, the Licensees shall make 200 key pieces of LWM available to entities conducting salmonid restoration actions in the lower Tuolumne River that Licensees shall not be using to meet other requirements of the license..
        i. For the purpose of this condition, key pieces for engineered log jams are logs greater than 18 inches in diameter and greater than 16 feet in length. Key pieces for toed-in or embedded LWM are logs greater than 24 inches in diameter and greater than 18 feet in length (from trunk base to log end), with a root wad or crown attached.
        ii. Entities receiving the LWM for the purpose of salmonid habitat restoration shall be charged no more than the hauling cost to transport the LWM to restoration areas or storage areas in the lower Tuolumne River.
        iii. All key pieces of LWM with root wads still attached shall be preferentially selected to be made available for lower Tuolumne River salmonid habitat restoration.
        iv. The Licensees shall consult annually with the USFWS on timing and amounts of key LWM pieces available.
        v. If less than 200 key pieces of LWM are available in years when LWM and woody debris exceeds 5,000 cubic yards of material, the Licensees shall provide the balance of the LWM in pieces of wood that can be used to construct engineered log jams in the lower Tuolumne River, selecting for pieces of LWM that are greater than 18 feet in length.
        vi. The Licensees shall provide the parties receiving the wood a minimum of 60 days to collect the key pieces of LWM.

vii. Licensees shall contact the FERC Coordinator with the Bay-Delta Fish and Wildlife Office at 916-930-5603 and the USFWS CVPIA AFRP Watershed Coordinator for the Tuolumne River at 209-334-2968 when commencing the contracting process for Rapid LWM Removal.

Justification for FPA § 10(j) Condition 9: **Revise the AFLA Woody Debris Management Plan Include Rapid LWM and Woody Debris Removal**

There are three distinct advantages to this wood-removal technique: (1) it reduces risk to recreational boaters by opening the reservoir for safe boating before the higher periods of reservoir use; (2) in minimizes the threat of death or injury to California red-legged frogs; (3) it reduces the risk of wildfire in California during a time when wild fires are an increasing risk to life and property.

Wood-flow events occur approximately every 10 years in California reservoirs on the west slope of the Sierra Nevada Mountains. The 2006 wood-flow event resulted in approximately 952,000 cubic feet of LWM and woody debris captured by Don Pedro Reservoir (W&AR-12) and the 2017 wood-flow event resulted in at least that amount of floating LWM and woody debris. See Figure 3, to see a portion of the LWM and woody debris from the 2017 wood-flow event.

The lower Tuolumne River is deficient in juvenile salmonid rearing habitat, including LWM. LWM has important functions for juvenile salmonid rearing, because it provides instream cover (Cederholm *et al*. 2000, USFWS 2010), invertebrate food sources (Wipfli and Baxter 2010), and micro-habitat complexity (Cederholm *et al*. 2000, Crispin *et al*. 1993, Wipfli and Baxter 2010). LWM introduced into the lower Tuolumne River is expected to support and improve conditions for juvenile salmonid foraging, growth, and survival. The linking of this condition to wood-flow events will reintroduce a component of ecological function into the lower Tuolumne River that has been historically removed from the river due to LWM management at Don Pedro Reservoir.

The lack of riparian regeneration in the lower Tuolumne River cannot be corrected without many years of adequate conditions, such as recession flows and floodplain activation, to support riparian growth. Recovery of the Tuolumne River's riparian diversity is likely to extend beyond the term of the license. Placement of LWM would provide instant cover for juvenile salmonids, and go toward mitigating for the Project's impacts to fall-run Chinook population in the Tuolumne River.

Throughout the relicensing process, the USFWS has repeatedly expressed concern regarding the lack of surveys for the California red-legged frog. Stockpiling of LWM and woody debris allows for bullfrogs, an introduced predator to the California red-legged frog, to increase in numbers and disperse into California red-legged frog habitat.

The technology exists to use a wood-removal alternative (Rapid LWM Removal) that allows the wood to be removed expeditiously, using an excavator placed on dry land and loading the wood from the water onto trucks. The wood is then hauled off-site for chipping, lumber, or salmonid habitat restoration. The Rapid LWM Removal actions on other California reservoirs in 2017 demonstrated that there is a viable solution to this problem. The advantages of this alternative approach are: (1) it results in material being removed from the reservoir much quicker than prior methods used, thereby opening the reservoir for safe boating sooner; (2) it avoids adverse effects to the California red-legged frog; and (3) it reduces the risk of wildfire associated with Project

O&M. If Rapid LWM Removal is situated away from bald eagle nests, it avoids disturbance to nesting bald eagles and take under the BGEPA.

FPA § 10(j) USFWS Condition 10: Develop and Implement a Bald Eagle Management Plan to Prevent Take of Bald Eagles

A. Within 6 months of license issuance, and after consultation with the Resource Agencies, the Licensees shall develop and implement a Bald Eagle Management Plan. The USFWS has provided a high quality, scientifically valid, and robust plan (Attachment 8) for the Licensees' convenience. The Bald Eagle Management Plan describes the surveys and protection measures to be conducted and implemented by the Licensees in the Project areas where eagles may be adversely affected, disturbed or taken by construction, operations, maintenance and recreational activities. The plan shall be submitted to the BLM, USFWS, and CDFW for review and approval prior to submitting the final plan to the Commission and shall be implemented upon approval of the Commission. The plan shall consist of the elements outlined below:
    1. Bald eagle nesting, wintering, and night roost surveys to be conducted annually within suitable habitat on all lands within 1 mile of the Don Pedro Reservoir shorelines.
    2. Surveys shall be conducted in accordance with the *Bald Eagle Breeding Survey Instructions* (CDFG 2010) and the *Protocol for Evaluating Bald Eagle Habitat and Populations in California* (Jackman and Jenkins 2004).
    3. Once any new nests or communal night roosts have been located, the Licnsees shall coordinate with the BLM, USFWS and CDFW to establish a buffer zone around each nest to prevent disturbances to nesting birds that may result from O&M and/or recreational activities.
    4. Annual employee awareness training.
    5. Annual consultation meeting and annual reporting.

Justification for FPA § 10(j) Condition 10: **Develop and Implement a Bald Eagle Management Plan to Prevent Take of Bald Eagles**

Nesting surveys performed by the Licensees in 2012 and 2013 identified nine bald eagle nests, three of which were occupied by nesting bald eagle pairs on Don Pedro Reservoir. Activities associated with project operations, maintenance, construction or recreation may adversely affect, disturb and/or take bald eagles. The National Bald Eagle Management Guidelines (USFWS, 2007) reports that recreational activities similar to those conducted in the Project Area (*e.g.*, boating jet skis, hiking, camping, fishing, kayaking, and canoeing) have the potential to disturb nesting bald eagles. Bald eagles are protected by federal law under the MBTA and BGEPA.

The development and implementation of a high quality, scientifically valid, and robust Bald Eagle Management Plan (such as the one provided in Attachment 8) that is implemented in a timely and effective manner, and regularly reviewed and revised as needed, will maximize avoidance of take of bald eagles, while allowing for project construction, operations, maintenance, and recreational activities.

FPA § 10(j) USFWS Condition 11: Revise the Terrestrial Resources Management Plan to Include Protective Measures for the San Joaquin Kit Fox, Western Burrowing Owl, Special Status Bats, California Red-legged Frog, California Tiger Salamander, Layne's Butterweed, and Red Hills Vervain.

A. Within 6 months of license issuance, and after consultation with the Resource Agencies, the Licensees shall revise the Terrestrial Resources Management Plan to include protective measures for the San Joaquin kit fox, western burrowing owl, special status bats, California red-legged frog, California tiger salamander, Layne's butterweed, and Red Hills vervain.

B. A draft Terrestrial Resources Management Plan shall be submitted to the BLM, USFWS, and CDFW for review and approval prior to submitting the final plan to the Commission and shall be implemented upon approval of the Commission. The plan shall consist of the elements outlined below:

    1. Bald eagle nesting, wintering, and night roost surveys to be conducted annually within suitable habitat on all lands within 1 mile of the Don Pedro Reservoir shorelines.
    2. Protective buffers for use of pesticides, including rodenticides. Pesticide use should be avoided within suitable habitat for the San Joaquin kit fox, western burrowing owl, California red-legged frog, and California tiger salamander. Pesticides should be avoided when within 500 feet of a bat maternity colony.
    3. Suppression or control of aquatic invasive species populations (bullfrog and crayfish) within the Project boundary. Bullfrog and crayfish efforts should be developed in collaboration with the BLM, CDFW, and USFWS, and shall include surveys to determine the extent of range within the Project boundary and assessment of vector methods as well as management/suppression activities to be included in the Terrestrial Resources Management Plan.
    4. Management of chytrid fungus within the Project boundary. Efforts should include survey efforts to determine the status of chytrid fungus within the Project boundary, its vectors for movement, potential interactions between the disease and other stressors (such as pesticides, recreation, nonnative species, and flows), and management activities to control its spread.
    5. Establishment of decontamination protocols in collaboration with BLM, USFWS, and CDFW to ensure that any Project activities that require movement from one water body to another have decontamination measures implemented (use protocols from Peek *et al*. 2017).
    6. Provisions that any hazard tree removal or fuels reduction/slash that is to be cleared will be removed within 24 hours, or will be left in place in perpetuity, and not be stored within 1000 feet of a wetland, riparian area, or core areas for recovery.
    7. Provisions to work with the USFWS, BLM, and CDFW to develop additional minimization measures for when ground disturbance actions are planned within 300 feet of wetlands, riparian areas, critical habitat, or core areas for recovery.
    8. Provisions to minimize impacts from roads on the San Joaquin kit fox, western burrowing owl, California tiger salamander, and California red-legged frog within the Project boundary shall be developed in collaboration with the USFWS, BLM, and CDFW (including potential measures for wildlife-friendly road crossings) and included for implementation in the Terrestrial Resources Management Plan.
    9. Provisions to minimize impacts from transmission lines on the San Joaquin kit fox and western burrowing owl within the Project boundary shall be developed in collaboration with the USFWS, BLM, and CDFW and included for implementation in the Terrestrial Resources Management Plan. These measures shall include measures to discourage raptor use of transmission lines as perches when within suitable habitat for the San Joaquin kit fox and western burrowing owl.

10. Avoidance of impacts to western burrowing owls from vegetation management and ground squirrel control. Vegetation management and burrow fumigation activities should avoid all occupied western burrowing owl dens in all months of the year. Buffers for occupied dens should be developed in collaboration with the USFWS, BLM, and CDFW and included for implementation in the Terrestrial Resources Management Plan.
11. Provisions to protect roosting special status bats (and all maternity colonies) from Project impacts shall be developed in collaboration with the USFWS, BLM, and CDFW and included for implementation in the Terrestrial Resources Management Plan. Protective measures must include:
    a. One day of surveys, annually, consisting of a daytime visual assessment and a nighttime emergence survey at all Project buildings (*e.g.*, powerhouses, storage buildings and valve houses), recreation facilities, dams, or other structures (collectively "Project facilities") for bats and/or signs of bats roosting. The surveys shall occur during the peak of the bat maternity season, which is July 1 through August 31.
    b. A brief report summarizing the results of the surveys and a list of Project facilities in which exclusion devices and screens that Licensees propose to be installed will be provided to USFWS, BLM, and CDFW within 30 days of completion of surveys. The report will include a table with the list of Project facilities surveyed and identify the facilities at which bats and/or signs of bat roosting were found, a map showing the locations of the facilities, photographs of the facilities showing the bats and/or signs of bat roosting, and the bat exclusion materials Licensees propose to use at each facility. USFWS, BLM, and CDFW will have 30 days to review the report and provide comments. If Licensees do not receive comments from USFWS, BLM, and CDFW within 30 days, Licensees will proceed with exclusion measures proposed in the report. It is the goal of this Plan that, where feasible, humane bat exclusion devices are installed in the same calendar year that surveys occur.
        i. As guidance, Licensees will not recommend the placement of exclusion devices from roosts discovered on the exterior of Project facilities or Project facilities where human presence is infrequent or non-existent. Humane exclusion devices and screens will only be installed when bats are less likely to occupy the facilities, which is generally between November 1 and February 28. Foam sealant shall not be utilized as an exclusion device.
        ii. Prior to installation of the humane exclusion devices, Licensees will perform an additional inspection of the facility to ensure that overwintering bats will not be trapped. If overwintering bats are present during that inspection, installation of humane exclusion measures will be delayed, and Licensees will consult with the USFWS, BLM, and CDFW to identify future dates that would be suitable for installation of humane exclusion devices at that facility.
        iii. Licensees will maintain all bat exclusion devices and screens in properly functioning condition. All bat exclusion devices and screens will be inspected 6 months following installation to confirm effectiveness (*i.e.*, no evidence of bat presence) and repaired or replaced if necessary. Thereafter, all exclusion devices and screens will be inspected on an annual basis and repaired or replaced if necessary.

c. Project facilities will be reevaluated for roosting bats every 2 years after the initial exclusion devices and screens are installed to insure that no new roosts or entry points have been established. Licensees will maintain a map that identifies the locations of all installed bat exclusion devices and screens.

12. Development of species monitoring in collaboration with the BLM, USFWS, and CDFW for inclusion into the Terrestrial Resources Management Plan. This monitoring shall include habitat surveys for the San Joaquin kit fox, western burrowing owl, special status bat species, California red-legged frog, and California tiger salamander to be conducted every three years (or as determined by the resource agencies) and are intended to inform the adaptive management process as part of the annual meeting with resource agencies.
13. Consideration of actions for inclusion within the Terrestrial Resources Management Plan as indicated in the Guidance for Burrowing Owl Conservation (CDFW 2008) as appropriate for the Project.
14. Consideration of actions for inclusion within the Terrestrial Resources Management Plan as indicated in the Recovery Plan for Upland Species of the San Joaquin Valley (USFWS 1998), California Red-Legged Frog Recovery Plan (USFWS 2002), and the Recovery Plan for the Central California Distinct Population Segment of the California Tiger Salamander (USFWS 2017b) as appropriate for the Project.
15. Direction for formal consultation with the USFWS for any pesticides planned for use within the Project Area.
16. Inclusion of San Joaquin kit fox, California red-legged frog, and California tiger salamander consultation during the annual meeting with BLM (this meeting shall include resource agencies such as USFWS, CDFW, and NMFS). Through the annual consultation process, the Licensees shall ensure that the Project is updated with any new or updated plans for the San Joaquin kit fox and is following the most current conservation guidelines.

Justification for § 10(j) USFWS Condition 11: **Revise the Terrestrial Resources Management Plan to Have Protective Measures for the San Joaquin Kit Fox, Western Burrowing Owl, Special Status Bats, California Red-legged Frog, California Tiger Salamander, Layne's butterweed, and Red Hills vervain.**

The Terrestrial Resources Management Plan does not provide protective measures for many listed and sensitive species affected by the Project. The USFWS has identified loss and degradation of habitat by agricultural, industrial, and urban developments and associated practices (including roads) decreases the carrying capacity of remaining habitat and threatens kit fox survival. Such losses contribute to kit fox declines through displacement, direct and indirect mortalities, barriers to movement, and reduction of prey populations (USFWS 1998).

Bats are very sensitive to anthropogenic impacts, both direct (*e.g.*, human presence) and indirect (*e.g.*, disturbances to the roost and surrounding habitat, including noise and vibrations) (Russo and Ancillotto, 2015; Jones *et al*., 2009). Research by Jung and Kalko (2011) has shown that bat species richness decreases with increasing human impact. Loss of roost habitat can be particularly harmful to bats since they utilize roosts during sensitive life history periods, including the maternity season and winter hibernating, and many roosts are used by successive generation of bats over many years. Disturbance to maternity colonies can cause bats to abandon young or fall to the ground where they are not usually retrieved and thus subsequently die (Sheffield et. al. 1992). Additionally, female bats do not reach sexual maturity until age 2 and

many species only have one young per year (H.T. Harvey & Associates 2004), so impacts to maternity colonies can decrease fecundity of individuals and populations as well as subsequent generations of bats. If disturbed during hibernation, bats may awake prematurely, which can cause an elevation in body temperatures and promote the use of stored energy reserves, leaving insufficient energy to survive the rest of the winter. The Licensees last conducted a bat survey in 2012 and the results may be outdated and should be updated in order to make accurate decisions regarding exclusion. A periodic survey of Project facilities throughout the life of the License is needed to insure that no new roosts or entry points have been established.

Vegetation management activities have the potential to impact western burrowing owls, nests, or eggs through grading, disking, earthmoving, heavy equipment compacting and crushing burrow tunnels, burning, and mowing (CDFW 2012b). Use of pesticides and rodenticides may result in impacts to western burrowing owls (CDFW 2012b).

Adult and larval bullfrogs are a well-known predator and competitor of native California frog species (USFWS 1996, USFS 2016, FS 2014, Moyle 1973, Hayes *et al.* 2016, Kiesecker *et al.* 1998). The effectiveness of bullfrogs as a predator and competitor of native frogs was demonstrated by Adams (1999), Adams *et al.* (2017), Kiesecker *et al.* (1998), Kiesecker *et al.* (2001), and Kupferberg (1984). Kupferberg (1997) found a strong negative correlation between presence of bullfrogs and presence of native frog species. Bullfrogs are also known to spread the chytrid fungus (Adams *et al.* 2017).

Wood piled in potential California red-legged frog habitat may become occupied by the species, as it is known to seek shelter in wood structures associated with wet soil. When the wood is moved, California red-legged frogs could be killed or harmed by crushing. In addition, bullfrogs can become established in floating LWM. California red-legged frogs could be harmed or killed through competition or predation from bullfrogs.

Pesticides, including their active and inert ingredients, are known to have deleterious effects to amphibians and other organisms (Babalola 2016, Cauble and Wagner 2005, Comstock *et al.* 2007, Folmar *et al*. 1979, Gaido *et al.* 1997, Giesy *et al*. 2000, Howe *et al.* 2004, Hoy *et al.* 2015, King and Wagner 2010, Lanctota *et al.* 2014, Lanctota *et al.* 2013, Magbanua *et al.* 2013, Mann and Bidwell 1999, Myers *et al.* 2016, Perez *et al.* 2007, Relyea 2005a, Relyea 2005b, Relyea 2005c, Relyea 2012, Relyea and Jones 2009, Soto *et al*. 1991, Trumbo 2005).

Chytrid fungus is considered to be the leading cause of the decline of native amphibians throughout the world (Houlahan *et al.* 2000, Stuart *et al.* 2004, Wake and Vredenberg 2008). Adams *et al.* (2017) found that a mass mortality event of foothill yellow-legged frogs in a San Francisco Bay area watershed in 2013 was caused by the introduction of chytrid fungus to the local environment by bullfrogs.

California red-legged frogs are known to move well into the surrounding terrestrial environment while feeding and during dispersal. Restricting large equipment and other ground-disturbance activities to at least 300 feet from wetlands, riparian areas, and critical habitat should minimize the potential that the species will be affected.

California tiger salamanders require a large amount of barrier-free landscape for successful migration and dispersal (Shaffer *et al.* 1993, Loredo *et al.* 1996). Habitat fragmentation (from roads and other impediments) reduces population connectivity needed for dispersal and

migration, results in isolation of metapopulations, and makes them more vulnerable to stochastic effects because they are unlikely to become recolonized if extirpated (Shaffer *et al.* 1993).

The Commission has a responsibility under sections 2, 4, and 7 of the ESA to use their authority to further the purposes of the ESA, including directing implementation of recovery actions.

FPA § 10(j) Condition 12: Organize Ecological Group and Host Annual Meeting

A. Licensees shall, within 60 days of license issuance, establish an Ecological Group that includes: Licensees, NMFS, USFWS, CDFW, BLM, NPS, and SWRCB. Ecological Group meetings shall be open to any organization or individual, who may fully participate in the meeting. The Licensees shall coordinate meeting agendas with interested agencies.
   1. Licensees shall maintain an Ecological Group e-mail contact list consisting of e-mail addresses (one primary and one alternate) provided to Licensees by the NMFS, USFWS, CDFW, BLM, and SWRCB agencies.
   2. Thereafter, Licensees shall organize and host Ecological Group meetings at least once each year. The Licensees shall organize and host additional Ecological Group meetings if agreed to by the Ecological Group.
   3. The agenda for the annual meeting shall include, unless otherwise modified by the Ecological Group, the following:
      i. Introductions.
      ii. Public comments.
      iii. Licensee's report of any deviations from the conditions in the license since the previous meeting required under this condition.
      iv. Discussion of Licensee's ecological-related FERC filings in the previous calendar year (*e.g.*, reports required by measures or implementation plans).
      v. Review of monitoring data and reports - In particular, the discussion will include the results of fish population monitoring data collected in the previous calendar year (and other prior years, as appropriate), in light of preserving and protecting ecological values affected by the Project.
      vi. Discussion of Licensee's planned license-required ecological-related monitoring in the current calendar year.
      vii. Discussion of any license-required agency ecological-related consultation in the current calendar year, and Licensee's proposal to complete the consultation, if needed.
      viii. Discussion of any Licensee-anticipated proposals that have ecological consequences in the calendar year regarding: (1) changes or additions to facilities or features in the license; (2) variances to conditions in the license; or (3) amendments to the license.
      ix. Licensee's follow-up on action items from the last meeting required by this condition.
      x. Identification of Licensee's follow-up action items from this meeting, if any.
   4. At least 30 days in advance of the annual meeting, Licensees shall make available to the Ecological Group the following material:
      i. Reports and other information from the previous calendar year required by license conditions or implementation plans in the FERC license

B. Licensees shall prepare for each Ecological Group meeting held under this condition a letter summary that shall include the date and location of the meeting, attendees, subjects discussed, and Licensee's action items agreed to by Licensees at the meeting. The summary is not intended to be a transcript of the meeting or formal comments on the

license by Licensees or participants in the meeting. Licensees shall file each meeting summary with the Commission no later than 30 days following the meeting.

1. Licensees are only required to take actions recommended in writing by the Ecological Group if a term or condition of the license expressly provides that the Ecological Group may direct the Licensees to take such action.

Justification for § 10(j) Condition 12: **Organize Ecological Group and Host Annual Meeting**

The formation of an Ecological Group comprised of agencies and Licensees would facilitate communications and assure that interested agencies have an opportunity to discuss license implementation with the Licensees.

The condition provides that Licensees would organize and host all Ecological Group meetings, with at least one agendized meeting held each year. Other meetings may be held upon agreement of the Ecological Group. Documentation of meetings would be provided by the Licensees, which would file letter summaries with FERC. Last, the condition clearly states the authority of the Ecological Group – the group may only direct the Licensees to take action if a condition in the license expressly provides the Ecological Group may direct Licensees to take an action under that condition. Condition 12 does not imply that Licensees may only proceed with license implementation until after the annual meeting, or that agencies' approval is needed for Licensees to implement the terms and conditions in the license. The Licensees are solely responsible for implementing the license.

BLM's Federal Power Act PRELIMINARY SECTION 4(e) CONDITIONS AND 10(a) RECOMMENDATIONS FOR THE BENEFICIAL USE OF BLM LANDS IN AND AROUND DON PEDRO HYDROELECTRIC PROJECT, FERC PROJECT No. 2299

Brief Introduction

As outlined in detail below, the BLM has had numerous concerns associated with the Project's continuing direct and indirect effects on public lands and fish and wildlife resources. Pursuant to its authorities and responsibilities under sections 4(e) and 10(a) of the Federal Power Act (FPA), the Federal Land Policy and Management Act (FLPMA), and the National Environmental Policy Act (NEPA), the BLM has developed comments, and preliminary recommendations, terms and conditions, and prescriptions to address these concerns (hereinafter referred to as "FPA Terms"). In this document, the BLM identifies and explains its FPA Terms, as well as their legal and evidentiary basis. The impacts we seek to ameliorate are addressed in our FPA Section 4(e) Conditions.

The rationale that forms the basis of the BLM's Preliminary FPA Terms is based upon data collected and analyzed from FERC approved studies, BLM's Sierra Resource Management Plan (2008), data from resource documents, planning documents, minimum instream flows, potential power production, water deliveries, research papers, agency manuals, and other sources of documents (Reference Documents filed separately). Additionally, the BLM has contributed to, and relied upon, a rationale that was collaboratively developed by the Department, other resource agencies, and several NGOs. This rationale is addressed below each final condition. The resource agencies/NGOs group (Rationale Participants) used the rationale to collaboratively develop protection, mitigation, and enhancement (PM&E) measures for the Project during the relicensing process.

The BLM's environmental and recreational PM&E measures that apply to the Don Pedro Hydroelectric Project No. 2299 provide a balanced amount of protection, mitigation, and enhancement for the public lands, fish, wildlife, and recreational resources affected by the Project.

The BLM has particular authorities under the FPA which allow it to require protection, mitigation, and enhancement conditions on FPA licensed projects. These authorities are discussed below and provide the basis for BLM's section 4(e) conditions and 10(a) recommendations. Following the outline of these authorities there is a short section describing BLM's applicable planning documents and comprehensive plans, which illustrate how the 4(e) conditions and 10(a) recommendations will benefit public recreation, aquatic resources, riparian resources, terrestrial resources, wildlife resources, and cultural resources while balancing water and power objectives.

FPA Authorities

Department's FPA Section 4(e) Authority

The Department of the Interior's BLM is one of the federal agencies charged with providing for the protection and utilization of reservation lands held under their supervision – *Federal Land Policy and Management Act,* 43 U.S.C. § 1701. In recognition of this authority, section 4(e) of the Federal Power Act ("FPA") provides:

> "The Commission is hereby authorized and empowered... *(e)*... To issue licenses to... any corporation organized under the laws of the United States or any State thereof, or to any State or municipality for the purpose of constructing, operating, and maintaining dams, water conduits, reservoirs, power houses, transmission lines, or other project works necessary or convenient... for the development, transmission, and utilization of power across, along, from or... upon any part of the *public lands and reservations of the United States* (including the Territories).... Provided, that licenses shall be issued within any reservation only after a finding by the Commission that the license will not interfere or be inconsistent with the purpose for which such reservation was created or acquired, and *shall be subject to and contain such conditions as the Secretary of the department under whose supervision such reservation falls shall deem necessary for the adequate protection and utilization of such reservation*.... 16 U.S.C. § 797 (emphasis added).

Under this statutory authority, BLM submits section 4(e) conditions for the protection and utilization of reservation lands affected by Modesto and Turlock Irrigation District's Don Pedro Hydroelectric Project No. 2299. The BLM's conditions apply to lands complying with the FPA's definition of reservations, which is:

> National forests, tribal lands embraced within Indian reservations, military reservations, and other lands and interests in lands owned by the United States, and withdrawn, reserved, or withheld from private appropriation and disposal under the public land laws; also lands and interests in lands acquired and held for any public purposes; but shall not include national monuments or national parks…. 16 U.S.C. § 796(2).

In the act of setting aside a reservation, usually through an Executive Order or Congressional Act, designated lands are withdrawn from public disposal status and placed under management authority of the federal government. Further acts and directives define the purposes for which the lands are withdrawn, and management and use of those lands adheres to those declared purposes. The following actions established the BLM reservations around the Tuolumne River.

Executive Order 6910 – This order took vacant, unreserved, and unappropriated lands in several States (including California) and withdrew them from settlement, location, and sale or entry, and reserved them for classification and future determination of the most useful purpose.

Table 1. Power Site Reservations and adjacent BLM lands for the Don Pedro Hydroelectric Project.

	Sec	Project Acre 5/9/1961 Acres Power Site WDs
03S 14 E	3	200
T/R	9	160
	10	80
02S 14E	33	40
	34	40
	26	43
	25	211.26
	24	115.99
	2	43.48
	1	39.04
01S 14E	35	318.89
	34	140
	25	640
	26	640
	27	540
	24	380
	12	30.16
	13	211.41
	2	244.61
	3	193.24
01N 15E	34	361
01S 15E	18	314.31
	19	111.56
	30	40
	31	520
	20	190.76
	17	270.88
	8	460
	5	548.51
	4	406.91

	3	360
	2	402.98
	1	312.56
	9	38
	21	35.55
	28	15.84
	27	93.52
02S 15E	6	402.49
	7	553.56
	8	240
	18	610
	17	440
	19	640
	20	320
	30	63.95
		11,749.15 acres of BLM land within the project and adjacent to the project boundary.

Under the authorities listed above and just below, the BLM manages lands and resources in and around the Don Pedro Hydroelectric Project.

Department's FPA Section 10(a) Authority

The Federal Power Act requires in § 10(a) that the project adopted shall be best adapted to a comprehensive plan for improving or developing a waterway or waterways for the use or benefit of interstate or foreign commerce, for the improvement and utilization of water-power development, for the adequate protection, mitigation, and enhancement of fish and wildlife (including related spawning grounds and habitat), and for other beneficial public uses, including irrigation, flood control, water supply and recreation and other purposes (such as energy conservation, protection of recreational opportunities and the preservation of other aspects of environmental quality) 16 U.S.C. § 803(a)(1); 16 U.S.C. § 797(e). To ensure compliance with this provision, the FERC is to consider the recommendations of Federal and State agencies exercising administration over flood control, navigation, irrigation, recreation, cultural and other relevant resources of the State in which the project is located, and the recommendations of Indian Tribes affected by the project, 16 U.S.C. § 803(a)(2).

The BLM has prepared its Preliminary recommendations based on current information regarding the proposed new licensing of the Don Pedro Hydroelectric Project. The Department strongly requests and urges FERC to accept the final recommendations in full and without change as license conditions.

BLM's PRELIMINARY RECOMMENDATIONS, TERMS AND CONDITIONS FOR THE DON PEDRO HYDROELECTRIC PROJECT 2299

The BLM, through its preliminary recommendations, terms and conditions, and prescriptions seeks to ensure appropriate levels of resource protection are incorporated in any new license. The BLM recommends that the FERC include in any new license issued for the Don Pedro Hydroelectric Project 2299 the following BLM preliminary recommendations, terms and conditions. The BLM believes this comprehensive framework provides for the sustainable management and conservation of the natural resources of the Tuolumne watershed. This framework is within the context of agency statutory authorities under the FPA and other applicable laws. The agencies intent is to issue their protection, mitigation and enhancement measures, terms and conditions, and recommendations consistent with this framework.

FPA § 4(e) BLM Condition No. 1 – Consultation

Licensee shall annually consult with BLM regarding license implementation. Licensee shall set an agreed upon date beginning in the first full calendar year of the new license term and each year thereafter, meet with BLM at the MID office in Modesto, California, to discuss past and current year implementation of the license conditions affecting BLM land. The meeting will be open to the public, except during those parts of the meeting when confidential information (e.g., cultural resources or specific location of ESA-listed species) is discussed. In those instances, only Licensee and appropriate agencies shall be allowed to be in attendance. At least 30 days in advance of the meeting, Licensee shall notify via email or other written means BLM and other interested stakeholders (interested stakeholders are defined as anyone who sends a letter or email to the Licensee requesting to be a part of the consultation group). Any organized group will select an individual to represent them and will notify the Licensee who their representative will be when they are attending these meetings, confirming the meeting location, time and agenda. At the same time, Licensee shall also provide notice to the: United States Fish and Wildlife Service (USFWS); National Park Service (NPS); National Marine Fishery Service (NMFS); California State Department of Fish and Wildlife (CDFW); and the State Water Resources Control Board (SWRCB) who may choose to participate in the meeting.

Three weeks prior to each annual meeting, Licensee shall make available to BLM, interested stakeholders, and the agencies listed above an operations and maintenance plan for project activities that may affect BLM land for the calendar year in which the meeting occurs.

The purposes of the meeting are to conduct discussions about forthcoming year's operations and maintenance plans that may affect BLM land; to have the Licensee present results from the past/current year monitoring, as well as any additional information that has been compiled for the project area including progress reports on any other issues related to preserving and protecting ecological values affected by the Project on or affecting BLM land; to share information on mutually agreed upon planned maintenance activities on or affecting BLM land; to identify concerns that BLM may have regarding project operations/activities and their potential effects on sensitive resources on or affecting BLM land, any measures required to avoid or mitigate those potential effects; and review and discuss the results of implementing Don Pedro Hydroelectric Projects-related conditions on or affecting BLM land.

Consultation shall include, but is not limited to, the items listed below as they pertain to project-effects on or affecting BLM land:

- A status report regarding implementation of license conditions.
- Discussion on any conditions that were not implemented. Rationale on why they didn't get implemented, and when will they be implemented.
- Results of any monitoring studies performed over the previous year in formats agreed to by BLM and Licensee during development of implementation plans.
- Review of any non-routine maintenance.
- Discussion of any foreseeable changes to project facilities or features.
- Discussion of any necessary revisions or modifications to resource implementation plans approved as part of this license.
- Discussion of needed protection measures for species newly listed as threatened, endangered, or sensitive, or changes to existing management plans that may no longer be warranted due to de-listing of species or, to incorporate new knowledge about a species requiring protection.
- Discussion of needed protection measures for newly discovered cultural resource sites.
- Discussion of elements of current year maintenance plans, e.g. road and trail maintenance.
- Discussion of any proposed pesticide use.
- Discussion of BLM identified concerns regarding project operations/activities and their potential effects on sensitive resources, and any measures required to avoid or mitigate those potential effects.
- Discussion of information on mutually agreed upon planned maintenance activities.
- Discussion on upcoming permitted events that are scheduled for the year.
- Discussion on any planned burning activities on BLM land.
- Discussions on other issues regarding project effects on BLM land.

A record of the meeting shall be kept by Licensee and shall include any recommendations made by BLM for the protection of BLM land and resources. Licensee shall file the meeting record, if requested, with FERC no later than 60 days following the meeting.

A copy of the reports/records/studies on or affecting BLM land from the previous water year shall be provided to BLM by Licensee at least 90 days prior to the meeting date, unless otherwise agreed.

Copies of other non-CEII reports including, but not limited to, monitoring reports, non-compliance reports filed by Licensee, geologic or seismic reports, and structural safety reports for facilities affecting or on BLM land shall be submitted to BLM concurrently with submittal to the FERC, with the goal of providing the material to BLM no later than 90 days in advance of the annual meeting.

During the first several years of license implementation, it is likely that more consultation than just one annual meeting will be required, given the complexity of the project and the acreage of BLM land affected by project operations.

BLM will be included to be a participant on Technical Committees that focus on anadromous fish, inter-related resident fish and other ecological topics and issues that may have a direct or indirect effect on BLM managed lands. The Technical Committees shall develop a technical advisory plan or process for ground rules for decision making and implementing decisions. Members of the committee will include those agencies with direct management responsibilities for lands (riparian, wetland, recreation, fisheries, aquatics, water temperature and water quality), and the selection of an appropriate non-governmental representative. The Technical Committee will be finalized within one year of license issuance.

Rationale for Consultation:

For BLM to ensure that the license will not interfere or be inconsistent with the purpose for which the reservation was created and to ensure adequate protection for utilization of the reservation and to preserve other aspects of environmental quality, it is necessary to have an ongoing consultation process in the Section 4(e) conditions. It is also essential that this process be inclusive of other resource agencies and interested stakeholders. BLM has approximately 4802 acres located within the project boundary that are affected directly by project operations. BLM also administers over 7000 acres of BLM land that is located outside of the project boundary but is impacted directly and indirectly from project operations.

With the large amount of public land impacted from project operations, it is necessary to conduct annual consultation with the Licensees. BLM has applied this condition in every License with far fewer acres impacted in those Licenses. Licensees have submitted a similar proposed measure for consultation in their Amended Final Licensee Application (AFLA) in the Terrestrial Resources Management Plan (TID/MID 2017b) which describes bi-annual employee trainings, biennial agency consultation, and periodic review of noxious weed and special-status plant lists. BLM does not support bi-annual trainings for employees nor do we support biennial agency consultation or periodic review of noxious weed and special status plant species as being sufficient to discuss project operations and resource concerns. The AFLA does not address consultation for all BLM related issues and only focuses on terrestrial resource issues for consultation. BLM believes it is necessary to have an annual consultation meeting to address all BLM related resource issues, license implementation schedules, and other agencies concerns; therefore, BLM has submitted this condition as a separate and distinct condition.

FPA § 4(e) BLM Condition No. 2 – Annual Employee Training

Licensee shall, beginning in the first full calendar year after license issuance, annually perform employee awareness training, and shall also perform such training when a staff member is first assigned to the Project. The goal of the training shall be to familiarize Licensees' Operations and Maintenance (O&M) staff with special-status species, non-native invasive plants, and sensitive areas (e.g., special-status plant populations and invasive plant locations) that are known to occur within or adjacent to the FERC Project Boundary. Licensee shall provide to each O&M staff a confidential map showing these sensitive areas, including GPS coordinates, as well as pictures and other guides to assist staff in recognizing special-status species, non-native, invasive plants, and sensitive areas. It is not the intent of this measure that Licensees' O&M staff perform surveys or become specialists in the identification of special-status species or noxious weeds. Licensee shall direct its O&M staff to avoid disturbance to sensitive areas, and to advise all Licensees' contractors to avoid sensitive areas. If Licensee determines that disturbance of a

sensitive area is unavoidable, Licensee shall consult with BLM to minimize adverse effects to sensitive resources. This measure applies to employee training that is not otherwise covered by a specific plan.

Rationale for Annual Employee Training:

The purpose of this measure is to minimize the possibility that continued Project O&M would adversely affect special-status species, sensitive areas and invasive plant introduction and spread. The measure requires Licensee to provide training to Project O&M staff when they are first assigned to the Project and to provide group training to Project O&M staff annually. Providing training to staff when they are first assigned to the Project will allow new staff to be quickly trained, and annual training will serve as a refresher for staff and to note any changes since the preceding year. Training will include the general identification of special-status species and invasive plants and their location within the Project Area. Training will also include procedures for reporting to Licensees' management if staff observes any Project activity directly affecting these sensitive areas.

FPA § 4(e) BLM Condition No. 3 – Erosion Control and Restoration Plan

Within one year of license issuance, Licensees shall develop and implement an Erosion Control and Restoration Plan for erosion and/or restoration actions to be carried out by Licensees on or affecting BLM lands that are within or adjacent to the FERC Project boundary. Licensees must acquire BLM approval before submitting the Erosion Control and Restoration Plan for Commission approval. Licensees shall file the approved Erosion Control and Restoration Plan with the Commission at least 90-days in advance of initiating construction of recreation or other Project facilities. Upon Commission approval, Licensees shall implement the Erosion Control and Restoration Management Plan.

Rationale for Erosion and Control and Restoration Plan:

The BLM Sierra RMP contains various requirements addressing erosion control and water quality. In particular, applicable riparian conservation objectives are described on pp. 8 through 10 in the Sierra RMP (BLM 2008a).

Erosion has the potential to influence both aquatic and terrestrial resources. BLM recognizes that each ground-disturbing activity that may be approved by the Commission in a new license would require site-specific erosion control measures that consider local topography and soils. Such details are typically incorporated into the final design for ground-disturbing activities. Review and approval of such final designs, including proposed erosion control measures, are to be approved by the BLM for BLM lands.

An effective erosion control and restoration plan should include the following: (1) a description of BMPs for erosion control that would be applied in specific circumstances; (2) provisions for inspecting erosion control measures while they are in place; (3) emergency protocols for erosion and sedimentation control (e.g., steps that would be taken if control measures fail during a storm event); (4) techniques that would be used to stabilize sites once construction is completed; and (5) a description of when and what type of water quality monitoring of surface waters would occur during and after ground-disturbing activities.

Identifying such measures and protocols in the proposed erosion control and restoration plan would assure that erosion does not unacceptably degrade water quality adjacent to construction and other ground-disturbance sites. Any ground-disturbing activity, including non-routine maintenance, has the potential to result in erosion and sedimentation. Include all construction and non-routine maintenance activities that could result in ground disturbance to ensure water quality and aquatic habitat are protected from sedimentation caused from erosion.

FPA § 4(e) BLM Condition No. 4 - Large Woody Debris Material Management Plan

Within one year of License issuance, Licensees shall develop and implement a BLM approved Large Woody Debris Material Management Plan for BLM administered lands within Don Pedro Reservoir. The Large Woody Debris Material Management Plan must include at all times a navigable waterway directly downstream of the Tuolumne Wild and Scenic Boundary to the Ward's Ferry Day Use Area and provide a safe accessible takeout area for whitewater boaters at all times. The Licensees must acquire BLM approval before submitting this plan for Commission approval. Upon Commission approval, Licensees shall implement the Large Woody Debris Material Management Plan.

Rationale for Large Woody Debris Material Management Plan:

Article 52 of the current FERC license requires the implementation of the Districts' Log and Debris Removal Plan. Under the Log and Debris Removal Plan, the Districts collect and remove floating debris at Don Pedro Dam, in the upper Tuolumne River portion of the reservoir, and in other dispersed areas of the reservoir as needed. Debris is collected in boom rafts, anchored along the reservoir edge, and burned during fall and winter under low reservoir levels. Woody debris removal is conducted in order to limit the public safety hazard to recreational users of Don Pedro Reservoir.

Large woody debris management is necessary in order to provide safe navigability for flatwater and whitewater recreational users from the river segment below the Tuolumne River Wild and Scenic River boundary to the Ward's Ferry Day Use Facility. Navigability for power boats and whitewater boaters is primary to ensuring public safety on and within Don Pedro Reservoir.

In the past, the Licensees have been blocking off navigability of both flatwater boaters and whitewater boaters within the Don Pedro Reservoir by cabling off the large woody material and stacking it along the edges of the reservoir in three different locations on BLM land.

Licensees are currently working with BLM to burn the excess material on site. Removal of the large woody material is significant in that 25 acres to over 50 acres of wood materials have been accumulating on any given year in Don Pedro reservoir. To clear the woody material, the Licensees have been stock piling the wood on BLM and burning it on site. This practice was occurring without proper authorization from BLM. Burning on BLM land requires an approved, signed Burn Plan for each event from BLM and authorized personnel from BLM are required to oversee all burning operations on BLM land. BLM can incur risks from a fire escaping and we were not aware of the Licensees burning on BLM land. The BLM Large Woody Debris Material Plan requires approval and coordination by all parties including USFWS, NOAA, CSWRCB, and CDFW, as well as determination by the

Licensees on how best to manage this material in the future. The current practice may change in the future based on developing a final plan for large woody material.

Figures 1, 2 and 3 below show large woody material and woody debris on Don Pedro Reservoir in 2017, near Ward's Ferry Bridge.

FPA § 4(e) BLM Condition No. 5 – Reservation of Authority to Modify 4(e) Conditions in the Event of Anadromous Fish Re-introduction

BLM exercises its 4(e) authority by reserving that authority to modify these conditions to respond to any reintroduction of Chinook salmon or steelhead trout listed under the Endangered Species Act, to stream reaches through BLM lands where the flow is controlled by the Don Pedro Hydroelectric Project.

Rationale for Reservation of Authority to Modify 4(e) Conditions in the Event of Anadromous Fish Re-Introduction:

This is a reopener condition in case anadromous fish re-introduction takes place on the Tuolumne River past La Grange Reservoir. BLM will need to understand what impacts to BLM land may occur from reintroduction and be able to mitigate those impacts appropriately.

The Districts did not file a proposed measure for a reopener for anadromous fish re-introduction.

FPA § 4(e) BLM Condition No. 6 –Aquatic Invasive Species Management Plan

Within one year of license issuance, Licensees shall file a BLM-approved Aquatic Invasive Species Management Plan following consultation with the BLM. The BLM has provided an Aquatic Invasive Species Management Plan (Attachment 1) for implementation on BLM-administered lands within the FERC Project Boundary. If changes are made to the Aquatic Invasive Species Management Plan as presented in Attachment 1, the modified plan shall be submitted to the BLM for review and approval prior to submitting the final plan to the Commission. Upon Commission approval, the Aquatic Invasive Species Plan shall be implemented.

Rationale for Aquatic Invasive Species Management Plan:

Aquatic invasive species (e.g., quagga mussels, New Zealand mudsnails, and Eurasian watermilfoil) are a threat to water quality; irrigation, diversion and power structures; recreation; integrity of Wild and Scenic Rivers; and functioning aquatic ecosystems. In addition, aquatic invasive plants including hydrilla (*Hydrilla verticillata*), Brazilian waterweed (*Corbicula fluminea*), and Eurasian watermilfoil (*Myriophyllum spicatum*) create a threat to water quality.

Flow regulation by dams can create a stable flow environment preferable to *Didymosphenia geminata* (Kirkwood et al. 2007). It has a preference in lower discharge velocities and less variation in discharge. Its presence can result in dense algal blooms that block sunlight and disrupt ecological processes, causing a decline in native plant and animal life. The exact pathway is unknown, but it spreads easily through contaminated boats and fishing gear.

- California Assembly Bill 2065 (2008) (enacted as FGC §2302), requires Project reservoirs to be assessed for their vulnerability to the introduction of non-native dreissenid mussel species and for reservoir owners or managers to develop and implement a program designed to prevent the introduction of nonnative dreissenid mussels that includes public education, monitoring, and management of recreational, boating, or fishing activities.

- Nearby programs that include boat inspections at Agricultural Inspection Stations located along Interstates 395 north of Reno, and 80 in Truckee, California; and at Lake Tahoe have intercepted boats with both live and dead quagga mussels, or mussel shells that have come from the following locations: Lake Havasu, San Francisco Bay, Lake Mead, and Lake Michigan. Asian clams were present on a boat from Folsom, CA. Other AIS have been intercepted (Crimmens 2013).

- Several waters in the State of Nevada have tested positive for Quagga veligers as follows: Lahontan Reservoir, Rye Patch Reservoir, Ruby Lake, Wildhorse Reservoir, and Topaz Lake (Vargas 2014). These water bodies are all located in proximity to two main highways: Interstate 80 and Interstate 395. These are primary access routes to the Reno/Tahoe area, just west of this Project.

- Local waters in adjacent watersheds have known infestations of AIS as follows:
  - Eurasian milfoil: Martis Lake, Placer County, CA
  - Asian clams: Lake Tahoe, CA; Donner Lake, CA
  - *Didymosphenia geminata*: North, Middle, and South Yuba Rivers
  - New Zealand mudsnail: 10-mile stretch of the Truckee River, CA; American River, Sacramento, CA
  - New Zealand mudsnail: Stanislaus River

- The Plan filed by Licensee contains no monitoring for any AIS. Recreational activities have a high potential to introduce a variety of AIS, in addition to dreissenid mussels, through recreational activities associated with the Project.

- The potential threat of dreissenid mussel infestations and other AIS has been recognized by local jurisdictions, resulting in local ordinances within Sierra and Nevada Counties,

and the town of Truckee to allow for boat inspections to reduce the spread of AIS (TRCD 2018).

- Several researchers caution against drawing conclusions regarding the inability of quagga mussels to persist in low calcium environments. Whittier et al. (2008) state "our work was based primarily on studies of zebra mussels. Much less is known about the ecology of the quagga mussel, and the zebra mussel may not always be a good analog." Chandra et al. (2009) found that viable adult quagga mussels could survive for periods of at least 1-2 months in low-calcium water collected from Lake Tahoe, and the population showed positive growth, and a potential for reproduction. They report that elevated calcium concentrations in Asian clam beds in Lake Tahoe suggest the potential for clams to modify the benthic environment, with the potential for successful quagga mussel establishment. Caldwell and Chandra (2012) caution that the potential risk of invasion to western water bodies may be underestimated by using zebra mussel-based risk assessments, and recommend that more research be devoted to dreissenid reproduction in low calcium waters, and include parameters other than calcium, such as pH, substrate size, nutrient limitation, and food quality.

- Even though some sites in the California State Water Project (SWP) assessed by Claudi and Prescott (2011, pg. 2) fell into a category of "unable to support long-term dreissenid mussel populations due to average levels of calcium concentrations below the very conservative minimum required level of 12 mg/L", they go on to state: "It is recommended that sampling for both calcium and veligers be included in the regular water quality monitoring program for all sites in the SWP."

FPA § 4(e) BLM Condition No. 7 – Terrestrial Resources Management Plan

Within one year of license issuance, Licensees shall file a BLM-approved Terrestrial Resources Management Plan following consultation with the BLM. The BLM has provided a Terrestrial Resources Management Plan (Attachment 2) for implementation on BLM-administered lands within the FERC Project Boundary. If changes are made to the Terrestrial Resources Management Plan as presented in Attachment 2, the modified plan shall be submitted to the BLM for review and approval prior to submitting the final plan to the Commission. Upon Commission approval, the Terrestrial Resources Management Plan shall be implemented.

Rationale for Terrestrial Resources Management Plan:

Western Pond Turtle

The western pond turtle (WPT, *Actinemys marmorata*) is California's only native aquatic turtle species. The species occurs along the Pacific coast, west of the Sierra/Cascade divide, from northern Washington south to northern Baja California, Mexico. The WPT has declined precipitously over most of its range, and is now considered endangered in Washington, threatened in Oregon, a Species of Special Concern in California, and a BLM California Sensitive Species. Western pond turtles that inhabit river environments are adapted to the hydrologic cycles of wet winters and dry summers in California Rivers. Preferred riverine habitats include slow flowing areas and backwater environments with basking sites (woody debris, floating vegetation) and underwater refuges (undercut banks, large root wads, rock

crevices) where they feed on aquatic insect larvae, crustaceans, small vertebrates (e.g., amphibian eggs and tadpoles), and possibly carrion.

Vegetation is also thought to be an important part of their diet. All feeding is done underwater as WPT cannot swallow in air (Reese and Welsh 1998, Bury and Germano 2008). As with other native aquatic species, the life cycle of WPT results in use of the rivers primarily in the summertime and avoidance of higher winter flows in winter. Females travel into upland environments to nest in mid-summer and may produce more than one clutch of approx. 4-8 eggs each year (Reese and Welsh 1997, Kelly 2007, Bury and Germano 2008, Scott et al. 2008). The relatively low reproductive effort and longevity of WPT (~ 40 years) means that this species' population recovery time (after disturbances or local extinctions) is relatively slow compared to other native aquatic species. Population sizes of WPT were documented in two forks of the Trinity River in northern California in the early 1990's. In the main stem Trinity, the average number of turtles was 39/km and in the south fork, the average was 34/km. The main stem has a slightly larger drainage area than the south fork (Reese and Welsh 1998).

Recent studies have focused directly on water flow and temperature effects on WPT. Freshwater turtles bask to warm their body. Turtles in the colder rivers spend significantly more time engaged in aerial basking than turtles in warmer rivers (Ashton et al. 2011, Bettaso 2005). Changes in normal thermoregulatory behaviors may affect several aspects of general life history traits such as growth patterns, age at maturity, and size at maturity, which in turn could affect age- and size-specific reproductive investments and the size at birth of offspring. The significant amount of time WPT spend in upland environments (for nesting and overwintering) means that effects of roads and canals and extreme flow fluctuations during winter months, in both rivers and reservoirs, needs to be evaluated. Canals can act as barriers to upland movements and potentially result in mortality if turtles fall in and cannot climb out. Road mortality effects on sex ratios (reduction in adult females) have been documented for many other species of turtles (Gibbs and Steen 2005).

Table 1. Seasonal use of aquatic, riparian, and upland habitats by riverine populations of western pond turtles in the foothill regions of the Sierra Nevada and Northern California Coast Ranges (TID/MID 2013c).

LIFE STAGE	**SEASON**			
	Summer	**Fall**	**Winter**	**Spring**
Eggs	deposited by adult females in riparian/upland nests, dug in ground	in nest		
Hatchlings		hatch in nest	overwinter in nest	migrate to small aquatic environments (e.g., springs, shallow river backwaters)
Juveniles	springs, small creeks, backwaters and small pools of rivers	overwinter in dry upland sites/"burrows"	overwinter in dry upland sites/"burrows"	springs, small creeks, backwaters and pools of rivers
Adult Females	pools and backwaters of creeks and rivers; nesting forays to riparian/upland areas in mid-summer	overwinter in dry upland sites/"burrows"; may also use ponds	overwinter in dry upland sites/"burrows"; may also use ponds	pools and backwaters of creeks and rivers

WPT is found in permanent and seasonal ponds, lakes, and slow-moving water in streams.

Twenty western pond turtles were observed during targeted surveys and incidentally during other relicensing studies. Although most of the observations were at or below the normal maximum water surface elevation, some were at locations upstream of the reservoir surface elevation at the time of the observation.

Table 2. Summary of observations of WPT and other turtles recorded during Project relicensing studies (TID/MID 2013c).

Location	Dates	Observations
Woods Creek Arm	4/18/12	1 adult WPT basking on bank.
	6/18/12	1 juvenile WPT basking on edge of stream; 1 adult WPT (carcass) on edge of stream.
	6/27/12	2 adult WPT basking on partially submerged log.
Moccasin Creek Arm	6/27/12	1 adult WPT swimming; 1 adult WPT (carcass) also found on shore.
Poor Man's Gulch	4/24/12	1 adult WPT basking on rock.
	5/18/12	1 adult WPT swimming.
	6/28/12	1 adult WPT basking on boulder.
Six-Bit Gulch	4/24/12	1 adult WPT basking on rock.
	5/21/12	1 adult WPT swimming near shoreline.
Big Creek Arm	4/17/12	5 adult turtles, not identified to species, basking on logs in pool.
	6/18/12	1 adult WPT observed in the water; 2 red-eared sliders also observed at site.
Upper Bay	5/20/12	1 adult WPT basking (location not associated with a tributary).
Hatch Creek Arm	6/26/12	1 adult WPT swimming.
Don Pedro Spillway	3/28/12	1 adult WPT basking, then swimming at location adjacent to Tuolumne River.

Because the western pond turtle is a BLM sensitive species, the BLM is requesting that the Licensees' incidentally observe and record WPT during other monitoring efforts to assist in a better understanding of the distribution and population status of the western pond turtles within the project area throughout the license period.

California Red-Legged Frog

California red-legged frog (CRLF), *Rana aurora draytonii*, is listed as threatened under the federal endangered species act. Although more prevalent in the coastal ranges, CRLF are limited to less than a dozen populations in the Sierra Nevada range. Habitat for the CRLF, the largest native frog on the west coast, includes low-gradient fresh water bodies, including natural and manmade ponds (e.g., stock ponds), backwaters within streams and creeks, marshes, lagoons, and dune ponds. To be considered essential breeding habitat, the aquatic feature must have the capability to hold water for a minimum of 20 weeks in all but the driest of years (USFWS 2010).

Three sites potentially affected by Project Operation and Maintenance activities that also provide potential habitat for CRLF are situated on public land administered by the BLM. These sites include two sewage treatment ponds near Moccasin Point Recreation Area, sites F51 and F52, and a pool in the spillway channel near the Tuolumne River, Site F89 (TID/MID 2013d). One site is a steep-banked pool within a spillway which likely does not provide adequate habitat for the species. However, two of the sites are sewer ponds. Although these sewer ponds have little to no emergent vegetation, they may provide suitable habitat for California red-legged frog. In 2017, three California red-legged frogs were found in a sewer treatment pond at Camp Far West (Willy 2018). In addition, California red-legged frog have been found in stock ponds with little or no emergent vegetation in East Bay Regional Parks. Protocol-level surveys are the only means to determine whether California red-legged frogs use these sewer ponds.

Adult dispersal outside the breeding season may be directed upstream, downstream, or upslope of breeding habitat, and may be associated with foraging and pursuit of hiding cover or aestivation habitat. Telemetry and other detection methods indicate that CRLF utilize small mammal burrows, leaf litter, and other moist sites as much as 200 feet from riparian areas (Jennings and Hayes 1994; USFWS 2006). Long-distance dispersal has been documented at distances of up to a mile and probably occurs only during wet periods (USFWS 2006). California red-legged frogs are known to move well into the surrounding terrestrial environment while feeding and during dispersal. Restricting large equipment and other ground-disturbance activities to at least 300 feet from wetlands, riparian areas, and critical habitat should minimize the potential that the species will be affected.

Bats

In 2012, the Districts performed the Special-status Wildlife – Bats Study (TID/MID 2013e), with the goal of identifying Project operation and maintenance (O&M) and/or recreation activities that may adversely affect special-status bat species. Several species including BLM special status species were documented during the surveys.

Table 3. Evidence of bat use observed during the inspection and focused survey (TID/MID 2013e).

Project Feature	Project Facility Observations
Don Pedro Powerhouse (Located on BLM)	*Crane Structure*: No evidence of use.
	Generator Den B: Minor use (i.e., one piece of guano and minor staining)
	Access Tunnel: Verbal accounts from Districts' employees provided information regarding sightings of bats regularly exiting and entering the tunnel, indicating a day roost.
Don Pedro Dam	*Fixed Wheel Gate Building*: No roosting on structure. 2 bats (*Myotis*, not identified to species) observed (day roosting) behind plaque on front of structure.
	Don Pedro Dam Spillway: No signs of bat use were observed on the spillway structure. However, bats were observed within the vent structures of the spillway during focused surveys.
Don Pedro Recreation Area	*Visitor Center Building*: Guano and staining on exterior of building. Visitor Center employees reported observing bats day-roosting on exterior of the building near doors, which is likely a rare and isolated occurrence.[1]
Fleming Meadows Recreation Area	*Campground A Loop*: Restroom A1: Guano and/or staining on interior walls of Restroom A1, A2, A3, and A4; evidence of use of exterior of Restroom A1 and A3. No signs of use of Restroom A5. Guano on walls of Group Picnic Pavilion.
	Campground B Loop: Guano on interior walls of Restroom B1. Guano and possible staining on exterior of Maintenance Building.

	Campground D Loop: Minor use (guano and/or staining) of Restroom D1 and D2. Major use of Swim Beach Filtration Building exterior, where pallid bat night roosting was also observed. Minor staining on exterior walls of Snack Bar. Staining and guano on shower units of Dressing Rooms. Minor use (guano and staining) on exterior of Trading Post.
	Campground H Loop: Minor staining at Restroom H1; no sign of use at Restroom H2.
	Boat Launch Restroom: Minor use (guano) of middle partition.
Moccasin Point Recreation Area	*Campground B Loop*: No signs of use of Restroom B1, B2, or B3.
	Campground C Loop: Minor use of exterior wall (one piece of guano) of Restroom C2; no sign of use of Restroom C1.
	Boat Launch Restroom: Staining on interior walls of men's restroom.
Blue Oaks Recreation Area (Located on BLM land in Loop C and D)	*Campground Area A Loop*: Staining and/or guano at Restroom A1, A2, Group Picnic Restroom, Storage Facility, and small structure near Restroom A2. Pallid bats sampled by mist nets.
	Campground Area B Loop: Guano on interior of Restroom B1 (along with pieces of Jerusalem cricket), B2, and B3.
	Campground Area C Loop: Guano and/or staining on interior of Restroom C1, C2, and C3.
	Campground Area D Loop: Guano (substantial amount) and pieces of Jerusalem cricket on interior of Restroom D1 and minor use (guano and staining) of Restroom D2.

[1] In 2016, after this study was completed, the DPRA headquarters was destroyed by a fire.

Acoustic monitoring provided evidence of at least seven species of special-status bats in the Don Pedro Project area: pallid bat (*Antrozous pallidus*), Townsend's big-eared bat (*Corynorhinus townsendii*), spotted bat (*Euderma maculatum*), western mastiff bat (*Eumops perotis*), western red bat (*Lasiurus blossevillii*), western long-eared myotis (*Myotis evotis*), and Yuma myotis (*Myotis yumanensis*).

Bats are sensitive to anthropogenic impacts, both direct (e.g., human presence) and indirect (e.g., disturbances to the roost and surrounding habitat, including noise and vibrations) (Russo and Ancillotto, 2015; Jones et. al., 2009). Research by Jung and Kalko (2011) has shown that bat species richness decreases with increasing human impact. Loss of roost habitat can be particularly harmful to bats since they utilize roosts during sensitive life history periods, including the maternity season and winter hibernation, and many roosts are used by successive generation of bats over many years. Disturbance to maternity colonies can cause bats to abandon young or fall to the ground where they are not usually retrieved and thus subsequently die (Sheffield et. al. 1992). Additionally, female bats do not reach sexual maturity until age 2 and many species only have one young per year (H.T. Harvey & Associates 2004), so impacts to maternity colonies can decrease fecundity of individuals and populations as well as subsequent generations of bats.

If disturbed during hibernation, bats may awake prematurely, which can cause an elevation in body temperatures and promote the use of stored energy reserves, leaving insufficient energy to survive the rest of the winter. The Licensee last conducted a bat survey in 2012, and the results may be outdated and should be updated in order to make accurate decisions regarding exclusion. A periodic survey of Project facilities throughout the life of the License is needed to insure that no new roosts or entry points have been established. Because the bat survey is over five years old, BLM feels that a new survey needs to be conducted on facilities, etc., located on BLM-

administered lands. In addition to a new survey, BLM is requesting additional protective measures in the Terrestrial Resources Management Plan (Attachment 2).

Invasive Species

Current management direction that applies to the desired future conditions for BLM invasive species includes the following:

- National Environmental Policy Act (NEPA)
- Sierra Resource Management Plan and Record of Decision (February 2008), Final Supplemental Environmental Impact Statement (May 2007).
- Federal Noxious Weed Act of 1974, Carlson-Foley Act of 1968, Plant Protection Act of 2000, Executive Order 13112 - Invasive Species, and Executive Order 13751- Safeguarding the Nation from the Impacts of Invasive Species.
- Vegetation Treatments Using Herbicides on BLM Lands in 17 Western States, Final Programmatic Environmental Impact Statement (2007) and Vegetation Treatments on BLM Lands in 17 Western States, Final Programmatic Environmental Report (2007).

Twenty-seven noxious weed species have the potential to occur within the Project vicinity. During botanical surveys conducted by the Districts in 2012, eight noxious weed species were observed at 85 occurrences on public lands administered by the BLM. On BLM lands, there were four barbed goatgrass, three tree-of-heaven, one giant reed, six smooth distaff thistle, 17 yellow starthistle, 19 Bermudagrass, 24 medusahead grass and 11 Klamathweed occurrences recorded (TID/MID 2013g). Barbed goatgrass, giant reed, and smooth distaff thistle are CDFA B-listed species, while Klamathweed, medusahead grass, yellow starthistle, and tree-of-heaven are CDFA C-listed species (CDFA 2010). Bermudagrass is considered a nuisance weed by the BLM.

The surveys that were conducted as part of relicensing show that numerous invasive species occur in the Project area. New problem invasive species are introduced on BLM lands every year and are often, but not always, associated with disturbance. Increasingly, invasive species pose a threat to the integrity of resources due to their ability to displace native species, alter nutrient and fire cycles, decrease the availability of forage for wildlife, and degrade soil structure (Bossard et al. 2000). Invasive plants have the potential to affect native plant species through direct competition for nutrients, light, and water as well as indirectly through mycorrhizal interactions and soil biochemical alterations (Bossard et al. 2000). Invasive species infestations can also greatly reduce recreational and aesthetic values.

Integrated pest management is a sustainable approach to managing pests by combining biological, cultural, physical, and chemical tools in a way that minimizes economic, health, and environmental risks (USDI Departmental Manual 517). Invasive species management complies with national and regional BLM land management direction and contributes to improved ecological condition. In Executive Order 13112, *Invasive Species*, Federal agencies are directed to prevent the introduction of invasive species and provide for their control and to minimize the economic, ecological and human health impacts that invasive species cause (USFR 1999). Executive Order 13751, *Safeguarding the Nation From the Impacts of Invasive Species*, amends Executive Order 13112 and directs actions to continue coordinated Federal prevention and control efforts related to invasive species. (USFR 2016)

The BLM has specific direction to reduce and control invasive species using early detection, rapid response, and prevention measures in the Sierra RMP (BLM 2008a). Complete surveys of a

management area are vital to the early detection, rapid response management strategy. With prompt detection and action, there is a high likelihood of control. Because of the ecological damage caused by established invasive species and the expense and difficulty of eradication, frequent surveys of the Project are needed.

Pesticide use restrictions on BLM lands require BLM to comply with law and policy. BLM policy requires that prior to herbicide application on BLM lands a Pesticide Use Permit must be prepared and submitted to BLM for analysis and review. Following application, a Pesticide Application Report must be completed within 24 hours and submitted to the BLM (BLM 2007b).

Special Status Plants

Current management direction that applies to the desired future conditions for BLM special status plant species includes the following:

- Endangered Species Act (ESA)
- National Environmental Policy Act (NEPA)
- Sierra Resource Management Plan and Record of Decision (February 2008), Final Supplemental Environmental Impact Statement (May 2007).
- Special Status Species Management (USDI BLM Manual 6840, 2008) and Special Status Plant Management (USDI BLM Manual 6840.06, 2012)

Implementation of the Terrestrial Resources Management Plan is required to comply with BLM's Sierra RMP as well as federal law and policy. The BLM's Special Status Species Management Policy requires that BLM ensure that BLM activities and BLM authorizations initiate proactive conservation measures that reduce or eliminate threats to BLM sensitive species in order to minimize the likelihood of and need for listing of these species (BLM 2008b). By law, federal agencies must take actions to recover federally protected species.

The Districts located two ESA-listed plant species on BLM lands in the study area during 2012 botanical surveys: Layne's ragwort (*Packera layneae*) and California vervain (*Verbena californica*). There were 25 occurrences of Layne's ragwort and 2 occurrences of California vervain, all of which were found on BLM lands within the Red Hills ACEC (TID/MID 2013b). The Districts also recorded 57 occurrences of eight different special-status plant species (TID/MID 2013a) on BLM lands within the Project. Monitoring of populations ensures population health and viability. If special status species are negatively impacted, the monitoring data can be used to develop mitigation measures, and to develop and measure the success of adaptive management measures.

California vervain is only known to grow in the Red Hills of California (TID/MID 2013b). Threats to California vervain include recreational activities such as gold mining, mountain biking and hiking. Additionally, hydrological fluctuations also affect the species (TID/MID 2013b). The two occurrences of California vervain in the Project study area are affected by weed invasion. Cattle grazing and recreation threaten one occurrence (TID/MID 2013b).

Layne's ragwort is found within the Chinese Camp and Moccasin quads (TID/MID 2013b). Urbanization and the ensuing habitat fragmentation, road construction and maintenance, herbicide spraying, change in fire frequency, off-road vehicle use, unauthorized dumping, horse overgrazing, competition from invasive alien vegetation, and mining imperil the species.

Portions of Layne's butterweed populations occur below the normal maximum water level of Don Pedro Reservoir. As a basal sprouting plant, Layne's ragwort can be killed or destroyed if inundated for too great a period of time. Three Layne's ragwort occurrences are located on Kanaka Point, near a recreation day use area. Multiple footpaths run past these occurrences, which are at risk of trampling from recreationists. Additionally, distaff thistle, a noxious weed, grows in the general vicinity of all three occurrences. Layne's ragwort occurrences near Poor Man's Gulch and Sixbit Gulch could be affected by grazing, recreation and noxious weeds (TID/MID 2013b).

Implementation of BMPs provided by the BLM in the Terrestrial Resources Management Plan (Attachment 2), which include annual employee training and annual consultation, combined with monitoring of existing occurrences every five years and conducting special status species surveys of the entire Project area every five or ten years (depending on location), will help to protect special-status plant species from Project O&M activities and indirect effects from invasive weeds, water fluctuations and recreation. Surveys prior to O&M activities will ensure these activities do not affect special-status plant species.

Red Hills Area of Critical Environmental Concern (ACEC)

ACECs are defined in FLPMA as "areas within the public lands where special management attention is required to protect and prevent irreparable damage to important and unique historic, cultural, botanic, and scenic values, fish and wildlife resources, other natural systems or processes (rare or exemplary), or to protect life and safety from natural hazards." Administrative protections established through stipulations, withdrawals, avoidance, and/or allowable uses are uniquely prescribed by each individual area. The objective is to provide special management for natural areas requiring such and to protect and preserve the relevant and important values. The Red Hills ACEC contains the following relevant and important values: special status plants and wildlife, and unique soils.

The Red Hills ACEC was designated in 1993 (and expanded in 2008) to protect rare plant species, unusual serpentine soils that provide habitat for unique flora, and habitat for the rare minnow known as the Red Hills roach. Twenty-seven populations of two ESA-listed plant species, California verbena and Layne's ragwort, which occur in the Red Hills, were found to occur within the Project. In addition, fifty populations of special status plant populations (BLM sensitive and species of concern) which occur in the Red Hills ACEC were also found to occur within the Project (TID/MID 2013a, 2013b). Because of the high number of ESA and special-status plant populations found in the Red Hills ACEC (75), it is imperative that the Licensees implement BMPs provided by the BLM in the red-lined version of the Terrestrial Resources Management Plan (Attachment 2).

Protection measures for special-status plant species in the Plan including annual employee training and annual consultation, combined with monitoring of existing occurrences every five years and conducting special status plant surveys of the Project area in the Red Hills ACEC every five years, will help protect special-status plant populations in the ACEC from Project O&M activities and indirect effects from invasive weeds, water fluctuations and recreation. Surveys conducted prior to O&M activities will ensure that these activities do not affect special-status plant species. Implementation of BMPs will help protect the relevant and important values of the Red Hills ACEC.

Rationale for Botanical Surveys:

Botanical surveys are conducted to determine the environmental effects of the proposed project on all botanical resources including special status plants and plant communities. When suitable habitats or reported locations are suspected to occur in the area of influence of the project, a field survey is performed (BLM 2009, BLM 2012). Those conducting botanical surveys must possess the skills necessary to identify the vegetation to species, subspecies or variety (as applicable). Botanical surveys must be done at the proper times of the year when plants can be identified to species, subspecies and variety as applicable. Floristic field surveys should be done. Plant surveys are generally good for five years or until new information is obtained.

In addition to seasonal coverage, surveying in more than one year is also important for rare plant survey work. There are some rare plant species, such as *Clarkia biloba* ssp. *australis*, where the abundance and location of the species can change from year to year because of annual climatic variation. The amount and timing of moisture can influence germination in these species. Detection of rare species is greater if surveys are conducted at periodic intervals such as every five years.

Rare plant surveys are to be conducted every five years in the Red Hills ACEC and every ten years on BLM lands elsewhere in the Project (see Attachment 2 for specific survey guidance), and will provide current baseline information on existing conditions in the Project area and assess Project-related effects. Project-related actions such as: operation and maintenance of Project rights-of-way, erosion, recreation effects, potential new construction, and any other Project related activities could adversely affect rare plant populations through direct loss, disturbance, non-native invasive plant spread, or habitat alterations. If potential negative effects are identified, measures may be developed to reduce or eliminate these effects.

Licensees located 84 occurrences of special-status plant species (TID/MID 2013a, 2013b) on BLM lands within the Project. Because of the high number of ESA plant populations found in the Red Hills ACEC (27), it is imperative that the Licensees conduct new surveys for rare plants every five years in the ACEC to provide up-to-date baseline data for management. New surveys conducted every ten years elsewhere in the Project area will help document new populations of special-status plants and provide up-to-date baseline data for species management.

FPA § 4(e) BLM Condition No. 8 – Bald Eagle Management Plan

Within one year of license issuance, Licensees shall file a BLM-approved Bald Eagle Management Plan following consultation with the BLM. The BLM has provided a Bald Eagle Management Plan (Attachment 3) for implementation on BLM-administered lands within the FERC Project Boundary. If changes are made to the Bald Eagle Management Plan as presented in Attachment 3, the modified plan shall be submitted to the BLM for review and approval prior to submitting the final plan to the Commission. Upon Commission approval, the Bald Eagle Management Plan shall be implemented.

Bald Eagle Management Objectives:

- Ensure all management activities and BLM authorizations are consistent with the conservation needs for special status species (BLM 2008a).

- Maintain or improve habitat for special status species (BLM 2008a).
- Maintain, improve, or enhance native fish and wildlife populations and the ecosystems upon which they depend (BLM 2008a).
- Provide opportunities for research and education (BLM 2008a).
- To sustain and manage forest ecosystems to such an extent as to support and maintain viable populations of the bald eagle, California spotted owl, and northern goshawk (forest raptors) on BLM lands in the planning area by managing factors affecting the distribution, abundance, and quality of habitat of these species, and by minimizing impacts to breeding during forest raptor nesting seasons (BLM 2008a).

Prioritized Goals for above objective (Partial list as related to Bald Eagles and potentially applicable to this relicensing) (BLM 2008a).

- Protected Activity Centers
    a. Protect nesting areas by identifying and mapping (using GIS) PACs 600 acres in size for the California spotted owl, northern goshawk and bald eagle, consisting of the best available habitat, including known and suspected nest stands, in as compact a unit as possible.
    b. Limit activities in PACs to those designed to improve the suitability or integrity of the PAC or to protect additional habitat within the home range of the pair using the PAC.
- Survey (to protocol) suitable bald eagle, goshawk and spotted owl habitat with unknown occupancy prior to undertaking vegetation treatments, and conduct site-specific consultation with the USFWS if the bald eagle are detected.
- Conduct protocol surveys to establish the location of the nest site when stand-altering activities are planned adjacent to a PAC, and consult with USFWS if activities may affect the bald eagle.
- Identify and protect bald eagle winter roosts.
- Provide bald eagle, northern goshawk and California spotted owl education programs where/when needed by posting signs, handing out published material, and offering presentations.

<u>Rationale for Bald Eagle Management Plan</u>:

BLM in coordination with the USFWS developed a Bald Eagle Management Plan (Attachment 3) that significantly differs from the Licensees' Bald Eagle protection measures in the Terrestrial Resources Management Plan (TID/MID 2017b). These differences include frequency of shoreline surveys, requirement for winter and night roost surveys, buffer distances around active nests, and protective measures for wintering bald eagles. In our discussion, we conclude that implementing the plan with the specific measures required by USFWS would afford more protection to bald eagles and minimize project effects on bald eagles nesting, wintering, and roosting in the project area. These effects include noise caused by vegetation management activities and facility and road maintenance, and disturbances caused by recreation users, including hikers and boaters. Vegetation management activities could also result in the removal of nest or roost trees. Activities associated with project operations, maintenance, construction or recreation may adversely affect, disturb and/or take bald eagles.

The National Bald Eagle Management Guidelines (USFWS 2007) reports that recreational activities similar to those conducted in the Project Area (*e.g.*, boating jet skis, hiking, camping, fishing, kayaking, and canoeing) have the potential to disturb nesting bald eagles. Bald eagles are protected by federal law under the Migratory Bird Treaty Act and the Bald and Golden Eagle Protection Act.

The development and implementation of a high quality, scientifically valid, and robust Bald Eagle Management Plan; such as that provided in Attachment 3; which is implemented in a timely and effective manner, and regularly reviewed and revised as needed; will maximize avoidance of take of bald eagles protected under various laws, while allowing for project construction, operations, maintenance, and recreational activities.

In 2012 and 2013, the Districts' conducted a modified nesting survey (two surveys versus the CDFW protocol-level of three surveys) (CDFG 2010). In 2012, three nests were occupied. Two nests likely fledged young (although this is uncertain due to the lack of the third late-season survey) and one nest failed. In 2012, two nests were occupied and both likely successfully fledged young (TID/MID 2013f).

Wintering surveys were not conducted by the Licensees. However, BLM in coordination with Central Sierra Audubon conducted wintering counts from 1994-2012. These counts were conducted one day each year during mid-January. The number of eagles per year varied from 5 to 34 with an average of 20 bald eagles per year (BLM 2018).

Because the location of active bald eagle territories, nests, and winter night roosts will change over the course of the license, the Bald Eagle Management Plan addresses periodic monitoring to understand bald eagle use of the Project throughout the license period.

There are numerous project locations where routine maintenance, including vegetation management, hazard tree removal, and recreation activities have the potential to disturb bald eagles. Bald eagles continue to be protected under the Migratory Bird Treaty Act of 1918 and the Bald and Golden Eagle Protection Act, which prohibit take without a permit. The regulatory definition of "disturb" (USFWS 2007; 72 FR 31132), including the final rule (located at 50 CFR 22.3) states: "Disturb means to agitate or bother a bald or golden eagle to a degree that causes, or is likely to cause, based on the best scientific information available, (1) injury to an eagle, (2) a decrease in its productivity, by substantially interfering with normal breeding, feeding, or sheltering behavior, or (3) nest abandonment, by substantially interfering with normal breeding, feeding, or sheltering behavior". In addition to immediate impacts, the USFWS specified that this definition also covers impacts that result from human-caused alterations initiated around a previously used nest site during a time when eagles are not present, if, upon the eagle's return, such alterations agitate or bother an eagle to a degree that injures an eagle or substantially interferes with normal breeding, feeding, or sheltering habits and causes, or is likely to cause, a loss of productivity or nest abandonment (USFWS 2007; 72 FR 31132). The Bald Eagle Management Plan in Attachment 3 addresses actions to reduce the potential for adverse effects from Project-related activities, and helps to insure that activities are in compliance with applicable laws.

FPA § 4(e) BLM Condition No. 9 – Annual Review of Special-Status Species Lists and Assessment of New Species on Federal Land

Licensee shall consult with BLM within 3 months, after license issuance, and annually thereafter during the annual consultation meeting, to review the current list of special-status plant and wildlife species (species that are Federally Endangered or Threatened, Proposed Threatened or Endangered, BLM Sensitive, State Threatened or Endangered, State Species of Special Concern, and CDFW Fully Protected) that might occur on public land administered by BLM in the Project area that may be directly or indirectly affected by Project operations.

When a species is added to one or more of the lists, BLM shall determine if the species, or un-surveyed suitable habitat for the species, is likely to occur on public land administered by BLM in or around the Project area. For any such newly added species, if BLM determines that the species is likely present on public land administered by BLM that may be directly or indirectly affected by the Project, Licensee shall develop and implement a study plan in consultation with BLM, and other appropriate agencies, to reasonably assess the effects of the Project on the species. Licensee shall prepare a report on the study, including objectives, methods, results, recommended resource measures where appropriate, and a schedule of implementation, and shall provide a draft of the final report to BLM and other appropriate agencies for review and approval. Licensee shall file the report, including evidence of consultation, with the Commission and shall implement those resource management measures required by the Commission.

If new occurrences of BLM special status plant or wildlife species as defined above are detected prior to or during ongoing construction, operation, or maintenance of the Project, Licensee shall immediately notify BLM. If BLM determines that the Project-related activities are adversely affecting BLM sensitive or watch list species, Licensee shall, in consultation with BLM, develop and implement appropriate protection measures.

If new occurrences of state or federally listed or proposed threatened or endangered species are detected prior to or during ongoing construction, operation, or maintenance of the Project, Licensee shall immediately notify BLM, FERC, and the relevant agency (USFWS or NMFS) for consultation or conference in accordance with the Endangered Species Act (USFWS 1988). If state listed or fully protected species are affected, CDFW shall be notified.

Threatened, Endangered, and Sensitive Species Objectives:

The following resource objectives are drawn from the BLM Sierra Resource Management Plan (RMP) and other relevant BLM regulations and documents (see References section).

- Ensure that proposed license conditions and recommended measures provide for well distributed, viable populations of special status species including threatened, endangered and BLM sensitive species, and are consistent with any applicable biological opinion issued under the federal or state Endangered Species Act (ESA). Ensure that proposed license conditions and recommended measures comply with BLM plans and policy.

- Ensure all management activities and BLM authorizations are consistent with the conservation needs for special status species.

- Manage special status species habitat to assist in the recovery of listed species.

- Maintain or improve habitat for special status species.

- Coordinate with the USFWS on implementation of recovery plans and conservation strategies for special status species

- Manage sensitive species to ensure that species do not become threatened or endangered.

- Maintain and restore habitat to support viable populations of TES species. Work cooperatively to reduce impacts to native populations where invasive species are adversely affecting the viability of native species.

- Avoid impact to species designated as fully protected under FGC sections 3511(b) and 4700(b).

- Avoid or minimize impacts to species whose viability has been identified as a concern.

- If impacts cannot be avoided, analyze the significance of potential adverse effects on the population or its habitat within the area of concern and on the species as a whole.

- Conserve ESA-listed species and the ecosystems on which they depend and to the extent possible recover these species so that ESA protection is no longer needed (BLM 2012).

- Minimize the effects of stream diversion or other flow modifications from hydroelectric projects on threatened, endangered, or sensitive species.

- Monitor populations and habitats of federally listed and BLM sensitive plant species to determine whether management objectives are being met (BLM 2012).

- Develop site-specific management objectives for each occurrence of listed threatened and endangered plant species and BLM sensitive plant species on BLM lands that will be affected by BLM actions (BLM 2012).

- Modify proposed actions, to the extent possible, to avoid adverse impacts to special status plant species; where avoidance is not possible, develop measures to mitigate impacts to these species (BLM 2012).

- Conduct inventories to determine the occurrence and status of all special status plant species on lands managed by BLM or affected by BLM actions to ensure compliance with NEPA and the ESA by having sufficient information to adequately assess the effects of proposed actions on special status plants. Inventories are to be conducted at the time of year when such plant species can be found and positively identified (BLM 2012).

Rationale for Annual Review of Special-Status Species Lists and Assessment of New Species on Federal Land:

Because the status of special-status species changes on a recurrent basis, this Condition allows the BLM to annually evaluate the potential project effects to new species in context with their

most recent state and federal designation, to have an opportunity to conduct any additional studies that may be needed to inform the BLM regarding Project effects, to conduct appropriate consultation with the U. S. Fish and Wildlife Service for newly-listed species, and to incorporate any additional requirements into other Measures, as needed. This will insure that the Project complies with the current laws, policy, and regulations throughout the terms of the license.

FPA § 4(e) BLM Condition No. 10 – Licensee Contacts

The Licensee shall designate an individual as its liaison with BLM, whenever planning or construction of recreation facilities, other major Project improvements, or Project-related maintenance activities are taking place on BLM lands. The Licensee agrees to coordinate with BLM through this individual in contract review and work inspection.

Rationale for Licensee Contacts:

To ensure projects on, adjacent to, or affecting BLM lands comply with the Sierra Resource Management Plan, and the Americans with Disabilities Act, it is critical that Licensees identify a single liaison to meet these objectives. Cooperation during all phases of the Projects will ensure early and upfront clarity to achieve this goal of compliance with applicable standards. This measure is not intended to require specific staffing on the part of Licensees, but rather is intended to provide efficient and effective planning and communication among the, BLM, and Licensees.

BLM understands the Licensees will provide a contact person to go over proposed changes at the annual recreation meeting.

FPA § 4(e) BLM Condition No. 11 – Annual Recreation Coordination Meeting

Each year during the term of the license, Licensees shall meet with BLM for an Annual Recreation Coordination Meeting to discuss the measures needed to ensure use and management, public safety, and protection and utilization of the recreation facilities and resources on BLM land. The date of the meeting will be mutually agreed to by Licensees and BLM but, in general, will be held within the first 90 days of each calendar year. A detailed agenda will be provided to BLM when the meeting date is proposed to assure that the appropriate parties are present.

The following will be discussed, at a minimum:

- Need for garbage collection based on the results of visitor surveys, evidence that wildlife is becoming habituated, and the status of garbage and litter left on site by users.
- Need for toilet facilities where dispersed camping is occurring will be discussed at least every 6 years (following submittal of Monitoring Report from the Recreation Resource Management Plan), and more frequently if warranted.
- Report on significant changes in sanitation issues and number and size of user-created dispersed camping areas.
- Other O&M issues identified by BLM or Licensees.

- Schedule and invite BLM to any recreation resource impact field evaluations and facility condition assessments to be conducted on BLM lands.
- Significant issues raised by the public.
- Any Licensee proposal for new or increases in recreation fees on BLM lands to help cover the costs of recreation facility construction, operation, and maintenance, as allowed by FERC regulations, will be discussed for consideration and approval by BLM.
- Recreation use data that is available from Licensee or the BLM, which includes summary data, at a minimum; and, upon request, raw data.
- Licensees will provide BLM a copy of all documentation associated with FERC inspections of Project recreation facilities and use on BLM lands, including follow-up action taken by the Licensees.
- Status of recreation projects from the previous year, including rehabilitation of existing recreation facilities, the establishment of new recreation facilities, and any other recreation measures or programs that were implemented.
- List of the recreation facilities scheduled for rehabilitation and any other Recreation Facilities Plan measures or programs to be implemented, including:
  - Logistical and coordination planning.
  - Implementation schedule.
  - Coordination needs.
  - Permitting requirement.
  - Key resources that will need to be protected from potential impacts associated with the implementation of the scheduled recreation projects.
  - Potential adjustments in schedule.
- Licensees and BLM will identify any coordination needed with other projects being implemented in the area. Permitting requirements, additional required environmental documentation and key resources that will need to be protected from potential impacts associated with the implementation of the scheduled recreation projects will be addressed. Licensees shall submit for BLM approval any revisions to the Project's Recreation Facilities Plan schedule when BLM land is involved, and the revised schedule will be submitted to FERC. Within 60 days following the meeting, Licensees will file with FERC evidence of the meeting, which will summarize comments made by the agencies, and Plan revisions or other agreements that were reached by Licensees and the agencies. The Annual Recreation Coordination Meeting is a minimum requirement and it is anticipated that meetings may occur throughout each year as needed to implement the Recreation Facilities Plan.

Any adjustments in specific actions or schedules shall be approved by BLM and filed with FERC.

Rationale for Review of Recreation Developments and Annual Coordination Meeting:

It is the desire of the BLM, and SWRCB, along with other interested parties, to continue a level of coordination and adjustment for the Project. Annual meetings and other meetings every six years to review results of surveys and other data will assist in determining necessary maintenance, rehabilitation, construction, and reconstruction work needed, based on facility condition and other factors at the time. Data from ongoing monitoring will assist in making any needed changes in the schedule of work, and for future planning.

Each year during the term of the licenses, Licensees will arrange to meet with interested Resource Agencies (BLM at a minimum) for an Annual Coordination Meeting to discuss the measures needed to ensure public safety, and protection and utilization of the recreation facilities listed in of this Plan. The date of the meeting will be mutually agreed to by Licensees and the Resource Agencies but in general will be held within the first 90 days of each calendar year. A detailed agenda will be provided to the Resource Agencies when the meeting date is proposed to assure that the appropriate parties are present.

The need for garbage collection will be addressed based on the results of visitor surveys, evidence that wildlife is becoming habituated and the status of garbage and litter left on site by users. The need for toilet facilities where dispersed camping is occurring will be discussed at least every six years (following submittal of Monitoring Report), and more frequently if warranted.

During the annual meeting with Resource Agencies, Licensees will review the status of recreation projects from the previous year. This will include rehabilitation of existing recreation facilities, the establishment of new recreation facilities, and any other recreation measures or programs that were implemented. The Resource Agencies will provide Licensees with any available recreational use data from the previous year for the facilities listed in this Plan.

At the coordination meetings, Licensees will provide the Resource Agencies with a summary list of the recreation facilities scheduled for rehabilitation and any other Plan measures or programs to be implemented. Work on recreation facilities scheduled for the forthcoming years will be presented to the Resource Agencies for review and will include logistical and coordination planning, and an implementation schedule. Licensees and the Resource Agencies will identify any coordination needs in regards to other resource agency projects being implemented in the area. Permitting requirements and other key resources that will need to be protected from potential impacts associated with the implementation of the scheduled recreation projects will be addressed. Any Licensees proposal for new or increases in recreation fees on BLM lands must be discussed and approved by BLM.

Licensees and the Resource Agencies may consider potential adjustments in specific actions or schedules, if appropriate. The Resource Agencies will be asked to approve any revisions to the schedule, and the revised schedule will be submitted to the Commission. Within 60 days following such consultation, Licensees shall file with the Commission evidence of the meeting, which summarizes any comments made by the Resource Agencies, and any agreements or Plan revisions that were reached by Licensees and the Resource Agencies.

The Annual Coordination Meeting is a minimum requirement; it is anticipated that meetings will occur throughout each year as needed to implement the Recreation Plans.

It is the desire of the BLM, along with other interested parties, to continue coordination and adjustment for the Project. By having specific coordination meetings, public interests including the results of surveys, resource protection measures, and other input from prior years can be reviewed. These reviews will allow for the determination of necessary maintenance, rehabilitation, construction, and reconstruction work needed, based on facility condition and other factors at the time. Data from ongoing monitoring will assist in making any needed changes in the schedule of work, and for future planning.

FPA § 4(e) BLM Condition No. 12 – Operation, Maintenance, and Administration Agreement

Licensees shall annually pay BLM Mother Lode Field Office for their staff's involvement in participating in monitoring and oversight of Licensees' project operations on BLM land. Licensees will pay for all incurred costs by BLM, including labor, vehicle use, gas, travel, and lodging, etc. All BLM costs associated with ensuring the Licensees are adhering to license articles in their license that affect BLM land. BLM will provide instructions with specific directions for submitting the annual payments. The initial payment will be the estimated costs that is expected to cost BLM for the work requiring BLM staff time for that given year. The BLM determined amount will be due 90 days after license issuance, and each annual payment thereafter will be due the 1st of whichever month contains the anniversary date of the license issuance. If additional funding is required BLM will notify the Licensees to submit an amount that will cover the remainder of the year.

Rationale for Operation, Maintenance, and Administration Agreement:

O&M costs are necessary because BLM would not be spending staff time and money on monitoring, oversight, and addressing project impacts if it were not for the project. Such funds will be used by BLM to offset operation, maintenance, management, monitoring and administration costs incurred while managing public use of BLM administered lands in and around the Don Pedro Hydroelectric Project. Example of actions that result in costs associated with BLM Management: staff required time in approving plans and conditions in implementing license conditions, BLM monitoring, BLM's operation, maintenance, management, and administration of its lands within and adjacent to the Don Pedro Project boundary. Monitoring and patrolling may include:

- Law enforcement personnel that have the authority to enforce federal public health and safety and federal public land laws on BLM Public lands. Monitoring and enforcing compliance with public safety, camping closures, fire restrictions etc. Other duties may include assisting the Licensee in:
- Monitoring Licensee permittees on BLM land.
- Implementing and Monitoring the Fire Management Plan, including BLM approved Fire Burn Plans.
- Implementing and Monitoring Recreation Resources Management Plan
- Implementing and Monitoring Terrestrial Resources Management Plan
- Implementing Historic Properties Management Plan
- Implementing Bald Eagle Management Plan
- Implementing Transportation Plan
- Implementing Special Status Species Condition # 9
- Implementing Visual Resource Management Plan.

- Aquatic Invasive Species Management and Monitoring Plan
- Installing and maintaining signs; adjusted as seasonally needed.
- Dispersing information to the public including firearm use, campfire safety; leave no trace, and other messages to reduce resource impacts and inter-user conflicts.
- Patrolling dispersed public use areas within one-quarter mile of all Project and Project-affected waterways. Monitoring and reporting vandalism of facilities, cultural sites or other resource damage. Reporting illegal activities and cooperating with law enforcement agencies, as needed.
- Monitoring and compliance with regulations associated with camping, parking, whitewater boating, trails, and other uses.
- Removing trash and clean fire rings from dispersed campsites and other areas of concentrated public use within 1/4 mile of all Project and Project-affected waterways.
- Maintaining fuels clearance within 100 feet of all dispersed campsites (including Project-provided steel fire rings and user created fire rings) surrounding Project lakes.
- Removing visitor created fire rings in areas where camping is limited to designated sites.
- Providing engineering review of plans to upgrade recreation facilities on BLM land review.
- Implementing and monitoring Ward's Ferry Day Use Recreation area facility development and maintenance.

FPA § 4(e) BLM Condition No. 13 Ward's Ferry Day Use Recreation Area

Within one year of license issuance, Licensees shall finalize a Ward's Ferry Day Use Facility Engineered Plan approved by BLM. If the Licensees determine they can design and build the Day Use facility cheaper, better, and safer by utilizing Licensees' property combined with utilizing BLM property, BLM will provide approval as long as the Final Ward's Ferry Facility Design meets all of the objectives listed below. In designing the Ward's Ferry Day Use Recreation Facility, Licensees shall coordinate with all interested parties including agencies and NGO's that request to participate.

Within four years of license issuance, Licensees shall complete the construction of a BLM approved Ward's Ferry Day Use Recreation Area Facility.

Licensees shall seek public input when establishing Recreation Use Fees charged at Ward's Ferry.

Objectives Overview

Licensee shall develop and construct an improved Ward's Ferry Day Use Recreation Area Facility. Maintenance and management shall be the responsibility of the Licensees or their designee by the Don Pedro Recreation Agency or another party selected by the Licensees for the duration of the license that includes the following components at the Ward's Ferry Bridge area:

- The facility shall accommodate all-water-level motorized vehicle access that safely and functionally accommodates 6 simultaneous river trip take-outs, consisting of up to 6 groups taking out simultaneously, consisting of up to 6 rafts in each group. Design may

include a single large boat ramp, or multiple smaller boat ramps or a combination of boat ramps and a multi-crane staging area and other possible engineered design features to accommodate up to 6 groups of 6 rafts each at any one time.

- The facility shall be designed to accommodate both private and commercial groups safely. The design shall accommodate safe unloading of gear from rafts and loading of gear into vehicles. The design shall be developed in coordination with the U.S. Bureau of Land Management, U.S. Forest Service, California State Water Resources Control Board, and Tuolumne County and in consultation with representatives of the boating community including American Whitewater, American River Recreation Association, California Outdoors, Tuolumne River Trust, Central Sierra Environmental Resource Center, and interested private boaters

- During the May 1st – October 15th mandatory USFS Tuolumne Wild and Scenic River permit season, Licensees shall provide maintenance, management, & staffing for the duration of license at the takeout facility to ensure that the takeout is being utilized in an orderly and safe fashion. Gates need to be open to the public and commercial outfitters from 2PM – dusk to accommodate vehicles accessing the takeout areas.

- Licensees shall provide an all-water-level pedestrian access that minimizes conflicts with motorized vehicles and is sufficient to meet current and future needs.

- The Licensees shall provide and manage appropriate toilet facilities (at least 2 ADA toilets). Toilet facilities will be open to the public on a daily basis from May 1st – October 15th. Licensees shall be required to maintain daily regular cleaning and upkeep of toilet facilities.

- Licensees shall provide adequate and safe day use parking for vehicles, trucks, trailers, and busses at or in proximity to Ward's Ferry. Licensees shall provide 20 to 25 parking spots in total off of Ward's Ferry Road on both sides of the river. Parking will be paved and striped. Licensees shall provide barrier structures approved by BLM and the structures will be placed near the embankment to keep vehicles from being pushed into the reservoir or down the steep embankment. The Licensees shall provide two ADA parking spaces near the bridge ends.

- Licensees shall provide (6-10) bear proof trash containers based on need. Location and number of trash containers will be determined in the site plans and upon approval of BLM.

- Licensees shall provide two safe passenger loading zone areas for all river trip passengers. Area must be able to handle up to 26 people at one time.

- Licensees shall provide for a Day Use area for non-whitewater boating related recreational users. Location shall be approved by BLM and shall be located in an area that will avoid conflicts with boaters. A minimum of 3 ADA wire meshed picnic tables that meet required ADA design shall be placed in an agreed- upon locations in the Ward's Ferry Day Use Recreation Area Facility. All picnic tables shall be cemented and secured in place to prevent people from stealing the tables. Licensee is responsible for

upkeep and replacement of tables. Preferably these locations shall be provided where shade from the afternoon sun can provide protection. Manmade shade structures may be possible that blend in with the environment.

- Licensee shall provide a BLM approved aesthetically pleasing and environmentally appropriate appearance at the Day Use facility. Licensee will need to meet BLM VRM management objectives identified in the BLM approved VRM Plan. Licensees shall develop a BLM approved Maintenance Plan for daily and long term maintenance in and around Ward's Ferry Day Use Recreation Area..

- If the Licensee charges fees at the Ward's Ferry Day Use Recreation Area they must be fair and reasonable maintenance use fees for the duration of license. All Recreation Use Fees charged at Ward's Ferry will seek public input from all affected stakeholders

- Interpretive and information signage, including two BLM approved kiosk signs, shall be placed on each side of the river. Location will be determined on the BLM approved site plan. All information placed on the kiosk signs must be approved by BLM. Replacement of signs that are in disrepair, damaged, vandalized, or stolen shall be replaced at the Licensees' expense.

Rationale for Ward's Ferry Day Use Recreation Area:

Whitewater boating on the Tuolumne Wild and Scenic River is a nationally acclaimed recreational use that is recognized for the river corridor's beauty and the quality of the experience. Unfortunately, the current existing whitewater boating takeout facility and access for both commercial and non-commercial boaters and general recreational users at Ward's Ferry is highly unsafe for boaters, creates a public safety hazard on the bridge for vehicles and pedestrians, and conflicts with other recreational uses. Currently, one restroom facility exists and is only available to commercial rafting clients and is not open for use by the general public. The need to meet public use demands requires at least two restroom facilities with two ports per facility. The current restroom facility is not adequate to accommodate the number of users. Parking is not defined and is inadequate. There is no informational and educational signage. No consistent agency or Licensee staff is present during the peak recreational season to oversee, maintain, and coordinate recreational use.

<u>Public Safety Issues</u>:

1. Currently, the takeout path/access road is almost impassable in places due to the continued erosion caused from the water fluctuations of the reservoir on an annual basis. A new design may require the takeout to be built out from the existing bank with retaining walls to make the path wide enough for vehicles to access the north side and/or south side of the river. Vehicle cement barricade is causing erosion on the north side. This barricade needs to be taken out and replaced by a gate.
2. The area is unsafe at times because of a lack of law enforcement patrols.
3. Booming rafts on the Ward's Ferry Bridge causes safety concerns for pedestrians walking and placing rafting gear anywhere along the bridge and blocks oncoming traffic trying to cross the river from both directions.

4. Public located below the bridge where rafts are being pulled up are exposed to gear and boats falling on top of them if a cable breaks or gear comes out of the rafts.

Figure 1. Demonstrates Reservoir Fluctuations from 2008-2011.

DON PEDRO RESERVOIR LEVELS
May – August,
2008 - 2011

May through August only
2008 - 2011

MAX is 880
MIN (river) is ~770?
Bridge deck is ~880

Above	Below	# of times				% of time above		% of time below	
825	830	6056	12.85%			825	12.85%	830	100.00%	6056
820	825	4493	9.53%			820	22.39%	820	87.15%	10549
810	820	6742	14.31%			810	36.69%	810	77.61%	17291
800	810	9996	21.21%	47.17%	62.17%	800	57.91%	800	63.31%	26837
790	800	5891	12.50%			790	70.41%	790	42.09%	32728
780	790	2574	5.46%			780	75.87%	780	29.59%	35302
770	780	2106	4.47%			770	79.62%	770	24.13%	37517
760	770	5741	12.18%			760	91.80%	760	20.38%	43258
750	760	1930	4.07%		25% of time,	750	95.87%	750	8.20%	45170
740	750	1945	4.13%		it was a river	740	87.15%	740	4.13%	47125
730	740	0	0.00%			730	87.15%	730	0.00%	47125

47125 data points

MEDIAN 805
80% EXCEEDENCE 763-828

(TODAY'S ELEVATION = 705 feet)

Figure 2. Shows the takeout path/access road that is almost impassable in places.

Figure 3. Shows vandalism of area.

Figure 4. Shows raft booming safety issues on Ward's Ferry Bridge.

Figure 5. Demonstrates pedestrian safety concerns on the bridge.

Figure 6. Safety concerns for the recreationists below the bridge.

Figure 7. Booming rafts on the bridge is a safety concern for the public.

The Licensees have proposed the following capital improvements to recreation facilities, excerpted from the Don Pedro AFLA Environmental Report – Exhibit E, 5.7.1 Whitewater Boating Take-Out Facility at Ward's Ferry Bridge, pp. 5-39-5-41 (TID/MID 2017a):

> "Whitewater boating in the Tuolumne River above the Don Pedro Project Boundary is a popular recreational opportunity enjoyed by individuals using personal watercraft or the services of commercial outfitters. The commercial rafting season generally extends from Memorial Day through Labor Day. For the most part, these recreationists enter the river at the USFS Lumsden campground at about RM 97 and make use of the CCSF Holm powerhouse hydro peaking flows to traverse the Wild & Scenic section of the upper Tuolumne River down to RM 80.8 at the Don Pedro Project Boundary. The Ward's Ferry Bridge, which crosses the Tuolumne River at RM 78, is the first possible river exit below the Lumsden put-in. Commercial outfitters' trips starting at Lumsden enter the river early in the morning in close sequence coinciding with the hydropeaking schedule of CCSF's Holm powerhouse. Generally, the Tuolumne River is not floatable by commercial rafts if the Holm powerhouse is not operating.
>
> "Using the peaking flows from Holm powerhouse which generally occur from about 7 am to about 11 am, many of the whitewater boaters arrive at the Ward's Ferry Bridge over a relatively short period of time resulting in substantial congestion at and on the bridge. The resulting congestion is unrelated to the operation of the Don Pedro Project, but is a result of the need for commercial outfitters to complete their float trips before the peaking flow from the Holm powerhouse subsides, which generally occurs about mid-afternoon at Ward's Ferry. The commercial rafting companies position truck cranes on the bridge to lift their rafts and equipment out of the river at Ward's Ferry. This creates considerable road blockage, traffic, and related congestion problems on the Ward's Ferry Bridge. As many as three truck cranes and associated hauling vans are on the bridge roadway for afternoon periods, potentially resulting in traffic problems and in violation of county road use ordinances.
>
> "The current boating take-out problems experienced at Ward's Ferry are not related to Don Pedro project operations. Nevertheless, the Districts are including in the Preferred Plan the construction of a deck on river left, upstream of the bridge, large enough to accommodate two or three truck cranes and hauling vehicles at one time (depending on final design), thereby eliminating the need to locate truck cranes and other vehicles/equipment on the bridge (Figures 5.7-1, 5.7-2, and 5.7-3). The Districts, unless other terms are negotiated with commercial outfitters, would charge a per-head user fee to recover its costs over the period of the new license. While the Districts would pay for the construction of the take-out, the Districts plan to discuss with Tuolumne County plans for the long-term upkeep of the facility as, fundamentally, it acts as an extension of the Ward's Ferry Bridge, and is not affected by any Project operations."

Over 5,000 whitewater boaters annually boat the Lumsden to Ward's Ferry segment. 1,000 to1,500 users are non-commercial boaters. The use numbers for non-commercial boaters have decreased since the mid 1980's because of the difficulty and safety issues with taking out at Ward's Ferry and because it is unsafe to leave your car overnight due to numerous break-ins. The commercial rafters have been booming their rafts off of Ward's Ferry Bridge and they provide public shuttles for their passengers so their numbers have stayed static. Ward's Ferry

takeout requires not only a design for commercial boats but also a design to allow private boaters to takeout safely. Boaters must be able to takeout safely at all times of the day and in all seasons.

Whitewater boating doesn't just rely on releases from the Holm Powerhouse. In many years natural flows provides enough water for boaters well into the Memorial to Labor Day USFS permit season. Boaters have much more flexibility to arrive at takeout during natural flow events thus spreading out the takeout hours. Congress has recognized the natural free flowing aspects of the Tuolumne River and its Outstandingly Remarkable Values, including whitewater boating, in designating it a Wild and Scenic River. During the summer, non-spill events and accretion flows are lower and the Holm Powerhouse provides enough flows for whitewater boating to occur on the Lumsden to Wards Ferry segment of river. These power generation flows are timed to benefit aquatics, riparian habitat, and whitewater recreation.

Prior to the inundation from Don Pedro Dam whitewater boaters were taking out at other locations within the project boundary of Don Pedro Reservoir where the river was close enough to an existing road. Even the existing large boating Recreation Areas on Don Pedro Reservoir today were built to some degree because of the existing road infrastructure that was in place at the time of construction of the dam. To infer that Project operations doesn't affect whitewater boating within Don Pedro Reservoir is inaccurate. Naturally, when the reservoir inundated these whitewater boating takeout locations the logical closest place for whitewater boaters to takeout became Wards Ferry.

Rationale for Wards Ferry Objectives:

- The facility shall accommodate all-water-level motorized vehicle access that safely and functionally accommodates 6 simultaneous river trip take-outs, consisting of up to 6 groups taking out simultaneously, consisting of up to 6 rafts in each group. Design may include a single large boat ramp, or multiple smaller boat ramps or a combination of boat ramps and a multi-crane staging area and other possible engineered design features to accommodate up to 6 groups of 6 rafts each at any one time.

  The facility shall be designed to accommodate both private and commercial groups safely. The design shall accommodate safe unloading of gear from rafts and loading of gear into vehicles. The design shall be developed in coordination with the U.S. Bureau of Land Management, U.S. Forest Service, California State Water Resources Control Board, and Tuolumne County and in consultation with representatives of the boating community including American Whitewater, American River Recreation Association, California Outdoors, Tuolumne River Trust, Central Sierra Environmental Resource Center, and interested private boaters.

  The following is excerpted from the *Tuolumne Wild and Scenic River Management Plan* (USFS 1988) – page 36:

  The USFS Groveland District Ranger Office issues mandatory permits for commercial and non-commercial whitewater boaters to boat on the Lumsden to Wards Ferry segment of the Tuolumne Wild and Scenic River. The permit allows boaters to stay up to three days on this segment of river allowing up to 438 potential number of boaters (52 commercial and 90 non-commercial boaters per day times 3 days) that can be found on the river at any one time. This also equates to 17 large groups of people of 26 people per

group and 101 boats that need to exit the river per day. In order to meet the potential number of users and water craft needing to exist the river safely before dark it is important to design a takeout facility large enough to handle this amount of use. Currently it takes a minimum of an hour and 15 minutes for 3 outfitters to pull up equipment and boats by crane and load them in their vehicles off the Wards Ferry Bridge. More time is required for non-commercial boaters because they have to carry out all of their gear, rafts, and equipment up a steep, slippery, narrow manmade access trail. This causes takeouts to be slower for non-commercial boaters. Those with rafts take even longer than those with kayaks. Most non-commercial boaters do not raft because of the difficulty of taking out with large heavy gear and boats. It is unfortunate that the current facilities or lack thereof, are currently seen as a limiting factor in contributing to the lower non-commercial boaters use numbers. With the potential of 4-6 commercial raft trips taking out on any given day it takes over 2.5 hours to complete. If the first group of outfitters arrive around 4:30pm the last group doesn't finish until 7:00pm. Non-commercial boaters do not have the ability to use a crane system to pull out rafts. There is a need for vehicle access ramps to be included in the design to accommodate almost double the potential number of users on any given day for non-commercial boaters.

- During the May 1st – October 15th mandatory USFS Tuolumne Wild and Scenic River permit season, Licensees will provide maintenance, management, & staffing for the duration of license at the takeout facility to ensure that the takeout is being utilized in an orderly and safe fashion. Gates need to be open to the public and commercial outfitters from 2PM – dusk to accommodate vehicles accessing the takeout areas.

STUDY REPORT RR-02 *WHITEWATER BOATING TAKE-OUT IMPROVEMENT FEASIBILITY ATTACHMENT RR-02 Attachment B Page 1-3*

1.3.4 Traffic Congestion

In summary, the lack of a designated take-out area or assigned area for boaters presents issues among boaters and other shoreline users, particularly related to vehicles. For example, as one boater explained:

" You have the spots where the vehicles are parked, but this year even the private trips are bringing the rafts and equipment up onto the road because there's no space on either side to park or a designated loading area. The commercial users know to keep the road open, but somebody there for the first time, they just explode into the space and they don't care whether somebody has to wait while they deflate their boat. And sometimes, I drive the bus, and I need a pretty good turnaround and to tow the trailer, they have to go all the way up, almost a mile, to turn their trailer around. But there is a place where I turn my bus, but a lot of times, fishermen park right in the area".

- Licensees shall provide an all-water-level pedestrian access that minimizes conflicts with motorized vehicles and is sufficient to meet current and future needs.

STUDY REPORT RR-02 *WHITEWATER BOATING TAKE-OUT IMPROVEMENT FEASIBILITY ATTACHMENT RR-02*

1.2. *"Commercial boaters typically use one side of the river (river left) and the private boaters will use the other side (river right). The old, stone bridge abutments just upstream of the concrete bridge are currently the main point of access. The lay-down areas and construction access routes created during construction of the existing bridge are used as a walking path to get down water level at a range of elevations. At high pool, the old bridge abutments are under water. As the pool drops below the bridge abutments, various kinds of user-created trails go up the bridge abutments, and are used for carrying equipment. The commercial outfitters park truck-mounted cranes on Ward's Ferry Bridge to lift their gear up to the bridge.*

According to the focus group participants, the trails below the high water elevation are considered less than adequate and the Outfitters worry about a twisted ankle by guests and staff; moving heavy equipment up the trail; and even users slipping off the trail carrying boats.

Presently, the commercial boaters use trucks with cranes on them. We pull the boats out of the reservoir and load our trucks. This has issues, using the bridge as a crane platform. And the county and the California Highway Patrol and other authorities have said 'well, until there's a better solution, we're going to look the other way.' It's not really legitimate in some ways what we're doing, but it's the best alternative".

Overall, river right receives more use due to it being a slightly shorter trail, less of an incline, and clear access to the Ward's Ferry road (i.e., no toilet blocking the trail). The trail on river right needs work, especially below the elevation of the top of the old bridge pilings.

It's just a gnarly little walk. It doesn't really work to carry equipment up it.

Several people have fallen into the reservoir off the old Ward's Ferry road because you're holding a big wide boat. The guys on the left sort of drop into the canyon."

STUDY REPORT RR-02 *WHITEWATER BOATING TAKE-OUT IMPROVEMENT FEASIBILITY ATTACHMENT B 1.2 How the Take-Out is Currently Used*

1.3.1 Difficult Terrain

The terrain at Ward's Ferry presents some challenges depending on water level. These include rock/boulder fields, eroding trail, incline to the road, limited space/access on the road, traffic, the (Italicized with quotations text in this summary present more or less direct quotes from focus group participants.)

1.0 Existing Take-Out Situation

RR-02 Attachment B Page 1-2 Initial Study Report Whitewater Boating Take-Out Improvement Feasibility Don Pedro Project, FERC No. 2299

Restroom blocks the access on river left, and traffic and operational concerns when using a boom truck.

" I would say that the risk of harm to my employees or my clients is greatest from the time they step off the boat to the time they step on the bus to leave Ward's Ferry. That area is very dangerous with sliding rock, people up above dropping rocks down on you down below, and just carrying equipment on steep slopes with no horizontal trail is a prime [situation] for workmen's comp claims or for people spraining ankles. This is a very dangerous place. The take-out is way more dangerous than the rapids."

" There was some concern over the concrete piling used to block traffic going down the trail on river right. Some said the trail eroded over the years because of the concrete blocks.

"When they put that block in, all the water that comes off the bridge hits that and careens off into the reservoir, but as it does, it cuts all this soil away. The original road bed is shrinking. "

- The Licensees shall provide and manage appropriate toilet facilities (at least 2 ADA toilets). Toilet facilities will be open to the public on a daily basis from May 1st – October 15th. Licensees shall be required to maintain daily regular cleaning and upkeep of toilet facilities.

There is one toilet facility provided and it is only available for use by the commercial outfitters when they are present. Private boaters and the general public do not have a restroom facility to use. The current toilet facility blocks access for boaters with rafts. When over 400 people potentially can be using the Wards Ferry Day Use facility during the afternoons there is a significant need to provide for toilets. Toilet paper and human waste, are found anywhere people can hide from site.

- Licensees shall provide adequate and safe day use parking for vehicles, trucks, trailers, and busses at or in proximity to Ward's Ferry. Licensees shall provide 20 to 25 parking spots in total off of Ward's Ferry Road on both sides of the river. Parking will be paved and striped. Licensee shall provide barrier structures approved by BLM and will be placed near the embankment to keep vehicles from being pushed into the reservoir or down the steep embankment. The Licensees shall provide two ADA parking spaces near the bridge ends.

Tuolumne County has provided a written comment letter explaining what they believe needs to be done in order to provide for safe parking at the Wards Ferry site. Since parking is not adequate nor is it defined there is a safety need to address this issue on both the north and south sides of the road to make as much room as possible for users to park in a safe manner.

- Licensees shall provide (6-10) bear proof trash containers based on need. Location and number of trash containers will be determined in the site plans and upon approval of BLM.

Currently there aren't any trash receptacles found at the Wards Ferry site. Trash can be found all over this area.

- Licensees shall provide two safe passenger loading zone areas for all river trip passengers. Area must be able to handle up to 26 people at one time.

At the present time there is no area designated for large groups to load up their gear and be safe from on coming traffic. Unloading gear and loading up and packing gear takes time and space is a premium. Gear loading areas need to be included in any new design.

- Licensees shall provide for a Day Use area for non-whitewater boating related recreational users. Location shall be approved by BLM and will be located in an area that will avoid conflicts with boaters. A minimum of 3 ADA wire meshed picnic tables that meet required ADA design shall be placed in an agreed- upon locations in the Ward's Ferry Day Use Recreation Area Facility. All picnic tables shall be cemented and secured in place to prevent people from stealing the tables. Licensee is responsible for upkeep and replacement of tables. Preferably these locations will be provided where shade from the afternoon sun can provide protection. Manmade shade structures may be possible that blend in with the environment.

Even though Wards Ferry receives a fair amount of shoreline recreational use by fisherman, picnickers, and swimmers there are no facilities available for these recreational users. Providing an area for picnicking that has some shade is highly desired at this location. Many day users currently hide from the afternoon sun underneath the Wards Ferry Bridge, knowing it's unsafe because rafts are being craned out and gear and boats could fall on them.

- Licensee shall provide a BLM approved aesthetically pleasing and environmentally appropriate appearance at the Day Use facility. Licensee shall meet BLM VRM management objectives identified in the BLM approved VRM Plan. Licensees shall develop a BLM approved Maintenance Plan for daily and long term maintenance in and around Ward's Ferry Day Use Recreation Area..

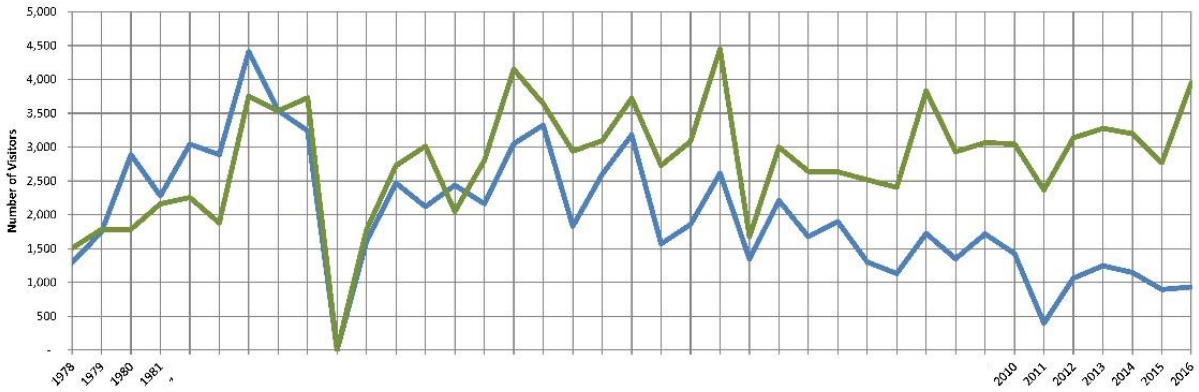
- If the Licensee charges fees at the Ward's Ferry Day Use Recreation Area they must be fair and reasonable maintenance use fees for the duration of license. All Recreation Use Fees charged at Ward's Ferry will seek public input from all affected stakeholders

- Interpretive and information signage, including two BLM approved kiosk signs, shall be placed on each side of the river. Location shall be determined on the BLM approved site plan. All information placed on the kiosk signs shall be approved by BLM.

Currently there are no signs of any kind at Wards Ferry. Informing the recreational users at this site is non existent and a sign plan approved by BLM is necessary to inform recreational users of the rules, regulations, and safety messaging necessary to keep the public informed and safe.

1978-2016 Tuolumne Wild & Scenic River Use

Graph 1: Main Tuolumne Wild & Scenic River



1978-2016 Tuolumne Wild & Scenic River Use

Table 1: Main Tuolumne Wild & Scenic River

Year	Non-Commercial		Commercial		
	Number of Visitors	%	Number of Visitors	%	Total
1978	1,292	46%	1,504	54%	2,796
1979	1,748	49%	1,786	51%	3,534
1980	2,888	62%	1,786	38%	4,674
1981	2,280	51%	2,162	49%	4,442
1982	3,040	57%	2,256	43%	5,296
1983	2,888	61%	1,880	39%	4,768
1984	4,410	54%	3,751	46%	8,161
1985	3,540	50%	3,536	50%	7,076
1986	3,240	46%	3,729	54%	6,969
1987	-		-		-
1988	1,605	47%	1,778	53%	3,383
1989	2,469	48%	2,725	52%	5,194
1990	2,120	41%	3,012	59%	5,132
1991	2,437	54%	2,049	46%	4,486
1992	2,164	44%	2,801	56%	4,965
1993	3,051	42%	4,149	58%	7,200
1994	3,323	48%	3,641	52%	6,964
1995	1,829	38%	2,940	62%	4,769
1996	2,600	46%	3,095	54%	5,695
1997	3,181	46%	3,722	54%	6,903
1998	1,572	37%	2,729	63%	4,301
1999	1,858	38%	3,087	62%	4,945
2000	2,615	37%	4,446	63%	7,061
2001	1,344	45%	1,676	55%	3,020
2002	2,211	42%	2,999	58%	5,210
2003	1,676	39%	2,639	61%	4,315
2004	1,899	42%	2,634	58%	4,533
2005	1,302	34%	2,516	66%	3,818
2006	1,131	32%	2,407	68%	3,538
2007	1,724	31%	3,829	69%	5,553
2008	1,349	32%	2,930	68%	4,279
2009	1,716	36%	3,064	64%	4,780
2010	1,427	32%	3,049	68%	4,476
2011	396	14%	2,368	86%	2,764
2012	1,062	25%	3,135	75%	4,197
2013	1,246	28%	3,276	72%	4,522
2014	1,148	26%	3,199	74%	4,347
2015	895	24%	2,769	76%	3,664
2016	933	19%	3,948	81%	4,881
TOTAL	**77,609**	**42%**	**109,002**	**58%**	**186,611**

Takeout Issues at Moccasin:

- Sand and siltation navigability issues.
- Time it takes to get to Moccasin. Analysis of River Channel Sediments at Upper End of Don Pedro Reservoir.

Bob Stanley, U.S. Forest Service Tuolumne Park Ranger River Patrol statement (2017):

> "Over the course of 5 summer boating seasons, 2012-2016, the Forest Service river patrol accomplished 25+ sediment channel runs with reservoir tow outs from the back end of the reservoir.
>
> "At higher pool elevations, the river meets the pool above the Ward's Ferry bridge. At these pool elevations, the sediment load appeared to clear out fairly quickly and did not tend to develop a deep load above the riverbed as this area is close to the maximum pool elevation. Sand waves above fine sediments did occur, especially within 300 yards upstream of the Ward's Ferry Bridge but, probably because the sediments were not deep, navigation for river watercraft was not significantly impeded. Quicksand did develop at rivers edge in the mooring zone around Ward's Ferry Bridge creating a dangerous situation for boaters attempting to exit boats or carry boats out of the water. Although some debris was in the river channel, it was possible to be towed (at pool elevations above the bridge) using prudent safety techniques without incident.
>
> "Over the course of the years from 2013 through 2016, the reservoir pool continually dropped on average, and the river patrol followed the rivers course as it cut its way through the sediments deposited over previous years of dam operations. As the pool dropped the sediment load got deeper, and more and more debris began to impede current flow in the river channel the further downstream one traveled.
>
> "From 2012 on, significant danger from sediment debris was noted, starting at Deer Creek rapid, the first rapid below Ward's Ferry Bridge. The current ran into standing snags, logs, timber with steel protruding; vehicle sheet metal, frames and drivelines, numerous tires and wheel rims; steel appliances; boat hull fiberglass and aluminum pieces; assorted sizes, shapes and shards of glass, Plexiglas; ceramics, plastics, synthetic rope, and plywood, were all strewn about in the sediments that had settled in the reservoir.
>
> "These objects made navigation thru the sediments hazardous. When the current cut through sediments into areas above and to the side of the pre-dam river channel, standing snags blocked some or almost all of the river channel in some locations. Pieces of sharp debris often would be embedded in the sediment river channel, or more often would be protruding into the channel from the side. Landing boats to scout hazards, or for any reason, exposed crews to soft unconsolidated sediments that would not support human weight. This resulted in contact with unseen debris, sometimes hazardous, resting below the surface of the sediment load.
>
> "As the river found its way across the lowest end of the sediments being exposed by the receding pool elevation, it spread out into a wide, shallow, and braided field of currents over fine sediments. This condition created pervasive "sand waves" (small, continuous waves, often covering wide areas). Even low draft, lightweight rafts traveling across this zone were likely to run aground on sediments underneath the sand waves. The sand waves in this zone agitated the fine sediments allowing water to penetrate deeply, creating a quicksand that would not support human weight. It was

difficult to release a stuck boat. In order to facilitate moving a boat, a crew member had to exit and remain in contact with the boat as it was possible to go straight to hip deep in the sediments while the boat lightened up enough to continue traveling, potentially leaving a crew member stranded if they were not retrieved.

"As the river continued to cut its way through the sediments at the top end on the reservoir, it developed narrow mini-canyons up to 25 feet tall in the sediment load. In early August of 2016 while boating thru one of these zones, a silty sediment berg, approximately the size of a 20-person school bus, collapsed into the narrow river channel between two patrol boats navigating through the sediments. This incident stopped further study of the feasibility for towing out watercraft from the Tuolumne river to Moccasin.

Conclusions and Recommended Actions:

"Providing reasonable egress from this river that is beloved for its outstanding scenery, whitewater, and recreational opportunities is a rational and just course of action in the context of management of the Wild and Scenic river corridor and it's terminus at the Don Pedro Reservoir.

"Current access and egress to the reservoir and river at Ward's Ferry Bridge is dangerous by any reasonable and prudent standard. All land and water based users of the river/reservoir are exposed to significant hazards at Ward's Ferry.

"The danger of taking boats out from the Tuolumne River is primarily due to human engineering (or lack thereof) of the Don Pedro Dam project. The lack of a reasonable access to the river at Ward's Ferry Bridge is not acceptable management for the terminus of the Tuolumne Wild and Scenic River.

"Our conclusion from studying the river running through the sediments at the Upper end of Don Pedro Reservoir is that tow outs are an unacceptable solution for boat retrieval from the Tuolumne River when the reservoir pool is below Ward's Ferry Bridge. The only personnel who would rationally navigate the river below the Ward's Ferry Bridge are EMS personnel trained in Swift Water Rescue.

"Providing a launch/retrieval facility at Ward's Ferry Bridge that will accommodate at least six vehicles at reservoir/rivers edge at all pool elevations and down to river level appears to be the minimum action to solve the dangerous situation presently existing there (Stanley 2017)."

FPA § 4(e) BLM Condition No. 14 – Recreation Resource Management Plan

Within one year of license issuance, Licensees shall file a BLM-approved Recreation Resource Management Plan following consultation with the BLM. The BLM has provided a Recreation Resource Management Plan (Attachment 4) for implementation on BLM-administered lands within the FERC Project Boundary. If changes are made to the Recreation Resource Management Plan as presented in Attachment 4, the modified plan shall be submitted to the BLM for review and approval prior to submitting the final plan to the Commission. Upon Commission approval, the Recreation Resource Management Plan shall be implemented.

Rationale for Recreation Measures – Recreation Survey and Monitoring:

- Licensee shall conduct Recreation Monitoring once every 6 years which will include evaluation of resource impacts from developed and dispersed use, including evidence of garbage and human waste left on site. The BLM shall be involved in the evaluation of resource impacts.
- Licensee shall conduct occupancy surveys of all project facilities on a 6 year cycle.
- Licensee shall conduct a Recreational User Survey (questionnaire) once every 12 years starting from license issuance. Survey methods and questions shall be reviewed and approved by the Resource Agencies in advance. The Recreation Survey shall be focused to address the key issues at the time. Survey information shall be reviewed by all interested parties.
- At 6 and 12 years, Licensee shall prepare the Recreation Monitoring and Survey Report, which shall be provided to BLM for review, comment and approval prior to being filed with the Commission. The Recreation Monitoring and Survey Report shall incorporate data from the information listed above, traffic counters, other resource monitoring results, law enforcement input, emergency services (including fire) input, accident reports, Project patrol reports, occupancy rates and other applicable information.

  The report shall address, at a minimum, the following factors:

  6-Year Monitoring Report:

  - Occupancy and capacity information.
  - Summarize monitoring results in relation to established triggers and address any changes in trends (including changes in peak season) since previous reports (or initially from relicensing studies).
  - User and resource conflicts.
  - Outstanding health and safety issues.
  - Known bear encounters at sites without food lockers.
  - Kinds and sizes of recreational vehicles (i.e. trailer, RV).
  - A 6-year schedule for maintenance, rehabilitation, reconstruction and new construction.
  - Proposed facility changes based on any mandated updated guidelines, such as ADA.
  - New or modified management actions (increased patrols, additional sanitation facilities, closure orders, etc.) proposed to address concerns identified in report.
  - Summary of the amount of garbage and evidence of human waste noticeable within 100' of clusters of dispersed campsites.

  12-Year Monitoring Report (Plus all the items in the 6-Year Monitoring Report)

  - Results of visitor surveys.
  - Changes in use type, volume, group size, duration of stay, other use pattern and trends.
  - Results of resource survey for riparian and lakeshore trampling, barren core area at popular dispersed sites.
  - User perceptions of crowding both at facilities and along lakeshore/lake surface.
  - User perceptions on the need for garbage collection at developed sites.
  - Percent of users seeing evidence of human waste (including toilet paper) and user perceptions on the need for toilet facilities at dispersed sites.
  - Kinds, quality, quantity, and range of recreational opportunities visitors are engaging in.

- Preferences in recreation activities and amenities.
- Summarize the most current regional and statewide trends in recreation based on available surveys and reports.

- Within 1 year of submission of the Report on Recreation Resources Licensee shall consult with the Resource Agencies and interested parties to review this report and propose appropriate management actions. BLM reserves the authority to require changes in the Project and its operation to accomplish protection and utilization of BLM resources identified as a result of these surveys.

Rationale for Recreation Measures – General Reconstruction:

Current Design Standards:

Since many of the existing facilities were constructed in the 1960's and 1970's, they are expected to reach their useful life at least once during the term of the license and need reconstruction. Because of the age of the facilities, many are not meeting current design standards (including accessibility standards) and were not designed to accommodate the current use and vehicle configurations.

Prior to reconstruction or rehabilitation of a recreation facility, the design of the facility will be reviewed in light of changes in use and design standards since the facility was constructed. Modifications will be made to the facility design to address the functionality of the facility and compliance of the facility with current design standards. This will include, but is not necessarily limited to: road widths and geometry and spur width and length (in light of the current vehicle use of the facility); providing additional campsites when warranted by demand; and compliance with current federal and agency accessibility standards: BLM lands, Architectural Barrier Act (ABA) Accessibility Standards (ABAAS) and agency facility design standards, or other applicable standards at the time of design, and; Licensee lands - Americans with Disabilities Act (ADA). Modification of the design may involve land beyond the existing footprint. Existing constructed features will be incorporated into the new design whenever it is efficient to do so, provided the features meet current standards and are in good condition. The intent of redesign is to assure the facility meets current standards, and users' needs while maintaining the character of the surrounding setting; the intent is not to "start from scratch".

When new construction or expansion is specified, the site capacities are general estimates only and will be refined during site design, based on current resource agency plans, Visual Resource Management Plans (VRM) class, laws, standards and policy for resource protection, topographic feasibility and recreation facility design.

Additional features (such as gates) may be added as part of the design modification.

Other Facility Features:

To assure the reconstructed facilities meet current standards and enhance site management, reconstruction or rehabilitation will address all constructed features as well as site grading and other site modifications including, but not limited to:

- Reconstruction, replacement or rehabilitation of constructed features, including - toilets, gates, table, fire rings, septic systems, water system features, barriers, retaining walls, unit markers, bulletin boards, signs, entrance and fee stations, animal resistant food lockers, etc.
- Accessibility - Evaluate opportunity to provide accessibility at all campsites and (to the degree topographically feasible) implement these opportunities
- Re-grading and graveling non-paved roads and spurs, resurfacing paved roads & including providing asphalt treatment and sufficient subgrade and (where appropriate) providing turn outs at entrance stations, toilets, trash bid pads etc. Providing asphalt treatment of spurs when the circulation road is paved.
- Address opportunities to lengthen and widen spurs as needed.
- Replacement of wood barriers with rock barriers and of sufficient quantity to prevent off road travel. Install additional barriers as needed.
- Installation of gates.
- Providing enhancements such as longer spurs and extra parking when there is a demand.
- Installing signing that meets BLM standards and addresses recreation area opportunities (including trails), maps of facilities, resource protection information (appropriate for the area), emergency contacts, safety, and regulations (including water surface regulations). Space should be provided to avoid overcrowding of bulletin boards which results in visitors bypassing information.

Reconstruction of All Recreation Facilities:

In addition to the actions listed below (unless otherwise agreed to) all existing Project and Project-related recreation facilities, constructed features and infrastructure will be replaced within 20 years of license issuance.

Ward's Ferry Day Use Recreation Facility

The Districts are including in the Preferred Plan "the construction of a deck on river left, upstream of the bridge, large enough to accommodate two or three truck cranes and hauling vehicles at one time (depending on final design) thereby eliminating the need to locate truck cranes and other vehicles/equipment on the bridge (Figures 5.7-1, 5.7-2, and 5.7-3). The Districts, unless other terms are negotiated with commercial outfitters, would charge a per-head user fee to recover its costs over the period of the new license. While the Districts would pay for the construction of the take-out, the Districts plan to discuss with Tuolumne County plans for the long-term upkeep of the facility as, fundamentally, it acts as an extension of the Ward's Ferry Bridge, and is not affected by any Project operations" (TID/MID 2017a).

Drinking Water Standards for Recreation Sites that Provide Potable Water:

Some of the Project recreation facilities on both BLM and Licensee lands provide drinking water and new drinking water systems are proposed. BLM policy specifies that all water systems shall be managed as public drinking water systems (i.e. serve at least 15 service connections or 25 persons) under the federal Safe Drinking Water Act (SDWA) that was signed into law in 1974, and reauthorized in 1996 to protect public health. In some states such as California, primacy has been delegated to the states and to the Counties which enforce all statutes, regulations and policies for drinking water systems within their jurisdictional boundaries. In Tuolumne County the California Department of Public Health regulates and enforces the drinking water quality laws and regulations. Tuolumne County regulates and enforces the drinking water laws and

regulations through their own health departments. All required water tests for all facilities located on BLM land must be included in the annual report and a copy must be sent the BLM Mother Lode Field Office designee.

Vegetation Management in Recreation Sites:

Vegetation is a key component of quality recreation sites in the area. Recreation sites without shade in this area are under-utilized and unpopular; therefore, it is critical to maintain a healthy, mature stand of vegetation. The vegetation management requirements are aimed at enhancing the recreation experience through active and professional vegetation management.

FPA § 4(e) BLM Condition No. 15 – Historic Properties Management Plan

Upon the Commission approval, Licensee shall implement the Amended Historic Properties Management Plan that was included in the letter TID/MID filed with FERC.

Rationale for Cultural Resource Measures:

Existing Conditions

There are current and past cultural resource management issues resulting from Project-related operations and activities that directly and indirectly affect cultural resource sites within the Project's Area of Potential Effect (APE).

Desired Conditions

The desired condition within the APE is to mitigate impacts to eligible historic properties pursuant to the National Historic Preservation Act of 1966, as amended.

The licensing of the Project is a federal undertaking requiring compliance with Section 106 of the National Historic Preservation Act, which requires any Federal undertaking to consider historic properties and afford the Advisory Council on Historic Preservation an opportunity to comment on the undertaking before issuance of the license (16 U.S.C.). Sections 32 and 33 will fulfill these Federal obligations. BLM is currently reviewing the documented work to insure that the Project complies with the current laws, policy, and regulations throughout the terms of the License.

FPA § 4(e) BLM Condition No. 16 - Transportation System Management Plan

Within one year of license issuance, Licensees shall file a BLM approved Transportation System Management Plan for the BLM land within the FERC Project Boundary. Upon Commission approval, Licensees shall implement the Transportation System Management Plan.

Rationale for a Transportation System Management Plan:

Numerous roads are within the Project boundary that the Licensees use which cross BLM lands. To insure these projects roads are being maintained to BLM standards, an agreed upon Transportation System Management Plan needs to be developed.

The Licensees identify in their Recreation Resource Management Plan (TID/MID 2017d) that there are roads, parking areas, boat ramps, a marina, and campground vehicle spurs throughout the project as well as roads that lead to powerlines, hydroelectric facilities, and other operational structures on BLM land.

As needed, the Licensees shall rehabilitate all existing roads and parking areas within the Project Recreation Areas (RAs). Specifically, the Licensees shall:

- Repave (asphalt) and re-stripe parking areas, including installing vehicle barriers at each parking area and accessible parking designation;
- Repave/overlay (with asphalt) all RA circulation roads; and install vehicle barriers. Where necessary, Licensees shall re-install to their original location, trash bins and pads in a designated area adjacent to parking areas with existing trash bins and pads once repaving activities are completed;
- Where unpaved, gravel parking areas exist, re-grade and clear the parking area and re-install vehicle barriers, as needed; and to BLM specifications on BLM land; and
- Repave or overlay (asphalt) all campsite spurs that are currently paved, and install vehicle barriers at each new spur.

Rehabilitation of roads, parking areas, and vehicle spurs shall occur on a facility-by-facility basis at all Project RAs. Roads, parking areas, and vehicle spurs shall be scheduled for rehabilitation near the end of their useful life based on the findings during regular or annual inspections, unless a different schedule is specifically identified in this Plan.

The Transportation Plan needs to identify all roads crossing BLM land and discuss what roads are being used by the Districts. Condition assessments need to be conducted with a BLM engineer. After assessments have been conducted a maintenance plan will need to be developed and a schedule needs to be addressed so BLM knows when and where and how often maintenance will be completed on these road systems.

In the AFLA, the Districts did not develop a Transportation Plan and instead they wanted to notify the BLM when they were planning on working on a road that crossed BLM, which is the current plan. The BLM has not been receiving notifications when roadwork occurs, and therefore, BLM is not in agreement with this approach moving forward in the new license.

FPA § 4(e) BLM Condition No. 17 – Fire Prevention and Response Management Plan

Within one year of license issuance, Licensees shall file a BLM-approved Fire Prevention and Response Management Plan following consultation with the BLM. The BLM has provided a Fire Prevention and Response Management Plan (Attachment 5) for implementation on BLM-administered lands within the FERC Project Boundary. If changes are made to the Fire Prevention and Response Management Plan as presented in Attachment 5, the modified plan shall be submitted to the BLM for review and approval prior to submitting the final plan to the Commission. Upon Commission approval, the Fire Prevention and Response Management Plan shall be implemented.

Rationale for Fire Prevention and Response Plan:

The Fire Prevention and Response Management Plan outlines a series of procedures that protects resources and facilities, and provides for public (as well as Licensee personnel) safety through prevention of fires, required authorized burn plans, and if needed, response to a fire. These procedures range from education about, and implementation of, fire restrictions; emergency contact information in the event of a fire in the vicinity of project facilities including recreation facilities, and outlines suppression efforts in the event of a Licensee Project caused fire as well as a fire in the vicinity of a project facility. It is important to note that contacting emergency services (e.g., 911) and taking action only within the limits of training and personal skill/knowledge in firefighting, is extremely important. It is expected that periodic updates to the plan will be necessary.

The Licensees filed a Fire Prevention and Response Management Plan in their Amended FLA (TID/MID 2017c); however, BLM would like the Fire Prevention and Response Management Plan in Attachment 5 to be implemented, because it includes BLM's requirements for the Licensees to get authorizations and approvals and to adhere to BLM fire restriction orders.

FPA § 4(e) BLM Condition No. 18 – Visual Resources Management Plan

Within one year of license issuance, Licensees shall develop and implement a Visual Resources Management Plan on BLM-administered lands that are within the FERC Project boundary. Licensees must acquire BLM approval before submitting the Visual Resources Management Plan for Commission approval. Upon the Commission approval, Licensees shall implement a Visual Resources Management Plan.

Rationale for Visual Resources Management Plan:

The Districts filed a Visual Report which was very thorough and covered almost all of the current facilities that are located on BLM land within the project boundary. The report did not cover future developments, obtaining BLM authorization in the future, or anything that addresses future planned improvements. The report did not identify the Moccasin Marina area and boat docks that are located on BLM land. It did not cover the Blue Oaks campground area where Loops C and D are partially located on BLM land. It did not cover BLM's opinion of the current existing features and whether they blend in with the surrounding environment. The report is a good starting point and with added features at Ward's Ferry and other developed areas BLM believes that we can get to agreement in finalizing a Visual Resources Management Plan.

BLM PRELIMINARY 4(e) ADMINISTRATIVE CONDITIONS

The following Section 4(e) Conditions include requirements that serve to address the statutory and administrative rights and responsibilities of the BLM pursuant to Federal, State, and local laws.

Rationale for Administrative Filed Conditions:

The following conditions are administrative or legal conditions that are necessary for adequate protection and utilization of BLM lands and preservation of other aspects of environmental quality. These conditions also ensure Licensee is complying with all appropriate laws and

regulations. In FERC's Draft Environmental Impact Statement (DEIS on Merced River Hydroelectric Project), FERC determined that these conditions were "administrative and legal in nature and not specific environmental issues" and did not analyze them further in the DEIS. For these reasons, BLM has deemed these conditions to be outside the scope of those that can be considered under the Energy Policy Act as set forth in 43 CFR § 45.73.

FPA § 4(e) BLM Condition No. 19 – Approval of Changes

Notwithstanding any license authorization to make changes to the Project, when such changes directly affect BLM lands the Licensee shall obtain written approval from BLM prior to making any changes in any constructed Project features or facilities, or in the uses of Project lands and waters or any departure from the requirements of any approved exhibits filed with the Commission. Following receipt of such approval from BLM, and a minimum of 60 days prior to initiating any such changes, the Licensee shall file a report with the Commission describing the changes, the reasons for the changes, and showing the approval of BLM for such changes. The Licensee shall file an exact copy of this report with BLM at the same time it is filed with the Commission.

FPA § 4(e) BLM Condition No. 20 – Maintenance of Improvements on or Affecting Bureau of Land Management Lands

The Licensee shall maintain all its improvements and premises on BLM lands to standards of repair, orderliness, neatness, sanitation, and safety acceptable to BLM. Disposal of all materials will be at an approved existing location, except as otherwise agreed to by BLM.

FPA § 4(e) BLM Condition No. 21 – Existing Claims

The License shall be subject to all valid claims and existing rights of third parties. The United States is not liable to the Licensee for the exercise of any such right or claim.

FPA § 4(e) BLM Condition No. 22 – Compliance with Regulations

The Licensee shall comply with the regulations of the Department of the Interior on BLM lands for activities on BLM lands, and all applicable Federal, State, county, and municipal laws, ordinances, or regulations in regards to the area or operations on or directly affecting BLM lands, to the extent those laws, ordinances or regulations are not preempted by federal law.

FPA § 4(e) BLM Condition No. 23 – Surrender of License or Transfer of Ownership

Prior to any surrender of this License, the Licensee shall provide assurance acceptable to BLM that Licensee shall restore any Project area directly affecting BLM lands to a condition satisfactory to BLM upon or after surrender of the license, as appropriate. To the extent restoration is required, Licensee shall prepare a restoration plan which shall identify the measures to be taken to restore such BLM lands and shall include or identify adequate financial mechanisms to ensure performance of the restoration measures.

In the event of any transfer of the License or sale of the Project, the Licensee shall assure that, in a manner satisfactory to BLM, the Licensee or transferee will provide for the costs of surrender and restoration. If deemed necessary by BLM to assist it in evaluating the Licensee's proposal, the Licensee shall conduct an analysis, using experts approved by BLM, to estimate the potential costs associated with surrender and restoration of any Project area directly affecting BLM lands to BLM specifications. In addition, BLM may require the Licensee to pay for an independent audit of the transferee to assist BLM in determining whether the transferee has the financial ability to fund the surrender and restoration work specified in the analysis.

FPA § 4(e) BLM Condition No. 24 – Protection of United States Property

The Licensee, including any agents or employees of the Licensee acting within the scope of their employment, shall exercise diligence in protecting from damage the land and property of the United States covered by and used in connection with this License.

FPA § 4(e) BLM Condition No. 25 - Indemnification

The Licensee shall indemnify, defend, and hold the United States harmless for:

- any violations incurred under any laws and regulations applicable to, or
- judgments, claims, penalties, fees, or demands assessed against the United States caused by, or
- costs, damages, and expenses incurred by the United States caused by, or
- the releases or threatened release of any solid waste, hazardous substances, pollutant, contaminant, or oil in any form in the environment related to the construction, maintenance, or operation of the Project works or of the works appurtenant or accessory thereto under the license.

The Licensee's indemnification of the United States shall include any loss by personal injury, loss of life or damage to property caused by the construction, maintenance, or operation of the Project works or of the works appurtenant or accessory thereto under the license. Indemnification shall include, but is not limited to, the value of resources damaged or destroyed; the costs of restoration, cleanup, or other mitigation; fire suppression or other types of abatement costs; third party claims and judgments; and all administrative, interest, and other legal costs. Upon surrender, transfer, or termination of the license, the Licensee's obligation to indemnify and hold harmless the United States shall survive for all valid claims for actions that occurred prior to such surrender, transfer or termination.

FPA § 4(e) BLM Condition No. 26 – Damage to Land, Property, and Interests of the United States

The Licensee has an affirmative duty to protect the land, property, and interests of the United States from damage arising from the Licensee's construction, maintenance, or operation of the Project works or the works appurtenant or accessory thereto under the license. The Licensee's liability for fire and other damages to BLM lands shall be determined in accordance with the Federal Power Act and standard Form L-1 Articles 22 and 24.

FPA § 4(e) BLM Condition No. 27 – Risks and Hazards on Bureau of Land Management Lands

As part of the occupancy and use of the Project area, the Licensee has a continuing responsibility to reasonably identify and report all known or observed hazardous conditions on or directly affecting BLM lands within the Project boundary that would affect the improvements, resources, or pose a risk of injury to individuals. Licensee will abate those conditions, except those caused by third parties or not related to the occupancy and use authorized by the License. Any non-emergency actions to abate such hazards on BLM lands shall be performed after consultation with BLM. In emergency situations, the Licensee shall notify BLM of its actions as soon as possible, but not more than 48 hours after such actions have been taken. Whether or not BLM is notified or provides consultation, the Licensee shall remain solely responsible for all abatement measures performed. Other hazards should be reported to the appropriate agency as soon as possible.

FPA § 4(e) BLM No. 28 – Protection of Bureau of Land Management Special Status Species

Before taking actions to construct new Project features on BLM lands that were not addressed in the Commission's NEPA processes for relicensing that may affect BLM threatened and endangered species or BLM special status species or their critical habitat, the Licensee shall prepare and submit a biological evaluation (BE) for BLM approval. The BE shall evaluate the potential impact of the action on the species or its habitat. In coordination with the Commission, BLM may require mitigation measures for the protection of the affected species.

The biological evaluation shall:

- Include procedures to minimize adverse effects to threatened and endangered species and special status species and their critical habitat.

- Include information on the current status of the special-status species within the project area, a full description of the Project and potential effects, if BLM determines that existing information is out of date.

- Ensure project-related activities shall meet restrictions included in site management plans for threatened and endangered species and special-status species and their habitat.

- Develop implementation and effectiveness monitoring of measures taken or employed to reduce effects to special status species.

FPA § 4(e) BLM Condition No. 29 – Access

Subject to the limitations set forth under the heading of "Access By The United States" in Condition No. 29 hereof, BLM reserves the right to use or permit others to use any part of the licensed area on BLM lands for any purpose, provided such use does not interfere with the rights and privileges authorized by this license or the Federal Power Act.

FPA § 4(e) BLM Condition No. 30 – Crossings

The Licensee shall maintain suitable crossings as required by BLM for all roads and trails that intersect the right-of-way occupied by linear Project facilities (power lines, penstocks, ditches, and pipelines).

FPA § 4(e) BLM Condition No. 31 – Surveys, Land Corners

The Licensee shall avoid disturbance to all public land survey monuments, private property corners, and forest boundary markers. In the event that any such land markers or monuments on BLM lands are destroyed by an act or omission of the Licensee, in connection with the use and/or occupancy authorized by this license, depending on the type of monument destroyed, the Licensee shall reestablish or reference same in accordance with (1) the procedures outlined in the "Manual of Instructions for the Survey of the Public Land of the United States," (2) the specifications of the County Surveyor, or (3) the specifications of BLM. Further, the Licensee shall ensure that any such official survey records affected are amended as provided by law.

FPA § 4(e) BLM Condition No. 32 – Pesticide-Use Restrictions on Bureau of Land Management Lands

Pesticides may not be used on BLM lands or in areas affecting BLM lands to control undesirable woody and herbaceous vegetation, aquatic plants, insects, rodents, non-native fish, etc., without the prior written approval of BLM. During the Annual Consultation Meeting described in Condition No. 1, the Licensee shall submit a request for approval of planned uses of pesticides for the upcoming year. The Licensee shall provide at a minimum the following information essential for review:

- whether pesticide applications are essential for use on BLM lands;
- specific locations of use;
- specific herbicides proposed for use;
- application rates;
- dose and exposure rates; and
- safety risk and timeframes for application.

Exceptions to this schedule may be allowed only when unexpected outbreaks of pests require control measures that were not anticipated at the time the report was submitted. In such an instance, an emergency request and approval may be made.

Any pesticide use that is deemed necessary to use on BLM lands within 500 feet of known locations of western pond turtles, California red-legged frog, or known locations of BLM Special Status or culturally significant plant populations will be designed to avoid adverse effects to individuals and their habitats. Application of pesticides must be consistent with BLM riparian conservation objectives.

On BLM lands, the Licensee shall only use those materials registered by the U.S. Environmental Protection Agency and consistent with those applied by BLM and approved through BLM review for the specific purpose planned. The Licensee must strictly follow label instructions in

the preparation and application of pesticides and disposal of excess materials and containers. The Licensee may also submit Pesticide Use Proposal(s) with accompanying risk assessment and other BLM required documents to use pesticides on a regular basis for the term of the license as addressed further in Condition No. 7 – Terrestrial Resources Management Plan. Submission of this plan will not relieve the Licensee of the responsibility of annual notification and review.

FPA § 4(e) BLM Condition No. 33 – Modifications of 4(e) Conditions after Biological Opinion or Water Quality Certification

BLM exercises its 4(e) authority by reserving that authority to modify these conditions, if necessary, to respond to any Final Biological Opinion issued for this Project by the National Marine Fisheries Service, United States Fish and Wildlife Service; or any Certification issued for this Project by the State Water Resources Control Board.

FPA § 4(e) BLM Condition No. 34 – Signs

The Licensee shall consult with BLM prior to erecting signs related to safety issues on BLM lands covered by the License. Prior to the Licensee erecting any other signs or advertising devices on BLM lands covered by the License, the Licensee must obtain the approval of BLM as to location, design, size, color, and message. The Licensee shall be responsible for maintaining all Licensee-erected signs to neat and presentable standards.

FPA § 4(e) BLM Condition No. 35 – Ground Disturbing Activities

If the Licensee proposes ground-disturbing activities on or directly affecting BLM lands that were not specifically addressed in the Commission's NEPA processes, the Licensee, in consultation with BLM, shall determine the scope of work and potential for Project-related effects, and whether additional information is required to proceed with the planned activity. Upon BLM request, the Licensee shall enter into an agreement with BLM under which the Licensee shall fund a reasonable portion of BLM staff time and expenses related to the proposed activities.

FPA § 4(e) BLM Condition No. 36 – Use of Bureau of Land Management Roads for Project Access

The Licensee shall obtain suitable authorization for all project access roads and BLM roads needed for Project access. The term of the permit shall be the same as the term of the License. The authorization shall require road maintenance and cost sharing in reconstruction commensurate with the Licensees' use and project-related use. The authorization shall specify road maintenance and management standards that provide for traffic safety, minimize erosion and damage to natural resources, and that are acceptable to BLM.

The Licensee shall pay BLM for its share of maintenance costs or perform maintenance or other agreed to services, as determined by BLM for all use of roads related to project operations, project-related public recreation, or related activities. The maintenance obligation of the Licensee shall be proportionate to total use and commensurate with its use. Any maintenance to be performed by the Licensee shall be authorized by and shall be performed in accordance with

an approved maintenance plan and applicable BMPs. In the event a road requires maintenance, restoration, or reconstruction work to accommodate the Licensee's needs, the Licensee shall perform such work at its own expense after securing BLM authorization.

The Licensee shall complete a condition survey and a proposed maintenance plan subject to BLM review and approval as appropriate once each year. The plan may take the format of a road maintenance agreement provided all of the above conditions are met as well as the conditions set forth in the proposed agreement.

In addition, all BLM roads used as Project Access roads and Right-of-Way access roads shall:

- Have a current condition survey.
- Be mapped at a scale to allow identification of specific routes or segments.
- Have BLM assigned road numbers to be used for reference on the maps, tables, and in the field.
- Have GIS compatible files of GPS alignments of all roads used for Project access be provided to BLM.
- Have adequate signage installed and maintained by the Licensee at each road or route, identifying the road by BLM road number.

FPA § 4(e) BLM Condition No. 37 – Access By The United States

The United States shall have unrestricted use of any road over which the Licensee has control within the project area for all purposes deemed necessary and desirable in connection with the protection, administration, management, and utilization of Federal lands or resources. When needed for the protection, administration, and management of Federal lands or resources the United States shall have the right to extend rights and privileges for use of the right-of-way and road thereon to States and local subdivisions thereof, as well as to other users. The United States shall control such use so as not to unreasonably interfere with the safety or security uses, or cause the Licensee to bear a share of costs disproportionate to the Licensee's use in comparison to the use of the road by others.

FPA § 4(e) BLM Condition No. 38 – Road Use

The Licensee shall confine all vehicles being used for project purposes, including but not limited to administrative and transportation vehicles and construction and inspection equipment, to roads or specifically designed access routes, as identified in the Transportation System Management Plan (Condition No. 16). BLM, as appropriate, reserves the right to close any and all such routes where damage is occurring to the soil or vegetation, or, if requested by Licensee, to require construction by the Licensee to the extent needed to accommodate the Licensee's use. BLM agrees to provide notice to the Licensee and the Commission prior to road closures, except in an emergency, in which case notice will be provided as soon as practicable.

FPA § 4(e) BLM Condition No. 39 – Bureau of Land Management Approval of Final Design

Before any new construction of the Project occurs on Bureau of Land Management lands, the Licensee shall obtain prior written approval of BLM for all final design plans for Project components, which BLM deems as affecting or potentially affecting Bureau of Land Management lands within the Project boundary. The Licensee shall follow the schedules and procedures for design review and approval specified in the conditions herein. As part of such written approval, BLM may require adjustments to the final plans and facility locations to preclude or mitigate impacts and to insure that the Project is either compatible with on-the-ground conditions or approved by BLM based on agreed upon compensation or mitigation measures to address compatibility issues. Should such necessary adjustments be deemed by BLM, FERC, or the Licensee to be a substantial change, the Licensee shall follow the procedures of FERC Standard Article 2 of the license. Any changes to the license made for any reason pursuant to FERC Standard Article 2 or Article 3 shall be made subject to any new terms and conditions of the Secretary of Interior made pursuant to Section 4(e) of the Federal Power Act to address Project effects within the Project boundary.

FPA § 4(e) BLM Condition No. 40 – Unattended Construction Equipment

The Licensee shall not place construction equipment on BLM lands prior to actual use or allow it to remain on BLM lands subsequent to actual use, except for a reasonable mobilization and demobilization period agreed to by BLM.

FPA § 4(e) BLM Condition No. 41 – Maintenance of Improvements

The Licensee shall maintain the improvements and premises on BLM lands within the Project boundary and Licensee adjoining property to standards of repair, orderliness, neatness, sanitation, and safety. For example, trash, debris, and unusable machinery will be disposed of separately; other materials will be stacked, stored neatly, or placed within buildings. Disposal will be at an approved existing location, except as otherwise agreed to by BLM.

FPA § 4(e) BLM Condition No. 42 - Construction Inspections

Within 60 days of planned ground-disturbing activity on or affecting BLM lands, Licensee shall file with the Commission a Safety During Construction Plan that identifies potential hazard areas and measures necessary to address public safety. Areas to consider include construction activities near public roads, trails, and recreation areas and facilities.

Licensee shall perform daily (or on a schedule otherwise agreed to by BLM in writing) inspections of Licensee's construction operations on BLM lands and Licensee adjoining property while construction is in progress. Licensee shall document these inspections (informal writing sufficient) and shall deliver such documentation to BLM on a schedule agreed to by BLM. The inspections must specifically include fire plan compliance, public safety, and environmental protection. Licensee shall act immediately to correct any items found which need correction.

A registered professional engineer or other qualified employee of the appropriate specialty shall regularly conduct construction inspections of structural improvements on a schedule approved by BLM.

FPA § 4(e) BLM Condition No. 43 - Hazardous Substances Plan

Within 1 year of license issuance or prior to undertaking activities on BLM lands the Licensee shall file with FERC a plan approved by BLM for oil and hazardous substances storage and spill prevention and cleanup. In addition, during planning and prior to any new construction or maintenance not addressed in an existing plan, the Licensee shall notify BLM and these entities shall make a determination whether a plan approved by BLM for oil and hazardous substances storage and spill prevention and cleanup is needed. Any such plan shall be filed with FERC.

At a minimum, the plan must require the Licensee to (1) maintain in the Project area, a cache of spill cleanup equipment suitable to contain any spill from the Project; (2) to periodically inform BLM of the location of the spill cleanup equipment on BLM lands and of the location, type, and quantity of oil and hazardous substances stored in the Project area; and (3) to inform BLM immediately of the magnitude, nature, time, date, location, and action taken for any spill. The plan shall include a monitoring plan that details corrective measures that will be taken if spills occur. The plan shall include a requirement for a weekly written report during construction documenting the results of the monitoring.

FPA § 4(e) BLM Condition No. 44 - Use of Explosives

Use of explosives shall be consistent with state and local requirements.

1. The Licensee shall use only electronic detonators for blasting on BLM lands and Licensee adjoining property, except near high-voltage powerlines. BLM may allow specific exceptions when in the public interest.

2. In the use of explosives, the Licensee shall exercise the utmost care not to endanger life or property and shall comply with the requirements of BLM. The Licensee shall contact BLM prior to blasting to obtain the requirements from BLM. The Licensee shall be responsible for any and all damages resulting from the use of explosives and shall adopt precautions to prevent damage to surrounding objects. The Licensee shall furnish and erect special signs to warn the public of the Licensee's blasting operations. The Licensee shall place and maintain such signs so they are clearly evident to the public during all critical periods of the blasting operations and shall ensure that they include a warning statement to have radio transmitters turned off.

3. The Licensee shall store all explosives on BLM lands in a secure manner, in compliance with State and local laws and ordinances, and shall mark all such storage places "DANGEROUS - EXPLOSIVES." Where no local laws or ordinances apply, the Licensee shall provide storage that is satisfactory to BLM and in general not closer than 1,000 feet from the road or from any building or camping area.

4. When using explosives on BLM lands, the Licensee shall adopt precautions to prevent damage to landscape features and other surrounding objects. When directed by the BLM, the Licensee shall leave trees within an area designated to be cleared as a protective screen for surrounding vegetation during blasting operations. The Licensee shall remove and dispose of trees left when blasting is complete. When necessary, and at any point of special danger, the Licensee shall use suitable mats or some other approved method to smother blasts.

FPA § 10(a) BLM RECOMMENDATIONS

FPA § 10(a) BLM Recommendation No. 1 – Conduct Geotechnical Studies at Ward's Ferry Day Use Recreation Area

Within 3 months after License issuance, Licensees should conduct geotechnical studies at the Ward's Ferry Day Use Recreation Area to assist in the design and layout of a safe boating takeout for the public. Licensee will conduct their studies to at least the BLM boundaries upstream of the Ward's Ferry Bridge and 1500 feet downstream of the Ward's Ferry Bridge on the north side and south side of the river in order to determine the stability of the slopes at the Ward's Ferry Day Use facility. BLM suggests the Licensees conduct geotechnical studies beyond the BLM boundaries up stream of the Ward's Ferry Bridge to at least the old bridge abutments and even further upstream on both sides of the river if possible. This is necessary so the BLM can understand how to build a safe boating takeout with an associated access road/ramp at Ward's Ferry.

NPS COMMENTS AND FPA § 10(a) RECOMMENDATIONS

Pursuant to section 10(a) of the FPA (16 USC § 791 et seq.), the NPS's Hydropower Assistance Program, Pacific West Region, offers the following recommendations to enhance recreation opportunities related to the Don Pedro Hydropower Project (P-2299-082). Over the past seven years, the NPS has been actively engaged in advocating for recreational boating flows on the Lower Tuolumne River and safety improvements to the Wards Ferry boating access site. Since the onset of the Don Pedro Project relicensing effort, the NPS has submitted comments to FERC as indicated in the earlier in this letter.

In addition to filing comments, the NPS has also been involved by participating in the Recreation Working Group, assisting Applicants and their contractor in writing study plans, and participating in the second season of field studies. It is based on this extensive involvement that the NPS submits the following comments on the Amendment to the Final License Application (AFLA) for the Don Pedro Hydropower Project.

Comments on the AFLA

Throughout the AFLA, the Applicants claim that the whitewater boating take-out issues experienced at Ward's Ferry Bridge are not project related. This position is illustrated in the following quotes taken from the AFLA:

- *The recreation-related concerns at Ward's Ferry Bridge are not related to the operations of the Don Pedro Project. (Exhibit A, p. 3-5)*
- *The current boating take-out problems experienced at Ward's Ferry are not related to Don Pedro project operations. (Exhibit E, p. 2-16)*
- *Operations do not affect the flows available for whitewater boating, angling or wading in the reaches designated as Wild and Scenic upstream of the Don Pedro Project. Water level fluctuations of the reservoir, by definition, do not affect the Wild and Scenic reaches. The only use of the Don Pedro Project by whitewater boaters is as a location where boaters choose to exit the Tuolumne River, this being at the Ward's Ferry Bridge, a non-Don Pedro Project facility. (Exhibit E, p. 3-287)*

- *The recreation-related concerns at Ward's Ferry Bridge are not related to the operations of the Don Pedro Project. (Exhibit E, p. 3-291)*
- *The current boating take-out problems experienced at Ward's Ferry are not related to Don Pedro project operations. (Exhibit E, p. 5-39)*
- *The congestion and congestion-related challenges experienced at Ward's Ferry Bridge are not related to any Project effects, and the congestion-related issues exist at all reservoir levels. The Ward's Ferry Bridge is not a Project-sponsored recreation site. (Exhibit E, p. 5-68)*

The above statements clearly indicate that the Applicants deny that there is a nexus between the Don Pedro Hydropower Project and recreation-related concerns at Ward's Ferry Bridge. The NPS has argued that such a nexus does exist since filing comments/study requests in response to the Pre-Application Document on June 5, 2011. As such, the NPS's stance is that the Wards Ferry Bridge take-out is located within the Project boundary and should be managed and improved as a Project-related recreational facility. The following comes from page 20 of NPS's study request for a Whitewater Boating Take-Out Adequacy and Feasibility Study:

> ***Criteria 5: Explain any nexus between project operations and effects (direct, indirect, and/or cumulative) on the resource to be studied, and how the study results would inform the development of license requirements.***
>
> *Full pool for the Don Pedro reservoir is 830' elevation. Reservoir/river level at Ward Ferry Bridge varies nominally between around 790' to 828' during the peak boating season (April – August), depending on how the reservoir is operated by the Licensee. Examples: Minimum reservoir level of 693' in 9/92 to maximum of 828' (slightly less than full pool) which is attained in June of many normal water years. There is no question that there is a nexus between project operations and whitewater boating within the project area and its effect on the functionality of the established whitewater boater take-out site at Ward Ferry Bridge and other potential downstream sites. At any of these levels, this site currently is the only practical take-out for boaters at the bottom of the established Main Tuolumne run due to a lack of vehicular access and logistical limitations elsewhere.*
>
> *We maintain that an applicable precedent has been set: FERC recognized whitewater boating as part of the Don Pedro Recreation Agency responsibilities in a License Amendment in 1987 (associated with the increase in electrical generating capacity). Article 52 of that amendment requires woody debris removal for boating at the Wards Ferry Bridge and Article 53 requires that a restroom be added at Wards Ferry. Both of these license conditions are being met.*

The above explains the nexus between project operations and recreation-related concerns at Ward's Ferry Bridge. FERC has indicated agreement with NPS's and other stakeholders' position. FERC's stance is stated in Scoping Document 2 (July 29, 2011), Section 2.3 on page 24 (*emphasis added*):

> ***Comment:*** *The National Park Service, Tuolumne River Trust, and others commented that recreational boating on the upper Tuolumne River may be affected by the project. Specifically, they stated that the whitewater boating*

takeout at Ward's Ferry Bridge, which is in the project boundary, is in disrepair and should be managed and maintained as a project recreational facility.

[FERC] Response: *We agree, the proposed project could have an effect on the whitewater boating takeout and restroom facility at Ward's Ferry Bridge and we have modified section 4.2.5 to address this issue.*

Comment: *The Tuolumne River Trust recommends that project effects on recreation encompass Upper Tuolumne River, above Don Pedro reservoir, and downstream of La Grange dam.*

[FERC] Response: *The proposed project could have an effect on the whitewater boating facilities above Don Pedro reservoir at Ward's Ferry Bridge and we have subsequently modified section 4.2.5. However, there is no evidence that the project affects public recreation facilities downstream of La Grange dam.*

FERC's position that boating take-out facilities at Ward's Ferry Bride are project related is also reflected in their request for additional information regarding the Applicant's proposed developments at that site. In FERC's Additional Information Request/Deficiency Notice, dated 10/27/2017, FERC requested that the Applicants *"itemize all costs associated with implementing the Recreation Resource Management Plan, including the proposed recreation developments at…Ward's Ferry Bridge"* (p. B-2, 3). FERC also asks the applicants to *"revise the Recreation Resource Management Plan to include [drawings and a cost estimate for a whitewater takeout at Ward's Ferry Bridge] and provide a detailed map of the proposed whitewater boating take-out to show the proposed development relative to the project boundary, existing restroom, Ward's Ferry Bridge, and Ward's Ferry Road.* (p. B-4). These requests to include Wards Ferry Bridge take-out facilities in the Recreation Resource Management Plan indicate that the proposed facilities are project-related facilities.

Recommendations (Ward's Ferry Take-out Facility)

The NPS appreciates the opportunity to make the following recommendations relating to the Ward's Ferry take-out facility. These recommendations are meant to be an addition to those proposed by the Applicants in the AFLA.

FPA § 10(a) NPS Recommendation 1: Ensure safety of those participating in recreation activities in proximity of the Ward's Ferry take-out facility

- Any improvements made should serve the access and safety of commercial and non-commercial (i.e., "private") whitewater boaters and all other recreationists (e.g., picnickers, anglers, and swimmers).

- Any continued boom operations at the take-out facility should operate clear of where any recreations are active to avoid potential hazards such as falling boats and gear.

- A law enforcement plan should be developed between Don Pedro Recreation Agency, Tuolumne County, State of California, and the Bureau of Land Management (BLM).

- Any pedestrian trail should be built separated from vehicle access roads to reduce potential vehicle and pedestrian collisions and other mishaps.

- The Don Pedro Recreation Agency (or staff from the BLM or U.S. Forest Service [USFS] funded by the licensees) should oversee the takeout process during the peak boating season (April to October).

- Within one year of License issuance, the Licensees should develop a BLM-approved large woody material plan for BLM-administered lands within the Project boundary. The plan must include at all times a navigable waterway directly downstream of the Tuolumne Wild and Scenic River boundary to the Wards Ferry take-out facility and provide a safe accessible take-out area for whitewater boaters.

Rationale: The improvements proposed above are aimed at providing a safe area for all recreationist visiting Wards Ferry, whether it is to exit the river after a premier whitewater rafting adventure or participate in other river-related activities such as fishing, swimming, or picnicking. The current take-out facility at Ward's Ferry does not provide a safe area for commercials and private boaters to exit the river. The applicants are addressing some of the safety issues by proposing to build a platform that would enable commercial outfitters to retrieve rafts without being on the bridge, thus alleviating bridge and road safety concerns. However, this proposal would not address all safety concerns, especially those related to private boaters as well as passengers on commercial trips who need safe passage off the river and onto awaiting vehicles parked in a secure area. As discussed above in the comments on the AFLA, there is a direct relationship between the Project and the whitewater boating take-out facility at Ward's Ferry, which means that safety at this facility should be addressed by the Applicants as at any other existing Project-related facility.

FPA § 10(a) NPS Recommendation 2: Improve conditions of the Ward's Ferry take-out facility to improve the overall whitewater boating experience

- Day use parking should be developed for up to 25 vehicles of all types off of Wards Ferry road on both sides of the bridge.

- Separate facilities including shade structures and picnic tables should be built for other recreationist to avoid crowding at boating facilities and reduce conflicts.

- The take-out facility should be built for all water levels with motorized vehicle access that safely accommodates six river trips simultaneously exiting the river (of up to 36 rafts at any one time), with a turnaround area about halfway down the access road.

- Restroom facilities should be ADA compliant with at least two toilets and open to all recreationists and other users during the day between April and October, and should be regularly maintained.

- Any use fees should be fair and reasonable for the duration of license. The entire cost of capital improvements should not be amortized and shifted onto users. Any new fees charged to boaters should be reviewed and approved by the USFS and BLM with public input.

Rationale: Whitewater boating on the Tuolumne Wild and Scenic River from Lumsden Bridge to Wards Ferry "provides one of the finest boating experiences in the nation."[1] Unfortunately, this "outstandingly remarkable" recreational value concludes at a less-than desirable take-out facility that takes away from the overall recreational experience. As discussed above in the comments on the AFLA, there is a direct relationship between the Project and the whitewater boating take-out facility at Ward's Ferry, which means that the Project directly impacts the outstandingly remarkable recreational experience provided by the designated Tuolumne Wild and Scenic River. As such, proposed enhancements at the take-out facility at Ward's Ferry should be aimed at reducing adverse effects on the exceptional whitewater boating experience.

FPA § 10(a) NPS Recommendations 3 (Lower Tuolumne River Recreation Flows)

The NPS appreciates the Applicants' commitment to recreation flows on the Lower Tuolumne River; however, the NPS remains concerned over early summer flows below infiltration galleries 1 & 2 at river mile 25.5. Based the NPS's review of the AFLA, the Applicants are proposing eight days of flows at 200 cfs during all year types except critically dry years, when it would drop down to 75 cfs. The AFLA states that those flows would occur on a three-day July 4th weekend, Labor Day weekend, and two additional weekends in July and August.

Ensure consistency in determining flow days and effectiveness in water hyacinth removal

- The three-day July 4th weekend flows should occur on the weekend closest to the day that July 4th falls on. For example, if July 4th falls on a Monday or Tuesday, the 200 cfs three-day flow should be the previous weekend, or if July 4th falls on a Thursday or Friday, the 200 cfs three-day flow should be on the following weekend.

- All measures to remove water hyacinth that render the river non-navigable should be conducted well before the summer recreational flow season.

Rationale: The Lower Tuolumne River below LaGrange Dam offers unique class 1-2 boating opportunities that currently sees very little use because of the lack of scheduled flows and adequate river access. Project operations directly impact flows on the Lower Tuolumne River, thus having a direct impact on related boating opportunities.

SUMMARY

The impacts we seek to ameliorate are addressed in our FPA Section 4(e) conditions, which provide for the protection and utilization of reservation lands used by the Project, and in our recommended conditions, which contain a wide variety of protection, mitigation and enhancement measures to benefit threatened and endangered species, and to address water quality; riparian, floodplain, terrestrial and aquatic habitats; cultural, recreational, and other public resources throughout the Project; and ensure consistency of the Project with comprehensive plans that guide these resources. Incorporation of the Department's Section 18 fishway prescription, our Section 4(e) conditions, and our proposed recommended conditions into any license issued for this Project will help to ensure protection of the Department's trust resources.

[1] https://www.rivers.gov/rivers/tuolumne.php

The USFWS 's concerns regarding any ESA issues associated with the Project should be addressed by the Commission through its compliance with Section 7 of the ESA. The USFWS recommends that the Commission initiate consultation discussions with the USFWS directly to jointly determine information needs to comply with Section 7 of the ESA on this licensing action. If the Commission's staff determines that any of the USFWS Section 10(j) fish and wildlife recommended conditions provided herein are inconsistent with the purposes and requirements of the FPA, then please contact then the Field Supervisor, Fish and Wildlife Service, Bay-Delta Fish and Wildlife Office, 650 Capitol Mall, Room 8-300, Sacramento, California 95814 or at (916) 930-5603 to resolve the inconsistencies prior to issuance of the license. Specific questions or requests for clarification regarding the USFWS submittal may be made to Alison Willy at 916-930-5669.

Incorporation of BLM's FPA Terms into the new license will ensure that the Project does not conflict with the goals of the Sierra RMP. Measures set forth in the Sierra RMP were developed to provide management direction for recreation, cultural, wildland fire, fish and wildlife, and other public resources present on public lands within the Sierra Nevada foothills. The terms, conditions, recommendations and comments developed by BLM support the Sierra RMP and ensure that utilization of power reservation lands for hydroelectric purposes is consistent with the Sierra RMP's requirements and goals. For questions in regard to BLM recommendations and conditions, please contact William Haigh, Mother Lode Field Manager, at (916) 941-3102.

If you have questions regarding comments and recommendations from the NPS, please contact Steve Bowes at 415-623-2321 or Barbara Rice at 415-623-2320.

For all other questions, please contact me at (415) 420-0524.

Sincerely,

Janet L Whitlock

Janet Whitlock
Regional Environmental Officer

FWS Attachments

1. USFWS 2014 Identification of the instream flow requirements for Anadromous fish in the streams within the Central Valley of California and fisheries investigations - Annual progress report fiscal year 2014
2. 2017 National Bald Eagle Management Guidelines
3. USFWS 2008 Draft Rotary Screw Trap Protocol for Estimating Production of Juvenile Chinook Salmon
4. USFWS 1997 Comprehensive Assessment and Monitoring Program (CAMP) Implementation Plan
5. Use Of Cumulative Acre-Days To Evaluate Changes In Floodplain Inundation On The Lower Tuolumne River Under Different Hydrological Regimes And Quantification Of Mitigation Measures

6. Analysis Used For The Large Woody Material Mitigation Measure In USFWS Condition 3: Restore And Enhance Juvenile Salmonid Rearing Habitat In The Lower Tuolumne River
7. CDFW 2012 Central Valley Chinook Salmon In-River Escapement Monitoring Plan
8. USFWS 2017 Bald Eagle Management Plan for Don Pedro Hydroelectric Project

BLM Attachments

1. Aquatic Invasive Species Management and Monitoring Plan
2. Terrestrial Resources Management Plan
3. Bald Eagle Management Plan
4. Recreation Resource Management Plan
5. Fire Prevention and Response Management Plan

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