

Attachment 2

Recommendations

for Flow and Non-Flow Measures

for the Lower Tuolumne River

Submitted by Ten Conservation Groups

to the

Federal Energy Regulatory Commission

January 29, 2018

**California Sportfishing Protection Alliance – Tuolumne River Trust
- Trout Unlimited – American Rivers – American Whitewater -
Merced River Conservation Committee – Friends of the River -
Golden West Women Flyfishers – Central
Sierra Environmental Resource Center – Tuolumne River
Conservancy**

January 29, 2018

By electronic filing

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

Re: Notice of Ready for Environmental Analysis
Don Pedro Hydroelectric Project, FERC Project No. 2299-082
La Grange Hydroelectric Project, FERC Project No. 14581-002

Dear Ms. Bose:

Attached for filing with the Federal Energy Regulatory Commission please find the response to the “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” of California Sportfishing Protection Alliance, Tuolumne River Trust, Trout Unlimited, American Rivers, American Whitewater, Merced River Conservation Committee, Friends of the River, Golden West Women Flyfishers, Central Sierra Environmental Resource Center and Tuolumne River Conservancy (collectively “Conservation Groups”) in the above-captioned proceedings.

Please contact me with any questions.

Respectfully submitted,



Chandra Ferrari
Senior Policy Advisor
Trout Unlimited

Enclosures

Cc: Service List, Project No. 2299-082
Service List, Project No. 14581-002

**UNITED STATES OF AMERICA
FEDERAL ENERGY REGULATORY COMMISSION**

)	
Modesto Irrigation District)	
Turlock Irrigation District)	
)	
Don Pedro Hydroelectric Project)	P-2299-082
La Grange Hydroelectric Project)	P-14581-002
)	

CONSERVATION GROUPS’ COMMENTS AND RECOMMENDATIONS
READY FOR ENVIRONMENTAL ANALYSIS

California Sportfishing Protection Alliance, Trout Unlimited, American Rivers, American Whitewater, Merced River Conservation Committee, Friends of the River, Golden West Women Flyfishers, Tuolumne River Trust, Tuolumne River Conservancy and Central Sierra Environmental Resource Center (hereinafter Conservation Groups) respectfully respond to the Notice of Ready for Environmental Analysis for the relicensing of FERC Project no. 2299, the Don Pedro Hydroelectric, and to the Notice of Ready for Environmental Analysis for the original relicensing for Project no. 14581, the La Grange Hydroelectric Project. Hereinafter, we refer to the Don Pedro Project as “the Project,” and to the La Grange Project as “the La Grange Project.” Both projects are operated by Modesto Irrigation District and Turlock Irrigation District (MID and TID respectively; collectively, Districts or Licensees).¹

The Federal Energy Regulatory Commission (FERC or Commission) has stated its intent to prepare one Environmental Impact Statement (EIS) under the National Environmental Policy Act (NEPA) for the Don Pedro and La Grange licensing proceedings for the sake of efficiency and because the Districts own and operate the Projects in a highly coordinated manner to maximize water supply and power benefits at both Projects.² For similar reasons, including the fact that the Projects cumulatively affect the same resources in the Lower Tuolumne River, we provide one set of comments in response to both notices. Additionally, we provide a suite of recommendations for each Project under the Federal Power Act (FPA).

¹ The Commission issued the “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” for the Don Pedro Hydroelectric Project (eLibrary no. 20171130-3002) on November 30, 2017. It issued the “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” for the La Grange Hydroelectric Project (eLibrary no. 20171130-3003) on November 30, 2017.

² See Scoping Document 2 for the LaGrange Hydroelectric Project, eLibrary no. 20140905-3012.

BACKGROUND

The Projects' facilities are located on the main stem of the Tuolumne River. The Project has a generating capacity of 203 megawatts (MW) and the La Grange Project generates 4.75 MW annually. The Conservation Groups have been active relicensing participants in the relicensing of the Project since before the formal commencement of the Integrated Licensing Process with several of the groups participating in dozens of face-to-face relicensing and/or settlement meetings. Additionally, the Conservation Groups have been active participants in the licensing of the La Grange Project and participated extensively in the pre-licensing proceeding to determine whether the La Grange Project was subject to the Commission's licensing jurisdiction. Key filings in the Don Pedro Project and La Grange Project dockets are noted below.

The Commission found that the La Grange Project was subject to its licensing jurisdiction under Part 1 of the FPA on December 19, 2012.³

The Licensees filed a Request for Rehearing and Motion for Stay Pending Judicial Review on January 18, 2013, arguing that the La Grange Project did not require licensing under the FPA.⁴

The Commission issued an Order on Rehearing, Clarifying Intervention Status and Denying Stay Pending Judicial Review on July 19, 2013.⁵ As part of the Order, the Commission upheld its earlier finding that the La Grange Project was subject to its licensing jurisdiction and declined to determine that the La Grange Project required licensing as part of the Don Pedro Project.

The Licensees filed a Draft License Application for the Don Pedro Project on November 26, 2013.⁶ They filed a Final License Application for the Don Pedro Project on April 28, 2014,⁷ and then filed an Amended Final License Application for the Don Pedro Hydroelectric Project on October 11, 2017.⁸

The Licensees filed a Final License Application for the LaGrange Hydroelectric Project on October 11, 2017.

The Commission issued the "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" for the Projects on November 30, 2017.⁹

³ See eLibrary no.20121221-5131; 141 FERC ¶ 62,211 (2012).

⁴ See eLibrary no. 20121219-3106.

⁵ See eLibrary no. 20130719-3031.

⁶ See eLibrary no. 201311265015.

⁷ See eLibrary no. 20140428-5069.

⁸ See eLibrary no. 20171011-5064.

⁹ The Commission issued the "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" for the Don Pedro Hydroelectric Project (eLibrary no. 20171130-3002) on November 30, 2017. The Commission issued the "Notice of Application Accepted for Filing,

SUMMARY OF KEY COMMENTS AND RECOMMENDATIONS

The Conservation Groups have worked collaboratively with the Licensees and the resource agencies throughout the licensing processes in an attempt to reach agreement on new license measures. The effort clarified many of the disputed issues, but unfortunately did not result in agreement. Most notably, the Licensees' proposal for protecting environmental resources in the lower Tuolumne River is insufficient to mitigate the effects of the Projects. Even though Conservation Groups did not reach agreement with the Licensees, the Conservation Groups' Flow Proposal and non-flow measures (i.e., floodplain recommendations and experimental weir) reflect an attempt to address the concerns articulated by the Licensee in those discussions. We believe they represent balanced measures that will address the Projects' impacts to ecological resources with minimal impact to Licensees' operations. These measures address key issues that have not been adequately addressed in the AFLA.

Conservation Groups recommend that the Districts and the Commission consider the following measures to ensure the legal sufficiency of the Commission's NEPA analysis (*see* 18 C.F.R. § 380.3) and to ensure that the new license is in the public interest and best suited to a comprehensive plan of development for the river consistent with Sections 10(a) and 15 of the FPA (*see* 16 U.S.C. §§ 803(a)(1) and 808).

- 1) Implementation of Conservation Groups' Flow Proposal as a comprehensive mechanism to address impacts to instream resources, strategically and flexibly manage reservoir storage levels and minimize effects to water deliveries.
- 2) Reservation of the National Marine Fisheries Services FPA § 18 authority to prescribe fish passage for spring-run Chinook salmon; re-evaluate in 2026.
- 3) Establishment of the Tuolumne River Technical Advisory Committee (TAC) as the primary forum to conduct post-licensing monitoring, research and consultation.
- 4) Creation of new floodplain habitat along the lower Tuolumne River.
- 5) Addition of gravel to fill in Special Run Pools in the lower Tuolumne River and to maintain spawning habitat.
- 6) Addition of large woody debris to provide salmonid habitat in the lower Tuolumne River.
- 7) Installation of a fish counting weir annually at RM 24, and installation of a temporary weir to capture piscivorous fish in Critically Dry and Super Critically Dry years.
- 8) Construction of a safe and efficient whitewater boating take-out facility and day-use facilities at Ward's Ferry Bridge.
- 9) Consideration of an alternative that analyzes changes to Project operations and condition of aquatic resources in response to Conservation Groups' Flow Proposal and non-flow measures.
- 10) Consideration of an alternative that analyzes changes to Project operations and condition of aquatic resources in response to limiting Delta exports.

Soliciting Motions to Intervene and Protests, Ready for Environmental Analysis, and Soliciting Comments, Recommendations, Preliminary Terms and Conditions, and Preliminary Fishway Prescriptions" for the La Grange Hydroelectric Project (eLibrary no. 20171130-3003) on November 30, 2017.

- 11) Consideration of the cumulative effects of the revised Bay-Delta Water Quality Control Plan, the San Joaquin River Restoration Program, and new Merced River operations on Tuolumne River fisheries and on the Tuolumne River's hydrological resources.

Summary Table A: Summary of Conservation Groups' Recommended Measures.

No.	Name	Notes	Page No.
I	Conservation Groups' Flow Recommendation	Includes water-year types, flows in lower Tuolumne River, irrigation deliveries, Groundwater Water Bank.	6
II	Reservation of FPA § 18 Authority to Require Fish Passage	NMFS reserve authority to issue a fish passage prescription; re-evaluate when NMFS is allowed to prescribe for spring-run salmon in 2026.	46
III	Establish a Restructured Technical Advisory Committee	Re-establish and reform the Tuolumne River TAC as a forum for consultation and coordination with resource agencies, Conservation Groups, and other interested parties on license conditions, monitoring, and annual river operations. Retain an independent consultant to facilitate the TAC.	51
IV	Increase Floodplain Rearing Habitat for Juvenile Salmonids	Lower floodplain surfaces to attain 100,000 acre-days of inundation in AN years, 65,000 ac-days of inundation in BN years, and 36,000 ac-days of inundation in D years OR create 810 acres of new 100% suitable floodplain rearing habitat, whichever is higher. Develop a Floodplain Rearing Habitat Restoration Plan.	55
V	Develop and Implement a Large Woody Debris Placement and Management Plan	Place 1600 pieces of LWD along the lower Tuolumne River from RM 52 to RM 0.	67
VI	Gravel Augmentation and Rehabilitation and Reduction of Habitat for Piscivorous Fish	Annually place 200,000 cu yds of sediment for 10 years to fill Special Run Pools and reduce piscivorous fish holding and spawning habitat. For the term of the license, annually place 2500 cu yds of cleaned spawning size gravel. Update the 2004 Coarse Sediment Management Plan.	71
VII	Annual Fish Counting Weir and Installation of a Temporary Weir to Capture and Remove Non-Salmonid Piscivorous Fish in Critically Dry and Super Critically Dry Water Years	Annually install a temporary fish counting weir at or near RM 24 as done since 2009. In CD and SCD years, install a temporary piscivorous fish removal weir between RM 25.9 and RM 25. Capture and remove striped bass to the San Francisco Bay. Relocate black bass to reservoirs where salmonids are not present.	74

VIII	Ward’s Ferry Bridge Whitewater Take-out	Construct a whitewater boating takeout and day-use recreation facility at Ward’s Ferry Bridge.	82
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SUBSTANTIVE COMMENTS AND RECOMMENDATIONS

I. The Conservation Groups’ Flow Recommendation: A Balanced Approach that Improves Instream Conditions, Minimizes Effects to Water Deliveries and Strategically Manages Reservoir Storage.

A. Conservation Groups’ Flow Proposal: Summary

Conservation Groups recommend a flow condition for the lower Tuolumne River that is based on the following key elements:

- The primary flow compliance point is La Grange gage; secondary compliance point at a gage to-be-determined, no more than 1 mile downstream of the existing Geer Road infiltration gallery (RM 29.9).
- The year-round minimum baseflow requirement at the La Grange gage is 300 cfs.
- The minimum baseflow requirement at the gage downstream of Geer Road infiltration gallery is 200 cfs in July, August and September of each year, and 300 cfs in all other months.
- Licensees will use six water-year types based on 50% exceedance estimated unimpaired flow at La Grange
- Licensees will modify the water-year type within three days of the issuance of Department of Water Resources (DWR) Bulletin 120 in February, March, April, and May.
- Licensees will modify water-year types for specified dry-year and critically-dry-year sequences, as specified.
- Licensees will release 50% of unimpaired inflow to Don Pedro Reservoir to the lower Tuolumne River in specified months in specified water-year types.
- Licensees will release 50% of unimpaired inflow at La Grange February through June in Wet years.
- Licensees will release 50% of unimpaired inflow at La Grange February through May in Above Normal and Below Normal years; Licensees will apply a flow recession in these water years according to a set rampdown schedule, beginning on June 10 of each of these water years.
- Licensees will release 50% of unimpaired inflow at La Grange March through April in Dry years; Licensees will apply a flow recession in these water years according to a set rampdown schedule, beginning on May 10 each of these water years.
- Licensees will substitute a spring 35,000 AF Block of Water flow requirement in place of a percent-of-unimpaired flow requirement in Critically Dry years, and a

- spring 12,500 AF Block of Water flow requirement in place of a percent-of-unimpaired flow requirement in Super Critically Dry years.
- Licensees will release a fall attraction pulse of 20,000 AF in Wet and Above Normal years, 15,000 AF in Below Normal and Dry years, 10,000 AF in Critically Dry years, and 7500 AF in Super Critically Dry years.
 - Licensees will limit irrigation deliveries to a percent of baseline demand in each year, as specified.
 - The City and County of San Francisco (CCSF) will pay for Licensees to construct and operate groundwater recharge facilities, capable of managed recharge of 90,000 AFY, which Licensees will operate as a “Groundwater Water Bank.”¹⁰
 - The Groundwater Water Bank will operate on a system of credits and debits similar in structure to the existing Water Bank arrangement between CCSF and Licensees for storage in Don Pedro Reservoir.
 - The ability of CCSF to debit credits in the Groundwater Water Bank will be limited to dry year sequences and Critically Dry years.

The specific components of this measure are enumerated and described in detail in section (C) below.

B. Conservation Groups’ Flow Proposal: Development

1. Update of the Bay-Delta Water Quality Control Plan

In developing a flow proposal for the lower Tuolumne River, the Conservation Groups attempted to work within the general framework that the State Water Resources Control Board (State Board) 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.¹¹ This framework centers flow requirements on release of a percent of the February-June unimpaired inflow to major San Joaquin tributary reservoirs, including Don Pedro Reservoir on the Tuolumne.

In its “Technical Report on the Scientific Basis for Alternative San Joaquin River Flow and Southern Delta Salinity Objectives” (February 2012, updated June, 2016; “Scientific Basis Report”), the State Board determined:

[H]igher and more variable inflows during the February through June time frame are needed to support existing salmon and steelhead populations in the major SJR tributaries to the southern Delta at Vernalis. This will provide greater connectivity to the Delta and

¹⁰ Conservation Groups understand that the Commission cannot require CCSF to pay for groundwater recharge facilities. However, as discussed *infra*, such payment is the most reasonable resolution to apportioning responsibility between CCSF and the Districts for increased Tuolumne River flows that simultaneously protects public trust resources. As also discussed *infra*, the Commission should analyze this feasible mitigation measure in its NEPA document and compare its combined environmental and economic impacts with other feasible measures.

¹¹ As discussed, *infra*, the State Board has reserved authority to regulate the “control, appropriation, use, or distribution of water used in irrigation or for municipal or other uses,” under FPA section 27. It also has delegated authority under Clean Water Act (CWA) section 401, 33 U.S.C. § 1341, to certify that any discharge from a federally-licensed activity will comply with applicable state water quality standards.

will more closely mimic the flow regime to which native migratory fish are adapted. Water needed to support sustainable salmonid populations at Vernalis should be provided on a generally proportional basis from the major SJR tributaries (Stanislaus, Tuolumne, and Merced Rivers).¹²

. . . A more natural flow regime is anticipated to improve a number of ecosystem attributes such as (but not limited to): 1) native fish communities; 2) food web; 3) habitat; 4) geomorphic processes; 5) temperature; and 6) water quality.¹³

In this Scientific Basis Report, the State Board also cites to its previous finding in *Development of Flow Criteria for the Sacramento-San Joaquin Delta Ecosystem* (Delta Flow Criteria Report), that “approximately 60% of unimpaired flow during the February through June period would be protective of fish and wildlife beneficial uses in the SJR.”¹⁴

The State Board released its first Substitute Environmental Document (SED) for Phase I on December 31, 2012. Numerous parties, including many of the Conservation Groups and the Licensees, submitted extensive comments. The State Board subsequently issued a recirculated SED on September 15, 2016.¹⁵ Generally speaking, the 2016 SED recommended flow objectives for the Tuolumne River as well as the Merced and Stanislaus rivers that required release of 30-50% of the February-June unimpaired flow in each river, with a beginning value of 40%. Again, numerous parties commented on the SED, including many of the Conservation Groups and the Licensees. The State Board intends to issue a final SED and to adopt water quality objective (including Tuolumne River flow) in the spring of 2018.

The Conservation Groups note that both iterations of the SED required rigid adherence to the same percent-of-unimpaired flow requirements in all of the same months across all years. This uniform adherence limits the opportunity to realize the full benefits of February-June flows in wetter years because identical percentages would cause the Tuolumne system to run out of water in dry years. Conservation Groups decided to use the water-balance model developed by the Districts and CCSF for the relicensing to incrementally evaluate different percentages of unimpaired flow requirements for the lower Tuolumne River in all or just some of the February-June months. We also reviewed the model runs of the Base Case or existing condition performed by consultants to the Districts and CCSF. This analysis informed our flow recommendations.

¹² State Water Resources Control Board, “*Technical Report on the Scientific Basis for Alternative San Joaquin River Flow and Southern Delta Salinity Objectives*” (“Scientific Basis Report,” updated June, 2016). Appendix C of the Substitute Environmental Document for Phase I of the update of the Bay-Delta Water Quality Control Plan. p. 3-1. Available at:

https://www.waterboards.ca.gov/waterrights/water_issues/programs/bay_delta/bay_delta_plan/water_quality_control_planning/2016_sed/docs/appx_c.pdf

¹³ *Id.*, p. 3-41.

¹⁴ *Id.*, p. 3-53. *Development of Flow Criteria for the Sacramento-San Joaquin Delta Ecosystem* (“The Delta Flow Criteria Report”) is available at:

http://www.waterboards.ca.gov/waterrights/water_issues/programs/bay_delta/deltaflow/docs/final_rpt080310.pdf.

¹⁵ Available at:

https://www.waterboards.ca.gov/waterrights/water_issues/programs/bay_delta/bay_delta_plan/water_quality_control_planning/2016_sed/index.shtml

2. Modification of the Don Pedro Water Balance Model

The water balance model that the Districts provided to relicensing participants did not initially have the capability to allow Conservation Groups to do an iterative analysis of various different scenarios that apply a percent-of-unimpaired flow requirement. Notably, the model did not allow variable irrigation deliveries, the ability to easily change water year type, or the ability to easily model monthly flow requirements. Over the course of about two years, staff from the California Sportfishing Protection Alliance (CSPA) made several requests of District staff and their consultants to modify the model to allow such capability. After a series of non-affirmative answers, CSPA approached technical staff at the San Francisco Public Utilities Commission (SFPUC) about making such modifications.¹⁶ In June, 2017, CSPA met with SFPUC staff, the modeling consultant to the Districts and CCSF, staff from MID and staff from the Bay Institute (TBI) to discuss desired modifications. In September, 2017, SFPUC delivered to CSPA and TBI a model with an added “dashboard” that allowed CSPA and others to model various scenarios. These scenarios included combinations of flows based in part on a percent of unimpaired flows in specified months, variable water-year types, and changes in irrigation deliveries. We view this as an important step in the collaborative process.

3. Broader Context of Conservation Groups’ Flow Proposal

a. Hydrology and System Demands

With an average annual unimpaired flow of just under 2 million acre-feet (MAF), the Tuolumne River is the largest tributary to the San Joaquin River. The watershed is also storage rich: Don Pedro Reservoir stores about 2 MAF of water.¹⁷ CCSF’s Hetch Hetchy Reservoir stores 360,000 acre-feet (AF), Cherry Reservoir (Lake Lloyd) stores 273,000 AF, and Lake Eleanor stores 26,000 AF.¹⁸

There is also much demand on the watershed. Combined annual average diversion demand by the Districts is about 900,000 AF. CCSF exports on average about 250,000 AF to the Bay Area annually.¹⁹

Required flows in the lower Tuolumne River are meager: on average, 21% of the February-June unimpaired flow is released into the lower Tuolumne, and only 40% of the average annual flow is released.²⁰ The largest maximum required annual flow release in any given year is 300,923 AF, the smallest required annual flow release is 94,000 AF, and the required annual flow release on a 50% exceedance basis is 165,000 AF.²¹

¹⁶ The SFPUC is the water purveyor within the City and County of San Francisco. SFPUC wholesales water outside San Francisco to Bay Area water agencies through the Bay Area Water Supply and Conservation Agency (BAWSCA). SFPUC tends to represent BAWSCA on policy issues. CCSF represents SFPUC on legal issues through the City Attorney’s office.

¹⁷ Don Pedro relicensing Pre-Application Document, p. 3-3.

¹⁸ *Id.*, p. 4-10.

¹⁹ *Id.*, p. 4-8.

²⁰ Scientific Basis Report, Table 2.20.

²¹ 1995 Settlement Agreement.

Looking at the required releases somewhat differently, actual February-June release from La Grange was equal to or less than 10% of the unimpaired February-June flow in 18 of the 45 water years from 1971 through 2015; equal to or less than 20% of the unimpaired February-June flow in 29 of the 45 water years from 1971 through 2015. In only 8 of the 45 water years from 1971 through 2015 did actual February-June flow at the La Grange gage equal or exceed 50% of the February-June unimpaired flow.²²

b. Role and Interests of the City and County of San Francisco

On July 16, 2009, the Commission issued an “*Order on Rehearing, Amending License, Denying Late Intervention, Denying Petition, and Directing Appointment of a Presiding Judge for a Proceeding on Interim Conditions.*”²³ During the subsequent informational Proceeding on Interim Conditions, resource agencies and Conservation Groups advocated that FERC require, until relicensing, a year-round flow release requirement of 275 cfs at the La Grange gage, with an added requirement to meet certain water temperatures. The Districts and CCSF opposed this proposed flow increase. At that time, the Districts and CCSF had not developed (or at least not made public) the water balance model that they later developed for relicensing. In addition, the HEC-5Q water temperature model that would later be available to the agencies had just been developed. Agencies and NGO’s were thus in 2009 limited in the tools available to test various flow scenarios.

One of the main lines of argument that developed in 2009 against interim flow increases was that the increases would cause water shortages in the Bay Area during drought and thus rain draconian economic impacts on the economy of the San Francisco Bay Area. CCSF developed and expanded this line of argument in the 2012-2013 and 2016-2017 workshops, hearing, comments and public statements on the State Board’s SED for Phase I of the update of the Bay-Delta Plan. The water supply of CCSF and its wholesaler the Bay Area Water Supply and Conservation Agency (BAWSCA) is not directly implicated in relicensing. However, CCSF has historically interpreted the Fourth Agreement between CCSF and the Districts to mean that CCSF is contractually responsible for 51% of any flow increases that the Commission may require in relicensing. Both the Districts and CCSF have consistently pointed out the potential economic impacts of this contractual arrangement.

As stated *infra*, the Fourth Agreement is a contractual agreement between the Licensees and CCSF. As such, it cannot be read to limit the authority of the Commission or the State Board to condition the licenses in order to assure compliance with the FPA and CWA, respectively. Acceptance of CCSF’s predicted economic impacts as immutable fact would leave Conservation Groups, resource agencies and potentially the Commission and the State Board in the apparent position of either acceding to unreasonable anemic flows in the lower Tuolumne River or unreasonable advocacy of economic risk in the face of drought.

It is unclear whether the Districts and CCSF are constrained by law from proposing a way out of this Hobson’s choice of their own making. What is clear is that each of the parties has in practice prioritized good faith in supporting the Fourth Agreement over consideration of a

²² SFPUC document distributed at stakeholder meeting, February 10, 2017.

²³ ELibrary no. 20090716-3060.

solution outside the letter of the Fourth Agreement that would reduce potential economic impacts to the Bay Area of increased flow in the Tuolumne River. In response, Conservation Groups propose a reasonable and feasible solution to the potential water supply impacts of increased lower Tuolumne River flows on the City and County of San Francisco. Our proposed solution is similar to the existing Water Bank arrangement in Don Pedro Reservoir that maintains the seniority of the Districts' water rights but that in this instance does not rely on protecting water rights priority at the expense of public trust resources.

c. Flow Negotiations for the Lower Tuolumne River 2012-2017

Since 2012, there have been at least three separate venues established whose scope included the negotiation of flows for the lower Tuolumne River. The first was established at the initiative of the California Resources Agency in 2012 as a prospective venue to resolve flows in each of the major San Joaquin tributaries. The second was a negotiation established by some of the Don Pedro relicensing participants in 2014 to negotiate issues relating specific to the Tuolumne River. The third was a negotiation established by the California Resources Agency to negotiate flow in the San Joaquin tributaries, as part of a broader effort to negotiate "voluntary agreements" throughout the Sacramento and San Joaquin river watersheds and the Bay-Delta estuary as an alternative to having the State Water Board set flow objectives in the various phases of the update of the Bay-Delta Water Quality Control Plan.

All of these negotiations were subject to confidentiality, non-disclosure and/or non-attribution agreements. None of them has reached negotiated settlement. None of them has directly produced usable work product that Conservation Groups or others can draw from verbatim in analysis or in direct support of flow proposals for REA comments or recommendations.²⁴

One of the consequences of the shift to confidential negotiations was that informal mutual explorations of potential flow scenarios, using a water balance model developed for relicensing, largely did not take place in the Don Pedro relicensing. This is the exception, not the rule in recent California relicensings. In both the Merced River Project relicensing and the Yuba River Development Project relicensing, there was considerable non-confidential discussion and analysis by relicensing participants of flow scenarios proposed by different entities.

In the relative absence of flow discussions in relicensing, public statements regarding impacts of increasing lower Tuolumne River flows have assumed a greater market share in the dialogue among relicensing participants. Much of this public advocacy has concerned the flows proposed in the State Water Board's Phase I of the update of the Bay-Delta Plan. The fuel for this dialogue is far more rhetorical than technical.

One glimpse of middle ground in the tone of ongoing dialogue has been a series of discussions between Conservation Groups and representatives of the San Francisco Public Utilities Commission (SFPUC). Following some relatively contentious disagreements and

²⁴ However, various technical staff from NGO's and agencies who were initially gathered to support the San Joaquin negotiation that began in 2012 started a collaborative group that developed the Scientific Evaluation Process Report, discussed *infra* and included as Attachment 3 to these comments.

discussions of documents in public meetings in 2016 and 2017, staff from SFPUC and from the Conservation Groups agreed that the dialogue would improve if it were grounded in a common set of technical tools that were not themselves in dispute. It was as a result of this dialogue that SFPUC staff agreed to modify the Don Pedro water balance model, as described in section (B)(2) above.

C. Conservation Groups' Flow Proposal for the Lower Tuolumne River

1. Water Year Types

Water year types shall be based on the DWR Bulletin 120 50% exceedance estimated annual unimpaired flow of the Tuolumne River at the La Grange gage, as shown in Table 1.

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

Water Year Type	Thousands of Acre Feet
Wet	Equal to or greater than 2725
Above Normal	Equal to or greater than 2000 and less than 2725
Below Normal	Equal to or greater than 1400 and less than 2000
Dry	Equal to or greater than 1075 and less than 1400
Critically Dry	Equal to or greater than 830 and less than 1075
Super Critically Dry	Less than 830 TAF

The water year type shall be modified when multiple dry and critically dry year water year types occur in sequence as follows:

- If a Dry year (according to inflow) is immediately preceded by any combination of two or more Critically Dry or Super Critically Dry years, it becomes a Critically Dry year.
- If a Critically Dry year (according to inflow) is immediately preceded by a Critically Dry year, it becomes a Super Critically Dry year.

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.

Because DWR Bulletin 120 is typically not released until about the 10th of the month in February, March, April and May, the flow requirement for each of these months will extend into the following month. 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.

2. Streamflow Compliance Points and Compliance

The primary compliance point for flow measurement for the lower Tuolumne River shall be the La Grange gage (USGS 11289650).

Because Licensees propose to establish a new point of diversion at the to-be-completed infiltration gallery at RM 29.9 just downstream of Geer Road, licensees must install a new “Downstream” compliance gage capable of measuring streamflow downstream of the new diversion. To reasonably limit the influence of accretions and depletions between the new diversion and the Downstream gage, the Downstream gage should be no more than 1 mile downstream of the new diversion.

In the months of October through June, the flow requirement at La Grange shall also be the flow requirement at the Downstream gage. If the Districts divert water at the new diversion (infiltration gallery) in the October through June time period, they must release sufficient extra water past the upstream La Grange gage such that the diversion at the infiltration gallery does not drop the streamflow at the Downstream gage below the required flow value for the La Grange gage.

In the months of July through September, the minimum instream flow requirement at the La Grange gage shall be 300 cfs. In the months of July through September only, the Districts may divert water at the infiltration gallery such that the flow at the Downstream gage meets a minimum value of 200 cfs.

When the minimum streamflow requirement is a specific number, minimum streamflows 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 addition, 15-minute flows shall not be less than the applicable flow requirement for more than 48 consecutive hours.

When the minimum streamflow requirement is stated as a percent of unimpaired flow, Licensee shall release the percent of unimpaired 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.

3. February-June Flows

a. Wet years

1. Meet 50% of February-June unimpaired flow at the La Grange gage.
2. 300 cfs at the La Grange gage is a February-June default floor value if 50% of unimpaired drops below 300 cfs in February-June in a Wet year.
3. Allowed irrigation deliveries in a Wet year are 100% of demand, 90,000 AF of which shall be managed recharge deliveries to the Groundwater Water Bank, as described *infra*.

b. Above Normal (AN) years

1. Meet 50% of February-May unimpaired flow at the La Grange gage.
2. 300 cfs at the La Grange gage is a February-May default floor value if 50% of unimpaired drops below 300 cfs in February-May in an AN year.
3. Allowed irrigation deliveries in an AN year are 90% of demand, 90,000 AF of which shall be managed recharge deliveries to the Groundwater Water Bank if July 1 Don Pedro storage is greater than 1.6 MAD, as described *infra*.
4. Apply a managed flow recession in AN years according to a set rampdown schedule beginning on the final day of any water year on which minimum flows are determined by a percent of unimpaired flow (approximately June 13).
5. If recession flow drops to 300 cfs prior to the end of June, the minimum instream flow for the remainder of June is 300 cfs at the La Grange gage.

c. Below Normal (BN) years

1. Meet 50% of February-May unimpaired flow at the La Grange gage.
2. 300 cfs at the La Grange gage is a February-May default floor value if 50% of unimpaired drops below 300 cfs in a BN year.
3. Allowed irrigation deliveries in a BN year are 80% of demand.
4. Apply a managed flow recession in BN years according to a set rampdown schedule beginning on the final day of any water year on which minimum flows are determined by a percent of unimpaired flow (approximately June 13).
5. If recession flow drops to 300 cfs prior to the end of June, the minimum instream flow for the remainder of June is 300 cfs at the La Grange gage.

d. Dry years immediately preceded by a Wet, AN, BN, Dry, or single Critically Dry year

1. Minimum instream flow in February is 300 cfs at the La Grange gage.
2. Meet 50% of March-April unimpaired flow at the La Grange gage.
3. 300 cfs at the La Grange gage is a March-April default floor value if 50% of unimpaired drops below 300 cfs in March-April in a Dry year.
4. Allowed irrigation deliveries in a Dry year are 80% of demand.
5. Apply a managed flow recession in Dry years according to a set rampdown schedule beginning on the final day of any water year on which minimum flows are determined by a percent of unimpaired flow (approximately May 13).
6. If recession flow drops to 300 cfs during May or June, the minimum instream flow for the remainder of May and/or June is 300 cfs at the La Grange gage.

e. Dry years immediately preceded by two Critically Dry (CD) years

1. Dry years immediately preceded by two CD years will be considered to be CD years.

f. Critically Dry (CD) years

1. February-June required flow is 300 cfs at the La Grange gage.
2. Provide an additional 35,000 acre-feet of water for pulse flows in the March 15 through April 15 period, with release specifics to be determined by an implementation committee.²⁵
3. Allowed irrigation deliveries in a Critically Dry year are 75% of demand.

g. Super Critically Dry (SCD) years (including CD years immediately preceded by a CD year)

1. February-June required flow is 300 cfs at the La Grange gage.
2. Provide an additional 12,500 acre-feet of water for pulse flows in the March 15 through April 15 period, with release specifics to be determined by an implementation committee.
3. Irrigation deliveries in a Super Critically Dry year are 70% of demand.

4. July-September flows

1. July-September required flow in all water year types is 300 cfs at the La Grange gage.
2. July-September required flow in all water year types is 200 cfs at a gage one mile or less downstream of the Geer Road infiltration gallery (“Downstream gage”).

5. October-January minimum flows

1. October-January required flow in all water year types is 300 cfs at the La Grange gage.

6. October or November pulse flows for salmon attraction

1. Licensees will release fall pulse flows to attract salmon, with release specifics to be determined by an implementation committee.²⁶ Flow volumes of pulse flows in addition to October baseflow volume shall be 20,000 AF in Wet and AN years, 15,000 AF in BN and Dry years, 10,000 AF in CD years, and 7,500 in SCD years.

7. Recession Flows in AN, BN, and Dry Years

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.

²⁵ See Conservations Groups’ Recommendation, *infra*: Establish a Tuolumne River Technical Advisory Committee.

²⁶ The model run for this flow proposal assumes that this pulse takes place in the second half of October.

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 2 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.
6. If there are flood releases on the day that the recession is to be initiated, or Licensees must make flood releases in excess of the prescribed value for any given day in the flow recession sequence, Licensees shall reinitiate the flow recession once flood control requirements allow Licensees to resume the recession. In such case, Licensees shall resume the flow recession using the highest flow at which Licensees can maintain system control as the new Recession Initiation Flow Value.

Table 2: 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

8. Groundwater Water Bank: Water Bank Expansion and Accounting

1. The Conservation Groups' flow proposal generally assumes that the City and County of San Francisco will be responsible for its commitments to the Districts per the Fourth Agreement.
2. The Conservation Groups propose a suite of measures that keep the Water Bank from going negative and also helps to preserve CCSF's Total System Storage at a level where CCSF can limit the frequency of water rationing.
3. The primary physical feature of Conservation Groups' proposal regarding the Fourth Agreement responsibility of CCSF is the construction by the Districts, at CCSF's

expense, of managed groundwater recharge facilities capable of recharging 90,000 AF a year in the MID and TID service areas.

4. Conservation Groups propose to use water recharged in these facilities as a Groundwater Water Bank (GWWB) that would serve as a supplement to the existing Water Bank in Don Pedro Reservoir.
5. The GWWB would be managed with the explicit purpose of CCSF planning for and managing dry year sequences, Critically Dry and Super Critically Dry water years.
6. Actual recharge using GWWB facilities would take place in Wet and in AN years in which July 1 Don Pedro storage is greater than 1.6 MAF. CCSF would receive GWWB credits in Wet years without debiting the (Don Pedro) Water Bank. CCSF would get 90 TAF of GWWB credit in AN recharge years and would debit the (Don Pedro) Water Bank 90 TAF on September 30 at the end of the AN recharge year. CCSF would be allowed to transfer credits from the GWWB to the (Don Pedro) Water Bank in the second year of BN/Dry year sequences, in CD years, and in SCD years, according to the amounts shown in Table 3 below:

Table 3: Groundwater Water Bank

Year type	Recharge	Surface Deficit (Districts)	Credit to CCSF		Debit to CCSF	
			To WB	To GWWB	From WB	From GWWB
Wet	90 TAF	0		90 TAF	*	
AN (if 7/1 DPS>1.6 MAF)	90 TAF	90 TAF	0	90 TAF	90 TAF**	
AN (if 7/1 DPS<1.6 MAF)	0	90 TAF	0	0	0	0
First BN or Dry	0	180 TAF	0	0	0	0
Second or more BN or Dry	0	180 TAF	90 TAF***	0	0	90 TAF***
CD (note: second CD yr is SCD by def.)	0	225 TAF	90 TAF****	0	0	90 TAF****
SCD	0	270 TAF	180 TAF*****	0	0	180 TAF*****

*Recharge water in Wet years is presumed to be from flood flows. CCSF receives the 90 TAF credit in the GWWB in Wet years for having built the recharge facilities.

** Water for recharge in AN years is debited from Water Bank and credited to GWWB. Debit from Water Bank occurs September 30 at the end of the water year.

*** In second (or more) consecutive BN/Dry year, CCSF will have the discretion to credit Water Bank with up to 90 TAF from the GWWB. This transfer of credits can take place any time from June 1 to July 1.

**** In a first CD year (CD year not immediately preceded by a CD year), CCSF will have the discretion to credit Water Bank with up to 90 TAF from the GWWB. This transfer of credits can take place any time from June 1 to July 1.

***** In an SCD year, CCSF will have the discretion to credit Water Bank with up to 180 TAF from the GWWB. This transfer of credits can take place any time from April 1 to July 1.

D. Modeling Notes

Conservation Groups modeled the flow proposal above as closely as reasonably possible using the Don Pedro water balance model as modified by CCSF/District consultant, with the added “dashboard” as described above. We present the results of this modeling as Attachments 1 and 2 to this document.²⁷

1. Water-Year Types and their Application

- a. In the Conservation Groups’ flow proposal, Licensees would adjust the water-year types based on the 50% exceedance estimated unimpaired inflow to La Grange as given in the February, March, April, and May DWR Bulletins 120. However, the Don Pedro water balance model as currently configured (with modified “dashboard”) does not allow adjustment of the water-year type on a monthly basis, although CSPA did request this modification in the interest of accuracy. As presented, the model uses perfect foresight to define the water-year type for any given year. In running the model for the Conservation Groups’ flow proposal, we thus initially let the model define each year according to the final actual inflow. However, we modified some the water year-types according to rules we defined in the flow proposal, as described below.
- b. In the Conservation Groups’ flow proposal, February flow requirements would begin within three days of the issuance of the February DWR Bulletin 120 (flows from January would continue until about February 10). Each subsequent month, Licensees would evaluate the water-year type for the month based on DWR Bulletin 120, and make the change within three days. The final year type determination will be based on the May DWR Bulletin 120. Since the monthly increments in the model as currently configured begin on the 1st of each month, this model run assumes that the water-year type for each year initiates on February 1. Changing the model so that it made an adjustment on about February 10, March 10, April 10 and May 10 would be more accurate, but would have added a level of difficulty and complexity. This is a potential model refinement.
- c. Recognizing that Dry and Critically Dry year sequences create greater limitations on water available for all uses than do single Dry or Critically Dry years, CSPA requested that the model allow manual adjustment of water-year types. This allowed response to the 1987-1992 drought sequence in particular. Conservation Groups created rules governing Dry and Critically Dry year sequences in our flow proposal, then manually adjusted water-year types in 1989, 1990, 1991 and 1992 to reflect those rules.

²⁷ Attachment 1 run is model output from a run that assigns Fourth Agreement responsibility to CCSF. Attachment 2 is a second model run that does not assign Fourth Agreement responsibility to CCSF. The two runs are presented to allow comparison of such values as Water Bank and CCSF Total System Storage. Other than the treatment of CCSF’s responsibility, these runs are identical. See modeling notes, *infra*. These Excel files contain hundreds of thousands of data points and cannot be served by surface mail.

2. Caps on Required Flows

- a. On the WY Type tab of the modified Don Pedro water balance model, there is an input that places a cap on the maximum flow that a percent-of-unimpaired flow requirement can require. CCSF/Districts' modeler set default value for this cap at 5000 cfs. The model will allow releases to exceed this cap only during flood releases. The graphic output shows that this cap does come into play with some frequency, particularly in Wet and AN water years. Conservation Groups modeled our flow proposal with this cap set at 5000 cfs. In part, this was to respect the limits of Districts' power generating capacity. In part, this was out of consideration of the desirability to avoid minor flooding events.
- b. During subsequent analysis, it came to our attention that a 2004 report identified 5500 cfs as the threshold for bedload movement in the primary spawning reaches of the lower Tuolumne River.²⁸ There may be geomorphic desirability of managing flows to meet this threshold with some frequency. Therefore, it is possible that a slightly higher cap, such as 6000 cfs, may have significant instream benefits.
- c. Increasing the cap to a value such as 6000 would likely cause a slight reduction in power generation compared to the present model run. It is unlikely that increasing the cap would affect the annual water balance in any given year, but it is likely that it would slightly reshape the winter-spring hydrograph in the lower Tuolumne River.

3. Averaging of Spring Pulse Flows in Critically Dry and Super Critically Dry Years

- a. In Critically Dry and Super Critically Dry years, a block of water for pulse flows would be applied in the spring instead of a percent of unimpaired flow. In modeling these pulse flows, Conservation Groups averaged the flows over then entire month of April to account for these blocks of water. To meet the 35,000 AF spring annual block flow in CD years, this model run increases April daily flows from 300 cfs to 890 cfs. To meet the 12,500 AF spring annual block flow in SCD years, this model run increases April daily flows from 300 cfs to 510 cfs.
- b. Insertion of a time series or of alternative time series would more accurately portray options for the shape of spring pulses.

4. Averaging of Fall Pulse Flows

- a. In each year, Licensees are required to release fall pulse flows for salmon attraction. The volume of water dedicated to fall pulse flows varies by water year type. In modeling fall pulse flows, Conservation Groups added the volume of the block of water allocated for fall pulse flows to the required minimum instream flow in October, and averaged the resulting flow totals over then entire month of October to account for these blocks of water.
- b. Insertion of a time series or of alternative time series would more accurately portray options for the shape of fall attraction pulses.

²⁸ McBain & Trush, *Coarse Sediment Management Plan For The Lower Tuolumne River*, Revised Final, July 2004
http://tuolumnerivertac.com/Documents/7-2004_Revised_CSMP_Report.pdf

5. Application of the Spring Recession in AN, BN and Dry Years

- a. Because this model run does not incorporate the delay in the issuance of DWR Bulletin 120 and assumes that flow changes in February-May initiate on the first of the month rather than about the 10th of the month, this model run assumes that the flow recession in AN and BN years initiates on June 1, and that the flow recession in Dry years initiates on May 1.
- b. The intent is that the full recession be implemented, starting from the Recession Initiation Flow Value and continuing to baseflow, even if the duration of the recession bleeds into a second month.

6. Application of Diversion at Geer Road Infiltration Gallery

- a. The Don Pedro water balance model as currently configured (with modified “dashboard”) does not include a point of diversion at the Geer Road infiltration gallery.
- b. Conservation Groups’ flow proposal requires a July-September release of 300 cfs at La Grange but allows the diversion of 100 cfs of that release at the infiltration gallery.
- c. In order to most accurately account for the water balance, Conservation Groups modeled the instream flow requirement for July-September as 200 cfs (at the La Grange gage).
- d. Any (future) water temperature modeling or habitat modeling that is based on a flow of 200 cfs upstream of Geer Road will be inaccurate, because the required flow between the La Grange gage and Geer Road will actually be 300 cfs.

7. Application of Reduced Irrigation Deliveries

- a. Modeling of Conservation Groups’ flow proposal applies diversion limitations on the Districts on an annual basis by calendar year. Generally, the irrigation season begins in March and ends in October. Water availability for irrigation deliveries in October are much more dependent on antecedent conditions from the previous water year (water years end September 30) than on October precipitation.
- b. Modeling of Conservation Groups’ flow proposal does not distinguish between Municipal and Industrial deliveries and irrigation deliveries to Modesto Irrigation District, though one can imagine that MID’s urban customers might be accorded preference over MID’s agricultural customers. In terms of assigning shortages to the Districts, Conservation Groups left that up to the default settings in the Don Pedro water balance model.
- c. An alternative method of limiting irrigation diversions would be to set storage targets for the end of September or the end of October. The model as it currently exists does not allow a requirement for a carryover storage target that would trigger changes in other operating rules. In any event, constraining diversions with carryover storage requirements tends to drive storage to the minimum allowed level. This does not promote smart planning. It is our observation that the District don’t operate that way in the current condition.

8. Modeling the Water Bank and CCSF's Contribution to Increased Streamflow

- a. The Don Pedro water balance model as currently configured has a Fourth Agreement toggle switch on the User Input tab that either assigns 51% of the responsibility for flow increases (“On”) or zero percent of the responsibility (“Off”) to CCSF. Conservation Groups ran our flow proposal both ways in order to compare, leaving all else identical save the Fourth Agreement toggle switch.
- b. The Don Pedro water balance model contains a macro that seeks to keep the Water Bank from going negative. Conservation Groups ran this macro for our flow proposal with the Fourth Agreement toggle switch “On,” but this drained reservoirs and crashed the model. Conservation Groups ran this macro for our flow proposal with the Fourth Agreement toggle switch “Off,” and the model resolved the few instances in which the Water Bank went negative.
- c. The Conservation Groups’ modeled flow proposal with Fourth Agreement toggle “On” (“with San Francisco”) thus leaves the Water Bank negative in some years during the 1987-1994 time period. The Conservation Groups’ modeled flow proposal with Fourth Agreement toggle “Off” (“without San Francisco”) uses the model to keep the Water Bank from going negative.
- d. Conservation Groups recognize the importance of not letting the Water Bank go negative. The proposal for a Groundwater Water Bank to supplement the Water Bank is an effort to keep the Water Bank positive. Conservation Groups manually estimated the Groundwater Water Bank balance as it would likely be applied, and believe that its implementation as proposed would prevent a negative Water Bank.
- e. The modeling of the irrigation diversions in Conservation Groups’ modeled flow proposal assumes that 100% of irrigation deliveries would be made in Wet water years, but the proposal is that 90,000 AF of these deliveries would go to the Groundwater Water Bank for groundwater recharge rather than irrigation. The water balance for total irrigation deliveries in Wet years (including Don Pedro storage) is thus correct, but the amount available in irrigation tables is overstated by 90,000 AF. The balance in the Don Pedro Water Bank for Wet water years is correct.
- f. The modeling of irrigation diversions in Conservation Groups’ modeled flow proposal assumes that 90% of irrigation deliveries would be made in Above Normal water years. However, the proposal is also that 90,000 acre-feet of the remaining allocated water go to the Groundwater Water Bank for groundwater recharge rather than for irrigation in AN years when Don Pedro storage on July 1 is greater than 1.6 MAF. The amounts shown as available for irrigation in the irrigation tables for years in AN years and for end-of-September Don Pedro Water Bank balance 1973, 1974, 1975, 1984 and 1999 is thus overstated by 90,000 AF. Don Pedro Water Bank balance is correct for 1993, when Don Pedro storage on July 1 was less than 1.6 MAF.
- g. In order to model the Groundwater Water Bank in the Don Pedro water balance model, it would be necessary to modify the Fourth Agreement toggle to allow its modification by a time series. Such modification is a potential future action. In the meantime, we reproduce below a table that shows how CCSF might potentially accumulate credits and debits in the Groundwater Water Bank (GWWB), and how those credits and debits would affect the Don Pedro Water Bank (DPWB).

**Table 4: Don Pedro Water Bank/Groundwater
Water Bank Debit/Credit Scenario 1971-2012 (TAF)**

Year	Credit to DPWB	Credit to GWWB	Debit from DPWB	Debit from GWWB
1971	0	0	0	0
1972	0	0	0	0
1973	0	90	90	0
1974	0	90	90	0
1975	0	90	90	0
1976	90	0	0	90
1977	90	0	0	90
1978	0	90	0	0
1979	0	0	0	0
1980	0	90	0	0
1981	0	0	0	0
1982	0	90	0	0
1983	0	90	0	0
1984	0	90	90	0
1985	0	0	0	0
1986	0	90	0	0
1987	0	0	0	0
1988	180	0	0	180
1989	0	0	0	0
1990	180	0	0	180
1991	90	0	0	90
1992	90	0	0	90
1993	0	0	0	0
1994	0	0	0	0
1995	0	90	0	0
1996	0	90	90	0
1997	0	90	0	0
1998	0	90	0	0
1999	0	90	90	0
2000	0	0	0	0
2001	0	0	0	0
2002	90	0	0	90
2003	90	0	0	90
2004	90	0	0	90
2005	0	90	0	0
2006	0	90	0	0
2007	0	0	0	0
2008	180	0	0	180
2009	0	0	0	0
2010	0	0	0	0
2011	0	90	0	0
2012	0	0	0	0
Total	1170	1530	540	1170

E. Rationale for Conservation Groups' Flow Recommendation

1. Hydrology and water supply management: Districts

In 2012, Modesto Irrigation District considered a “Comprehensive Water Resources Management Plan” that would potentially have involved the sale of water to CCSF. Revenues from the sale of water would have been used to make various water delivery infrastructure improvements. A public presentation in support of the potential program presented a “Generalized Average Water Balance” as 310 thousand acre-feet (TAF) of canal diversions, 16 TAF of inflow from Oakdale Irrigation District, 191 TAF irrigation demand, 35 TAF domestic deliveries, 60 TAF in “seepage losses,” and 40 TAF in “operational discharges.”²⁹ The same presentation suggested that MID could realize a “potential water savings” of between 25,000 and 40,000 AF per year for a cost of about \$115 million.³⁰

In the face of vehement opposition by MID constituents to selling MID water to CCSF, MID’s directors rejected the prospective transfer of water. Shortly thereafter, the general manager of MID and MID’s outside counsel, both proponents of the transfer program, were relieved of their duties.

Review of the statistics used in support of the 2012 prospective plan led Conservation Groups to review additional data regarding water use and efficiency by both MID and TID. Specifically, Conservation Groups reviewed the Turlock Irrigation District’s *2015 Agricultural Water Management Plan*³¹ and Modesto Irrigation District’s *Agricultural Water Management Plan 2015 Update*³² (AWMP’s). We reproduce some of the statistics from each document in the tables below.

Table 5: “TID Distribution System Irrigation Season Water Balance” (2010-2014)³³

(Volumes are in acre-feet)	2010	2011	2012	2013	2014	Average
Irrigation Releases	531,107	537,685	445,579	460,420	320,862	459,131
Operational spillage	81,968	87,229	46,211	46,865	19,207	56,296
Irrigation Season Seepage	39,210	39,340	36,890	36,890	31,000	36,333

²⁹ See slide 7 of <http://www.mid.org/about/newsroom/projects/watertransfer/waterpresentation-120228.pdf>

³⁰ *Id.*, slide 10.

³¹ Available at: http://www.tid.org/sites/default/files/documents/tidweb_content/TID%20AWMP%202015-FINAL_12_09_15_w-attachments.pdf

³² Available at:

<http://www.water.ca.gov/wateruseefficiency/sb7/docs/2015/plans/Modesto%20ID%202015%20AWMP.pdf>

³³ Table 4.8, TID *2015 Agricultural Water Management Plan*.

Table 6: “TID Irrigated Lands Irrigation Season Water Balance Results” (2010-2014)³⁴

(Volumes are in acre-feet)	2010	2011	2012	2013	2014	Average 2010-2014
Deliveries	481,780	491,115	482,593	494,105	364,246	462,768
ET of Applied Water	291,230	278,797	326,004	364,811	358,919	323,952
“Deep Percolation” of Applied Water	201,650	219,446	177,879	170,903	105,416	175,059
Net recharge (AF per acre)	1.8	1.8	0.8	0.5	0.0	1.0

Table 7: MID “Surface Water Supplies”³⁵

(Volumes are in acre-feet)	2010	2011	2012	2013	2014	Average 2010-2014
MID water diverted at La Grange	261,728	282,640	311,500	316,571	176,087	269,705

Table 8: MID “Overall Water Balance for 2012”³⁶

(Volumes are in acre-feet)	
Surface water irrigation	278,800
Surface water M&I	32,700
ET of Applied Water	184,700
Deep percolation - Irrigation	108,500
Groundwater intentional recharge	0
Operational spills	49,700

³⁴ Table 4.9, TID 2015 Agricultural Water Management Plan.

³⁵ From MID, Agricultural Water Management Plan 2015 Update, Table 32. Average calculated by Conservation Groups.

³⁶ *Id.*, Table 48. MID did not provide data for all 5 years like TID did. Instead, it chose 2012 as a representative year. *Id.*, p. 28.

These tables (and the complete tables from which they are excerpted) provide a snapshot of key features of the water supply management of MID and TID.

The most obvious feature of both systems is that agricultural water users apply large amounts of surface water in excess of what is needed to grow crops. Based on an earlier study by USGS, MID assumes a 63% efficiency factor.³⁷ In the normal and wet years 2010 and 2011, TID estimated “deep percolation” from applied surface water of 201,650 AF and 219,446 AF respectively. The numbers diminish in drier years. MID, for the representative year 2012 for which it presented statistics in its AWMP, estimated deep percolation from applied surface water of 108,500 AF.

TID explains the water management and recharge strategy in its AWMP:

TID’s conjunctive management program is designed to encourage irrigators to draw from surface water supplies during periods of normal and above normal reservoir storage. Surface water from the Tuolumne River, applied within the TID via flood irrigation, is the primary source of groundwater recharge within the Basin.

TID’s tiered volumetric pricing structure for surface water (described in Section 2.7) is designed to encourage growers to use available surface water supplies to provide appropriate in-lieu and direct groundwater recharge. Having two rate schedules, one for normal or wetter years and one for dry years, provides different pricing signals between normal and dry water year types. This pricing encourages the use of available surface water supplies in normal and wetter years.³⁸

Stated differently, TID explicitly incentivizes over-watering of crops in normal and wet water years in order to recharge groundwater. Since MID has a very similar pricing structure, it is fair to say that MID also incentivizes over-watering crops in normal and wet water years, although MID’s AWMP suggests that there is an ongoing transition in the MID service area away from flood irrigation to more efficient irrigation techniques.

From a strictly agricultural business perspective, the biggest problem is that in dry years, critically dry years, and dry year sequences, flood irrigators have a harder time making do with less water. Flood irrigation requires heavy application of water even in times when water is scarce. Surface water use is inefficient, and groundwater must be heavily pumped.

MID’s AWMP says that the District conducts zero managed aquifer recharge.³⁹ We found no mention of managed recharge in TID’s AWMP, and presume there is none there either,

³⁷ See U.S. Geological Survey, *Hydrologic Model of the Modesto Region, California, 1960–2004*, 2015. Available at: <https://pubs.usgs.gov/sir/2015/5045/pdf/sir2015-5045.pdf>. See also MID, *2015 Agricultural Water Management Plan 2015 Update*, p. 38.

³⁸ TID *2015 Agricultural Water Management Plan*, p. 45.

³⁹ MID, *Agricultural Water Management Plan 2015 Update*. Table 48.

although TID's AWWP does mention "Partnership with the Eastside Water District for groundwater recharge projects."⁴⁰

Both TID and MID have initiated a series of efficiency upgrades in the last decade, in part in response to the mandates of SB7X-7 (2009 state of California legislation). Most of these upgrades involve improving distribution systems. They do not address the structural over-application of water as a basic business strategy.

Over-application of water makes a certain sense if one is willing to starve the Tuolumne River of flow. In its crude way, it works. Flood irrigation is inexpensive. It requires relatively little special infrastructure. It keeps the groundwater in relative balance. However, it is unknown how much of the excess water that is applied is actually recoverable for use. As a business model for recharge, it is a relatively sloppy system built on keeping the ground wet.

Part of 2009 Senate Bill X7-7 requires municipal water suppliers to reduce water use 20% by the year 2020. Most municipal suppliers are on their way to achieving this goal. Given the Districts' business model for agricultural water use, Conservation Groups believe it is entirely reasonable to ask the Districts to cut back half of that, 10%, as a default starting point for systemwide water conservation.

2. Hydrology and Water Supply Management: San Francisco

Prior to approval of its Water System Improvement Program (WSIP) in 2008, the San Francisco Public Utilities Commission projected that water demand in its service territory would reach 285 million gallons per day (mgd) by 2018. The WSIP proposed diverting an additional 25 mgd from the Tuolumne River to meet future demand. While conservation organizations supported the seismic upgrades proposed in the WSIP, they were adamantly opposed to an increase in diversions.

To avoid a controversy that would likely slow down or derail the WSIP, the SFPUC approached the conservation organizations with a compromise. In exchange for NGO support of the WSIP, the SFPUC offered to cap water sales at 265 mgd until at least 2018 and to focus on water conservation, recycled water and groundwater to make up any potential supply deficit. CCSF would be responsible for 10 mgd in savings, and BAWSCA would be responsible for the other 10 mgd.

The conservation organizations agreed to this compromise, which became known as the Phased WSIP, and the WSIP was approved without challenge.

At that point, the SFPUC, its wholesale customers represented by BAWSCA, and the conservation organizations had a common goal, and worked together to reduce reliance on the Tuolumne. The water purveyors implemented a number of programs, including rebates for high-efficiency toilets, washing machines, irrigation equipment and graywater systems, a Lawn Be Gone program (rebates for converting turf to climate-appropriate landscaping), large landscape audits and water-wise gardening workshops, indoor and outdoor water efficiency ordinances,

⁴⁰ TID, *2015 Agricultural Water Management Plan*, p. 112.

leak detection programs, and more. Some water agencies supplied by BAWSCA have even begun to explore indirect potable reuse projects.

San Francisco enacted a Non-Potable Water Ordinance that requires new development projects of 250,000 square feet or more to install and operate onsite non-potable water collection and to use systems that utilize rainwater, stormwater, graywater, blackwater and foundation drainage for toilet flushing, irrigation and cooling. In 2017, the SFPUC launched a program to blend groundwater with water from the Regional Water System. When fully operational, groundwater will provide 4 mgd of potable water. The SFPUC also broke ground on its Westside Recycled Water Project, which will provide 2 mgd of recycled water for irrigation.

An innovative program included in the WSIP is the Regional Groundwater Storage and Recovery Project, which provides surface water to several water agencies in normal and wet years so that they don't need to pump groundwater. The groundwater basin can then recharge in order to provide 8 mgd of water during drought years.

As a result of these measures and growing public awareness, water demand in the SFPUC service territory decreased from just over 250 mgd in 2008 to 223 mgd in 2013. Then, in response to the drought, demand dropped to 195 mgd in 2015 and even further to 175 mgd in 2016. Following the end of the drought, demand increased only slightly to 180 mgd in 2017. In both 2016 and 2017, overall water use was lower than during the 1976/77 drought, despite considerable population growth.

Despite this commendable conservation effort, CCSF has maintained a posture in the Don Pedro relicensing, and in the proceeding at the State Water Board to update the Bay-Delta Plan, that flow increases in the lower Tuolumne River would be catastrophic to the Bay Area. This posture began during the 2009 FERC proceeding on Interim Conditions. In that proceeding, David Sunding of Berkeley Economic Consulting presented estimates of potential economic impacts of water rationing in the SFPUC service territory if instream flows in the Tuolumne River below La Grange Dam were increased. Since then, real world experience has shown that Dr. Sunding's projections were far from accurate.

Dr. Sunding stated in 2009:

The impact of potential rationing levels on employment is severe. In the 51% rationing scenario, I estimate that the Bay Area would lose more than 188,000 jobs as industrial and commercial output is reduced to meet conservation requirements...Job losses in the other scenarios are 139,146 (41% Rationing), 6,562 (20% Rationing), and 3,922 (10% Rationing).

Lost sales of firms in the SFPUC Regional Water System area are in excess of \$49 billion annually in the event of 51% rationing...Sales losses in the other scenarios are \$37 billion (41% Rationing), \$3.1 billion (20% Rationing), and 1.8 billion (10% Rationing).⁴¹

⁴¹ CCSF Exhibit 20 in 2009 Hearing on Interim Measures, Answering Testimony of David Sunding, pp. 9-10, eLibrary no 20990922-5093.

Between 2006 and 2016, water demand in the SFPUC service territory decreased by more than 30%, from 257 mgd to 175 mgd, with no negative economic impacts. Between 2010 and 2015, 190,000 jobs were added in San Francisco and San Mateo Counties (which receive almost all of their water from the SFPUC), and 265,000 jobs were added in Santa Clara and Alameda Counties (which receive a portion of their water from the SFPUC). The regional economy improved to its strongest position ever.

In 2014, Dr. Sunding, on behalf of the Brattle Group, explained his process for determining the socioeconomic impacts of water rationing in a report entitled *Socioeconomic Impacts of Water Shortages within the Hetch Hetchy Regional Water System Service Area*.⁴² A coalition of environmental groups analyzed the study and identified a number of flaws. They found that the study: 1) erroneously based rationing on demand vs. supply; 2) comingled Bay Area water sources with Tuolumne supply as if Bay Area sources would be affected by an increase in flows in the Tuolumne; 3) treated instream flow as reduced water supply and failed to consider the role of carryover storage and replenishment; and 4) underestimated the potential for water conservation, especially with consideration to irrigation use.

Since 2008, the SFPUC has planned for an extreme rationing scenario based on an 8.5-year “Design Drought,” which includes the 1987-92 drought of record, followed immediately by the driest 2-year period on record: 1976-1977. The SFPUC assumes that every year is either the beginning of, or middle of, this Design Drought, and thus factors in much higher levels of rationing than would have been required at any time in the past.

In neither this licensing nor the Bay-Delta Plan proceeding at the State Water Board has CCSF acknowledged its ongoing efforts to secure alternative water supplies during droughts. The SFPUC and BAWSCA have both been active partners in the Bay Area Regional Reliability Project, which seeks to use the regional resources of Bay Area water agencies to assure water supply reliability.⁴³ One of the most promising projects in this regional planning effort is use of the existing or an expanded Los Vaqueros Reservoir in eastern Contra Costa County to store drought water supply for Bay Area water agencies. CCSF could even add a point of diversion for its existing water rights at the intakes to Los Vaqueros (Contra Costa Water District’s points of diversion in the south Delta). However, although Conservation Groups suggested that CCSF consider west-of-Delta storage as part of its drought planning in scoping for the Don Pedro relicensing, CCSF has been dismissive of the alternative.

3. Groundwater Water Bank Rationale and Description

Conservation Groups propose the application of less surface water to the ground in the Districts. The Tuolumne River cannot withstand an annual diversion demand of 1.2 MAF, which is 60% of its average annual flow and in some individual years is greater than the year’s total unimpaired flow in the Tuolumne River watershed. The Districts need to reduce their water use. They can reasonably reduce their water use by applying less irrigation water whose functional purpose is to recharge groundwater.

⁴² Dr. Sunding’s 2014 Report is available at: https://www.tuolumne.org/wp-content/uploads/2016/10/CCSF-Draft-Socioeconomic-Study_3_13_2014.pdf

⁴³ See Bay Area Regional Reliability Project website at: <http://www.bayareareliability.com/>

Conservation Groups propose a more tightly managed system of groundwater replenishment through managed aquifer recharge to maintain groundwater in relative balance. We propose that CCSF pay for recharge facilities and in exchange receive credits against future upstream diversions: a Groundwater Water Bank account based on water recharged using facilities CCSF has paid for.

The Groundwater Water Bank maintains the basic parameters of the Fourth Agreement. It gives CCSF zero access to groundwater stored in MID and TID's service areas. In the spirit of dividing the benefits and responsibilities for the Groundwater Water Bank, CCSF's Don Pedro Water Bank would not be debited in Wet years for recharge water, but would be debited in AN years. We presume that these two water year types are those in which physical recharge would occur, with the exception of AN years when July 1 Don Pedro storage is less than 1.6 million AF.

Districts would divert water for groundwater recharge into the Groundwater Water Bank under the Districts' existing senior water rights. Even though the Districts would be required to apply less water to the ground, the diversion of water into the Water Bank would preserve the volumes of the Districts' senior water rights. We believe that over a series of years, in agricultural water management plans and reports, the Districts will be able to demonstrate beneficial use of the water recharged through the Groundwater Water Bank.

In devising a proposed strategy for sharing responsibility for increased flow in the lower Tuolumne River, Conservation Groups began from the fact that leaving the Fourth Agreement intact would have unacceptable impacts to public trust resources. "When the public trust doctrine clashes with the rule of priority, the rule of priority must yield." *El Dorado Irrigation Dist. v. State Water Resources Control Bd.* (2006) 142 Cal.App.4th 966. (*El Dorado*).

We recognize that CCSF has made extensive infrastructure improvements in the last decade to its water distribution system, with expenses running into billions of dollars. We also recognize the CCSF and to a somewhat lesser degree its BAWSCA wholesale customers have developed a strong culture of water conservation over the past decade, and really stepped up during the 2013-2015 drought. Nonetheless, it is reasonable to ask CCSF to invest in water supply infrastructure for the Districts if CCSF's customers get water supply reliability in return. While the availability of financial resources in the Bay Area would allow the Bay Area to subsidize irrigation infrastructure, it seems to us less reasonable to ask CCSF and BAWSCA customers to pay for improvements within the Districts that the Districts have not been willing to pay for and that don't have a clearly identifiable direct benefit to Bay Area water customers.

Greater conservation by CCSF and BAWSCA is always possible, and Conservation Groups will continue to encourage it. However, even though the SFPUC's drought planning horizon is excessively conservative, simple math limits CCSF's ability to contribute to increased flow in the lower Tuolumne River. One could even make a convincing argument that severely shorting water deliveries to the San Francisco Bay Area in a prolonged drought is not in the public interest. One could thus make a case that in severe droughts, CCSF should be allowed to let the Don Pedro Water Bank go negative, or that CCSF should be absolved of part of its

responsibility for Tuolumne River flow by some other instrument. However, Conservation Groups also recognize that there is a legal obligation to observe the rule of water rights priority: “Every effort . . . must be made to respect and enforce the rule of priority. A solution to a dispute over water rights ‘must preserve water right priorities to the extent those priorities do not lead to unreasonable use.’” (*El Dorado, supra*, at 966).

In sum, Conservation Groups’ Groundwater Water Bank is our best effort to both restore flow in the Tuolumne River and to minimize harm to water supply for both the Districts and CCSF, consistent with both the public trust and reasonable use doctrines and with the rules of water rights priority.

4. Rationale for Selection of Water-Year Types

Conservation Groups took into account multiple considerations in selecting rules for water-year types.

Broadly speaking, Conservation Groups had an interest in carefully distinguishing among water year types in order to match both flow requirements and water supply to system hydrology. The desire was to optimize the capacity of the system to achieve adequate instream flows without recklessly drawing down storage, while at the same time keeping reductions in water supply deliveries to a minimum. Because the Conservation Groups’ proposed flow and water delivery rules differ significantly for different water-year types, it was important not to approximate water-year types or approach them in a perfunctory fashion.

The availability of the Don Pedro water balance model for use in iterating different water-year type designations provides the opportunity to test options against historical hydrology. Water-year types are one of the variables that one can test. Of course, this also has the limitation that the perfect foresight afforded by the model does not reflect how real-world operators would respond to borderline water year designations or how the Districts would respond in making irrigation allocations.

Conservation Groups had a particular interest in distinguishing between very wet years and years that were above average but that did not feature the extent of flood releases of the very wet years. This interest stemmed from the desire to continue high flows through June when reasonable and also from a recognition that the Wet designation allows increased irrigation deliveries. Conservation Groups had a similar interest in carefully distinguishing Below Normal and Dry years for the same reasons.

Conservation Groups consider Critically Dry years to be years of triage both for instream resources and for water supply. It is important to recognize when the system is in hydrological trouble, and to act decisively. It is important to have a water-year type designation that anticipates triage and that defines its level in advance, rather than punting flow requirements to *ad hoc* decision making. Conservation Groups disagree strongly with the flow levels released into the Tuolumne River in Critically Dry years in the past: they were years of ecosystem collapse, unchecked bleeding of the fisheries. But Conservation Groups also recognize that

application of a percent of unimpaired flow in Critically Dry years breaks the system, which is no better for the fisheries than it is for water supply.

Conservation Groups recognize that 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, Conservation Groups propose 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.

In both Critically Dry and Super Critically Dry years, Conservation Groups decided the best thing to do for the salmon and *O. mykiss* fisheries is to maintain relatively high baseflows as compared to historical flows and as compared to the Districts' Preferred Plan.⁴⁴ Small spring and fall pulse flows will provide some (but very limited) managed opportunities to stimulate migration. In these years, conditions are most ideal for warm water piscivorous fish such as black bass and striped bass. In these years when flow is limited by hydrology, conditions also allow for installation of a temporary weir to capture migrating bass. Conservation Groups propose such a measure below.

Districts 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. 60-20-20 uses 75% exceedance to set water-year types, somewhat conservatively.

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. Conservation Groups think that 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). This distinction is not really needed in a storage-rich system with a relatively small flood reservation, and may skew water-year types to lower categories under future changing climate conditions.

Conservation Groups ran multiple scenarios with 60-20-20 and with the water-year type schedule Conservation Groups adopted. As noted above, the Don Pedro water balance model as currently configured does not allow for adjustment of water-year types in February-May. Therefore, Conservation Groups were not able to analyze the relative difference of using a 50% exceedance versus a 75% exceedance in setting water-year types. This analysis is worth conducting with a modified model. For the moment, Conservation Groups chose the estimated 50% exceedance value for annual flow at La Grange. We believe the annual value is the better value to use than the 60-20-20 emphasis on inflow from April-July.

In running the model with various flow scenarios, Conservation Groups found in particular that the 60-20-20 broke the distinction between Wet and AN years at too low a point.

⁴⁴ Conservation Groups' overall flow volumes in CD and SCD years are about double the volumes proposed in the Districts' Preferred Plan for downstream of the infiltration gallery.

For instance, 1993 was a Wet year under 60-20-20, but an AN year under the Conservation Groups' water-year types. The same is true for 1974 and 1975. For purposes of Conservation Groups' flow proposal at least, we think 60-20-20 is not as good a fit.

The actual values for the break points between water-year types were inserted by CCSF/Districts' consultant as placeholder values on the Don Pedro water balance model's dashboard. We retraced the steps and found that the break points worked well with our flow proposal. We viewed the categories somewhat differently than CCSF/Districts' consultant, however, eliminating a "Normal" year type and adding Super Critically Dry.

5. Biological Rationale for Prioritization of Percent-of-Unimpaired Flow Requirements by Month and for Snowmelt Recession Flows in Above Normal, Below Normal and Dry Water Years

In considering the relative benefit and losses of eliminating certain months from the default February through June percent-of-unimpaired requirement in Above Normal, Below Normal and Dry years, Conservation Groups 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) and downstream conditions in each month.

In considering flows in Above Normal and Below Normal water years, Conservation Groups observed that most salmon outmigration from the Tuolumne River is completed by mid-June except in Wet water years that feature flood flows through June.⁴⁵ High June flows have benefits to pelagic fish species downstream in the Delta, and in Wet years high June flows may extend the in-river rearing period and increase outmigrant size. On the front end of the February-June time period, February generally has relatively little inflow compared to later months, including June; reducing flow in February would gain little in volume but would lose an entire month in variability. Eliminating the percent-of-unimpaired requirement in June also does more to balance the water towards water for storage and irrigation. With less in-river biological benefit in water years that are not Wet years, and relatively high water cost, Conservation Groups chose to first eliminate June as a month to require release of a percent-of-unimpaired inflow in Above Normal and Below Normal years. Conservation Groups also eliminated February and May from a percent-of-unimpaired requirement in Dry years.

Because DWR does not release its Bulletin 120 until about the 10th of the month in February through May, the actual dates for a percent-of-unimpaired requirement in AN and BN years would be approximately February 15-June 15, and in Dry years would be March 15-May 15.

In AN, BN and Dry years, Conservation Groups' flow proposal would to a limited degree extend the benefit of the percent-of-unimpaired flow requirement by immediately following such

⁴⁵ Compare for example the 2011 Tuolumne River Rotary Screw Trap Annual Report, pp. 25 *ff*, with the 2013 Report, pp. 17 *ff*, available at: http://tuolumnerivertac.com/Documents/2011%20Tuolumne%20RST%20Annual%20Report_final.pdf and http://tuolumnerivertac.com/Documents/2013%20Tuolumne%20RST%20Annual%20Report_FINAL%20COPY.pdf

flow requirements with a managed down-ramp that mimics the snowmelt recession. Recent river science has placed increased emphasis on the importance of mimicking the snowmelt recession in regulated rivers.⁴⁶ In valley floor river settings, a managed recession coming off high spring flows is particularly important for riparian recruitment.

Recent literature suggests that riparian vegetation is most likely to become established when the rate of recession at the end of the high-flow portion of the hydrograph is less than 3 cm/day.⁴⁷ However, others have suggested that down-ramping at the beginning of the recession can be more rapid and still allow successful riparian recruitment, particularly if that down-ramping is not at the end of the May-June seed dispersal period.⁴⁸

Therefore, in recognition that required flows when the percent-of-unimpaired flow requirement ends are likely to be thousands of cfs, Conservation Groups selected 180 cfs as the required daily recession value until flows at La Grange drop to 1400 cfs. In addition, for the first six days after receding flows drop to 1400 cfs, the allowed drop in stage height is 9 cm/day. Thereafter, the allowed drop in stage height is 3 cm/day, until flows reach baseflow.

To calculate the flow values for the recession rate, Conservation Groups used the stage/discharge relationship at the Tuolumne River at Modesto gage, USGS 11290000 as published on the USGS website. It is possible that the flow values in the recession rate would benefit from further refinement.

6. Selection of 50% as the applied percentage of unimpaired flow requirement

The State Board's 2010 Delta Flow Criteria Report⁴⁹ established that 60% of February-June unimpaired flow is what fish need as in-river flow in each of the three major San Joaquin tributaries and as outflow from the San Joaquin River. The Delta Flow Criteria Report used fall-run Chinook as the target species for evaluation within the tributaries, including the Tuolumne. The Report evaluated the effects of flow on a variety of species including Delta smelt when considering fisheries downstream of Vernalis on the lower San Joaquin River.⁵⁰

Conservation Groups selected the 50% of unimpaired value as a compromise based on analysis of the hydrology of the Tuolumne River and the competing uses. Conservation Groups do not recommend that the Commission or the State Water Board balance against this compromise as a sideboard. It is the Conservation Groups' recommendation for where the

⁴⁶ See e.g., Yarnell et al., *Ecology and Management of the Spring Snowmelt Recession*, 2010. Available at: https://watershed.ucdavis.edu/pdf/Yarnell_et_al_BioScience2010.pdf

⁴⁷ See e.g., South Yuba River Citizens League, *Cottonwood Seedling Recruitment on the Lower Yuba River Under Existing and Alternative Flow Regimes*, 2016. Available at: <http://yubariver.org/wp-content/uploads/2017/08/LYR-cottonwood-recruitment-and-flows-SYRCL-2016.pdf>

⁴⁸ Stillwater Sciences. *Restoring recruitment processes for riparian cottonwoods and willows: a field-calibrated predictive model for the lower San Joaquin Basin*, 2006. Available at: http://www.esf.edu/fnrm/stella/website_pubs/SWS_06_CVRrpt.pdf

⁴⁹ http://www.waterboards.ca.gov/waterrights/water_issues/programs/bay_delta/deltaflow/docs/final_rpt080310.pdf

⁵⁰ See analysis by the Bay Institute for a variety of species including bay shrimp, striped bass, starry flounder, and longfin smelt, as well as Delta smelt in TBI Exhibit 2 at http://www.waterboards.ca.gov/waterrights/water_issues/programs/bay_delta/deltaflow/bay_inst.shtml

jurisdictional regulators should end in their balancing. Stated differently, it is part of a recommendation for how the regulators could reasonably balance divergent uses, taking all uses into account.

50% of unimpaired, with fewer months than February-June applying in all water-year types except Wet years, is a substantial reduction from the recommendations in the Delta Flow Criteria Report. Using February-June unimpaired flow in the Tuolumne River as a metric, Conservation Groups analyzed the average February-June percent of unimpaired flow for each water-year type. The values are shown in Table 9 below.

**Table 9: Percent of Unimpaired Flow By Month
Conservation Groups' Flow Proposal⁵¹**

Average of % of Unimpaired	WY type					
Month	Wet	AN	BN	Dry	CD	SCD
1	102	91	38	20	60	97
2	108	97	64	28	33	74
3	95	87	70	50	21	28
4	79	64	53	50	32	24
5	50	46	48	16	7	11
6	47	28	32	22	17	29
7	39	17	29	59	62	83
8	73	55	76	100	229	227
9	112	140	136	119	145	476
10	457	299	816	295	249	1009
11	232	95	79	67	46	157
12	97	74	47	27	48	198

Table 9 also shows that actual flows in Wet years overwhelm the required flows in all months except May and June. There are lesser amounts of “flood releases” in Above Normal years, even under Conservation Groups’ flow proposal. In most months in BN years, and in almost all months in Dry, CD and SCD water-year types, the actual flow is very close to the required flows. This is because the 2.6 million AF of storage in the system captures the vast majority of flow in the Tuolumne River watershed in all but Wet years.

On balance, Conservation Groups believe it is of greater value to meet the highest reasonably achievable percent-of-unimpaired flow requirements in as many months as possible, rather than reducing the percent-of-unimpaired requirement to a lower percent and, in effect, averaging the flow volume across additional months. In Wet years, 50% is achievable in all months (February-June) with no reduction in net diversions. In water years where the water balance did not allow 50% of unimpaired release in all months, Conservation Groups elected to meet it in a reduced number of months rather than spread the water cost over five months by reducing the percent of unimpaired. The principal benefits of increased February-June flow

⁵¹ This table assumes water-year type based on perfect foresight of the year’s ultimate final water-year type. See discussion of water-year type modeling, supra.

ascribed to salmonids in the Delta Flow Criteria Report are variability, floodplain inundation above certain flow thresholds, water temperature improvements, outmigration success from the San Joaquin tributaries, and outmigration success from the lower San Joaquin River. The functional benefits seem to be greater above a threshold than by lowering the threshold.

7. Spring Blocks of Water in Critically Dry Years

In Critically Dry years, including multiple Dry/Critically Dry-year sequences (in which Conservation Groups propose to treat Dry years as Critically Dry years and Critically Dry years as Super Critically Dry years), taking a percent-of-unimpaired flow in the February-June time period causes the Tuolumne River water supply system to run very low on water. Generally, depending on the rules one applies, CCSF's Don Pedro Water Bank is the first to run out of water. Even where it doesn't, CCSF's total system storage is reduced well below 1 million AF, which would trigger rationing in the Bay Area. Conservation Groups modeled rules that would require 50% of unimpaired flow in March and April, 30% in May and 25% in June of sequential Critically Dry years, while allowing 75% of irrigation deliveries. This modeling exercise caused Don Pedro Reservoir to crash. Modeling irrigation deliveries at 50% of demand with the same flow requirements still pushed Don Pedro Reservoir very close to dead pool.

The Districts and other water purveyors in the San Joaquin River and elsewhere have argued that using a percent-of-unimpaired flow is infeasible in any year because of water shortage and depleted storage (with attendant water temperature impacts) in Critically Dry years and in dry-year sequences. Reasonable reduction of baseline diversions to restore balance to the Tuolumne River's beneficial uses, combined with a triage approach to flow requirements in Critically Dry years (including dry-year sequences), cuts through this tedious hyperbole.

Conservation Groups determined that maintaining the 300 cfs baseflow⁵² in Critically Dry and Super Critically Dry years is the first best use of limited water. In Critically Dry years, Conservation Groups propose that a 35,000 AF spring block of water be available over and above the baseflow. In Super Critically Dry years, Conservation Groups propose that a 12,500 AF spring block of water be added to the 300 cfs baseflow. In both water year types, an implementation committee would determine the deployment of these blocks of water.⁵³ Under Critically Dry water-year conditions, water is not available to substantially enhance the rearing conditions of juvenile salmonids over most of the February - June period; we make no pretense that 35,000 AF or 12,500 AF will do that. The proposed spring block flow is purely and simply triage to at least facilitate successful outmigration of those salmonids that are able to survive flatline baseflow conditions; those baseflows provide adequate spawning conditions but create little juvenile rearing habitat.

8. Fall Pulse Flows to Attract Upstream-Migrating Adult Salmon

Conservation Groups propose requiring releases of fall pulse flows to attract salmon upstream. The volumes of water dedicated to fall pulse flows vary by water year type, ranging from 20,000 AF in Wet and AN years to 7,500 AF in Super Critically Dry years. As with the

⁵² 200 cfs downstream of the Geer Road infiltration gallery in the months of July-September.

⁵³ See Conservation Groups' Recommendation, Technical Advisory Committee, *infra*.

spring pulse, an implementation committee would determine the deployment of these blocks of water.

Fall pulse flows to attract adult salmon are proven, water-efficient measures used in multiple watersheds. They bring salmon into rivers. The Districts’ Preferred Plan astonishingly turns away from such pulses entirely.

While there are many examples of the effectiveness of fall salmon attraction flows, the program established by the Lower Mokelumne River Partnership has years of data based on refinement of fall pulse flow timing and volumes. The East Bay Municipal Utility District (EBMUD) publishes annual escapement reports that, among other things, discuss the upstream migration of Mokelumne River salmon.⁵⁴ Two representative graphs from the 2013-2014 and 2014-2015 reports are shown below.

Figure 1: Mokelumne River flow and migrating adult salmon counts at Woodbridge Irrigation Diversion Dam, August 2013-January 2014 and August 2014-January 2015. Source: EBMUD Escapement Reports.

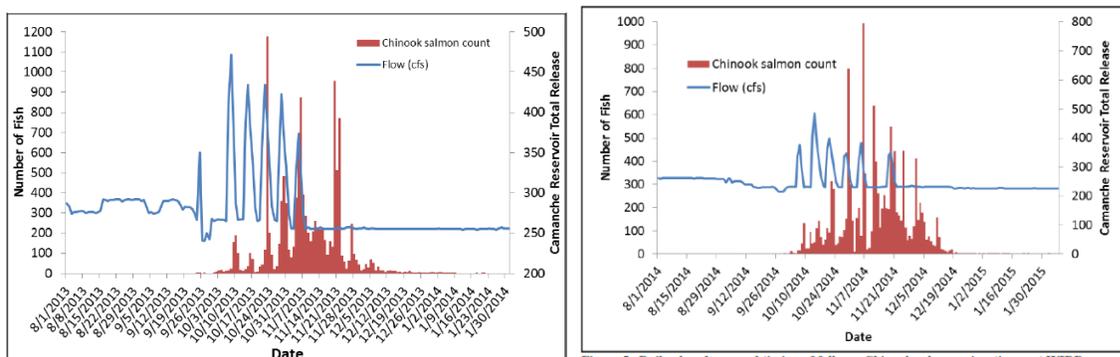


Figure 5. Daily abundance and timing of fall-run Chinook salmon migrating past WIDD compared to flow below Camanche Reservoir, August 1, 2013 - January 31, 2014. Flow data are preliminary and subject to change.

Note that there is a strong correlation between flow pulses and upstream migration. Salmon consistently move into the Mokelumne River on the declining limb of the pulse. This pattern has been consistent over at least the last five years.

Districts propose a volume of 5950 AF for “flushing flows” on October 5, 6, and 7 of Wet, AN, and BN years. This is likely too early to be the best use of water to bring salmon into the river, and would be better devoted to an attraction flow later in the fall. In addition, the volume is inadequate. Finally, it is important to have some pulses every year, even if limited in overall volume. The experience of the Stanislaus River in 2015 shows that even in very poor water years, pulses are effective at bringing fish into the river.

⁵⁴ EBMUD’s annual fisheries reports are available at: <http://www.ebmud.com/recreation/protecting-natural-habitat/fisheries-and-wildlife-division-reports/>

9. Use of the Geer Road Infiltration Gallery

During negotiations that led to the 1995 Tuolumne Settlement, the Districts developed the idea of constructing an infiltration gallery just downstream of Geer Road at approximately RM 25.9. The concept was that the Districts would construct works to divert up to 100 cfs for municipal water supply use south of the Tuolumne River in parts of South Modesto, Ceres, Turlock and other nearby communities, all of which rely on groundwater for their municipal water supply. The plan was to construct facilities such that diverted water in excess of immediate municipal needs could be directed into the Ceres Main Canal for irrigation use. The prospective benefit to the Tuolumne River was that up to 100 cfs of the water released into the Tuolumne River at La Grange could be recaptured downstream. In theory, this would allow increased instream flow in over 26 miles of the lower Tuolumne River at little or no water cost.

During the reconfiguration of Special Run Pool 7 in the mid-2000's, the Districts installed the in-river portion of infiltration gallery infrastructure. However, because the use of these in-river works was contingent on construction of facilities by other parties, the Districts have not diverted a single gallon of water through the gallery. Now, Districts propose to bring the existing infiltration gallery on line. In addition, Districts propose to construct a second infiltration gallery just upstream of the existing gallery, which could allow the release at La Grange and the downstream recapture of up to an additional 125 cfs of water.⁵⁵

Conservation Groups considered both the instream needs of the Tuolumne River between La Grange Dam at RM 52 and Geer Road at RM 25.9 and the instream needs of the Tuolumne River downstream of RM 25.9. We accept the diversion in the months of July-September of up to 100 cfs at Geer Road, provided the release at La Grange is 300 cfs. 300 cfs is sufficient to provide thermally suitable *O. mykiss* habitat from La Grange Dam downstream to RM 43, and to provide thermally suitable habitat downstream to about Roberts Ferry Bridge (RM 39.5) most of the time.⁵⁶ Conservation Groups consider a location between RM 43 and Roberts Ferry Bridge a reasonable benchmark for thermally suitable overwintering habitat for *O. mykiss*. 300 cfs between La Grange Dam and RM 25.9 also provides boatable flow at all times in the reach.

Downstream of RM 25.9, Conservation Groups consider 200 cfs rock bottom for acceptable flow from the river to the San Joaquin River. In the Lowest Boatable Flow Study (RR-3), the Districts determined 200 cfs to be the lowest boatable flow. Because Districts' proposed diversions at the infiltration galleries would keep flows downstream of RM 25.9 lower than 200 cfs between June 1 and October 15, the Districts' Preferred Plan proposes twelve recreational boating days downstream of RM 25.9 in this annual time period. Twelve days fall well short of

⁵⁵ See AFLA, Ex. E, Fig. 3.5-14.

⁵⁶ *Id.* at Ex. E, Fig 4.3-17. Thermally suitable habitat for *O. mykiss* means average daily water temperatures of 20° C. or less. 20°C average daily water temperature is not ideal, but it is acceptable. The Districts' efforts to demonstrate with their swim chamber study (W&AR 14) that Tuolumne River *O. mykiss* somehow have a higher thermal tolerance is unsupportable. Short-term thermal tolerance is not an indicator of long-term survivorship. As CSPA and TRT stated comments on the study: "Thermal conditions in the summer in most of the lower Tuolumne River are much more comparable to a marathon than a sprint." Districts simply responded that long term response was not part of the study design. Exactly! In addition, there is no evidence that there is a strain of *O. mykiss* specific to the lower Tuolumne River, let alone one that has somehow adapted to higher water temperatures.

the percentage of boatable flow days during the summer that occurred between 1997 and 2012. As described by the National Park Service:

During the months of the typical boating season of May through October, flows were at or above 175 cfs 97 percent of the time in May and 56 percent of the time in July, August, and September. For the same period, the flow of 200 cfs is exceeded 88 percent of the time in April, 95 percent of the time in May, 56 percent of the time in June, July, August and September, 74% of the time in October, and 70% of the time in November.⁵⁷

At flows less than 200 cfs, water quality issues develop, water becomes more stagnant, water hyacinth becomes more prevalent, and the river becomes a breeding ground for the piscivorous fish about which Districts express great concern. These effects carry downstream to the San Joaquin River. The AFLA identifies the reach of the Tuolumne River between RM 25.9 and about RM 11 as largely urban.⁵⁸ The visual quality of the river in this area thus has the greatest effect on the greatest number of people. At 75 cfs, the Districts' proposed flow in Dry and Critically Dry water years, the river is likely in many reaches to look more like a lake than a river. The City of Modesto deserves a living river.

Districts propose even lower flows until infiltration galleries are up and running.⁵⁹ The lower flows would apply if there are delays due to permitting or other external factors, and would apply permanently if FERC does not accept the galleries. Conservation Groups have been waiting 23 years for the promise of the infiltration galleries to translate into real water. 23 years is long enough. Conservation Groups' flow proposal assumes that Districts will release 300 cfs from La Grange in July-September. If for whatever reason Districts cannot capture 100 cfs at the Geer Road infiltration gallery, Districts must pass downstream the full flow that reaches the site of the gallery.

10. Compliance with Percent-of-Unimpaired Flow Requirement

Compliance with the percent-of-unimpaired flow requirement is set up to allow for operational feasibility without unnecessary averaging. Averaging tends to reduce the variability of flow that is a key benefit of tying flow releases to the unimpaired inflow. Conservation Groups have witnessed much complaining before the State Water Board that compliance would be difficult. Conservation Groups believe that the issue is much more that operators do not want to comply than that they can't comply.

A straightforward means of compliance would be to compute the average daily inflow to Don Pedro Reservoir, Hetch Hetchy Reservoir, Cherry Lake, and Lake Eleanor by measuring change in stage height of each reservoir against a rating curve and by measuring gaged outflow from each reservoir. The calculated release value for the lower Tuolumne River could be the net inflow to Don Pedro two days earlier plus the net inflow to Hetch Hetchy, Cherry and Eleanor reservoirs three days earlier. Some averaging over a week would allow true-up to account for the inherent inaccuracies of such a means of measurement. The Districts could post, and follow,

⁵⁷ AFLA, Ex. E, p. 3-287.

⁵⁸ *Id.* at Ex. E, p. 5-36.

⁵⁹ See AFLA, Ex. E, Table 5.6-2.

a calculator into which gages would electronically feed the necessary data. It would require working gages and perhaps gage redundancy. The goal is not perfection on any given day. The goal is reasonable measurable compliance over a season.

11. Water Hyacinth Abatement

Water hyacinth is a non-native plant that quickly establishes large, impenetrable, river-wide mats that block any boating passage during warm, low flow conditions. In the Tuolumne River, water hyacinth became a very significant problem during the low-flow years of 2014-2015.

Water velocity is a key factor in moving water hyacinth. Despite heavy and regular spraying by the Division of Boating and Waterways, water hyacinth was well-established in the Tuolumne. In the winter of 2015-16, the first winter with close to average precipitation after four years of drought, the Licensees were able to release modestly higher flows: four events in excess of 1250 cfs, three of which were in excess of 2250 cfs. These flows flushed the water hyacinth blockages, which previously were unaffected by Division of Boating and Waterways treatments, downstream and out of the river.

This underscores the benefits of higher flows for achieving desired environmental conditions. While the precise flow at which water hyacinth is mobilized and moved out of the system is unknown, flows similar to those achieved in April and May of 2016 were effective. The Conservation Groups' flow proposal will frequently achieve similar flow conditions that will more effectively control water hyacinth than the Licensees' proposed water hyacinth control program.

12. Gravel Cleaning and Gravel Mobilization

The Tuolumne River's flows and sediment inputs are out of equilibrium. Low-flow conditions favor the filling of interstitial spaces among spawning gravels. As noted in McBain and Trush, *Coarse Sediment Management Plan For The Lower Tuolumne River*, Revised Final, July 2004:

Aggradation and degradation frequently have detrimental impacts on the river channel and ecosystem. For example, many regulated rivers receive elevated rates of fine sediment (silt and sand) to the channel, and combined with a reduced magnitude and frequency of floods, fine sediments accumulate in the channel bed, filling interstitial spaces among larger gravel and cobble particles. Increased substrate embeddedness renders the channel bed more resistant to mobilization, reduces invertebrate production, and reduces the quality of salmonid spawning gravels.⁶⁰

The Licensees' proposed fix for this problem is experimental gravel cleaning. The Licensees provide little description of the project and no background to support the feasibility or efficacy of such an approach. The approach is likely to be highly disruptive to spawning gravels

⁶⁰ McBain and Trush, *Coarse Sediment Management Plan For The Lower Tuolumne River*, Revised Final, July 2004. Available at: http://tuolumnerivertac.com/Documents/7-2004_Revised_CSMP_Report.pdf

and the river bed, which may result in other unintended negative consequences. Additionally, the project will require consulting and permitting from Federal and State fish agencies, and there is a good potential that the agencies will not grant permits.

The 2004 McBain & Trush study of coarse sediment found 5500 cfs to be the threshold for bed mobility in the prime spawning reach of the Tuolumne River. The Conservation Groups' proposed flows would result in flows that frequently achieve or exceed 5500 cfs in the lower Tuolumne River, though if 5500 cfs is in fact the threshold for bedload mobilization, it may be necessary to increase the flow cap on the percent-of-unimpaired flow requirement, as discussed in the modeling notes, *supra*. Frequent flows in excess of the threshold for bedload mobilization should transport fine sediments out of the spawning gravels. This would more effectively accomplish the goals of the Districts' proposed gravel cleaning program.

The Licensees also propose periodic gravel mobilization flows of 6000-7000 cfs when sufficient water is available. While we do not oppose this measure *per se*, our concern is that the Districts will too infrequently determine that sufficient water is available.

F. Comments on the Flow Component of the "Districts' Preferred Plan"

1. Districts' and Conservation Groups' Approach to Flow in General and to Drought Planning Approach in Particular

Conservation Groups understand the importance of drought planning. Conservation Groups also understand the importance of constructing a flow schedule that allows reasonable water supply reliability during droughts. In crafting our flow proposal, Conservation Groups believe we have achieved that reliability, requiring no more than a 25% reduction in deliveries to the Districts in Critically Dry water years and no more than a 30% reduction in deliveries to the Districts in Super Critically Dry water years. We have proposed a contractual arrangement that keeps the CCSF Water Bank from going negative; this arrangement would require construction of groundwater recharge infrastructure at CCSF expense that will help assure the continuing availability of groundwater to the Districts to help mitigate water supply deficiencies during droughts. In exchange, CCSF will be able to transfer credits to the Don Pedro Water Bank from the new Groundwater Water Bank in Critically Dry, Dry and Below Normal water years.

Conservation Groups' proposal would achieve drought protection for both the Districts and CCSF, in part by requiring and funding more efficient groundwater recharge practices in the Districts, and in part by reasonably reducing District diversions during non-drought water years. Equally if not more important, Conservation Groups' flow proposal would achieve drought protection by changing the rules for providing instream flows during droughts. As discussed above, this allows greater required flows in non-drought years that are shaped according to the natural hydrograph, not according to flood releases and/or late spring pulses.

In Exhibit E of the AFLA, the Districts explain the underlying rationale of the flow component of the Districts' Preferred Plan:

Planning for drought conditions is at the core of water supply system design and water supply impact analysis. Considering water supply impacts by comparing “average” annual water supply effects over the long-term has little meaning or value if reliable water supplies are not available during extended droughts. ... Properly designed water supply projects have to be able to deliver reliable water supplies during drought and extended drought conditions. ... Therefore, the effects of the Districts’ Preferred Plan, as well as alternative scenarios provided by others, are examined by how they impact water supplies during drought conditions. In the 1971 through 2012 period, the longest drought occurred in the six-year period extending from 1987 through 1992.⁶¹

This is consistent with the drought planning policy of CCSF, which as described above assumes for planning purposes that each water year is going to be immediately followed by the 1987-1992 drought, which would then be immediately followed by the 1976-1977 drought.

The Districts’ Preferred Plan does not propose to change the rules for instream flows during droughts. Using a framework that is consistent in philosophy with CCSF’s drought planning, the Districts’ Preferred Plan limits required flow releases for non-drought years to levels that would be safe during droughts.

In order to argue in favor of their Plan, the Districts spend a large section of Ex. E of the AFLA using charts and graphs to show that application of any percent of unimpaired flow in the winter-spring of drought years would cause severe water shortages during droughts. In applying non-drought rules to droughts, the Districts endeavor to make the non-drought rules appear unreasonable. It is reasonable to have rules for drought year flows. However, it is unreasonable to apply rules made for drought years to flows in non-drought years.

The Districts’ Preferred Plan provides limited but still inadequate increases in required flow in Critically Dry, Dry and some Below Normal water years. The districts modest proposed flow increases in Above Normal and Wet years are in practice overwhelmed by flood flows.⁶² Effectively, the Districts propose to make three kinds of water years: (very) Wet water years in which flood releases dominate the hydrograph for many months (as was the case historically in 1995, 1998, 2011, and 2017); Above Normal years in which some flood flows add enough to the hydrograph to allow some variability in the winter-spring hydrograph to make these years functionally below normal years; and functionally critically dry water years (which would effectively be all the rest of the years, the majority). In the functionally critically dry water years, the required February-June flow would be between 6% and 15% of the average February-June unimpaired runoff. A substantial portion of the proposed summer flow increases in Districts’ Preferred Plan compared to Base Case would be diverted at the existing and proposed additional infiltration galleries.

2. Districts’ Preferred Plan Flow Objectives and their Application in Baseflows

Districts describe the biological objectives of their flows according to time of year as follows:

⁶¹ AFLA, Ex. E, pp. 5-51 and 5-52.

⁶² See Appendix E-1, Attachment G, tables 4-6, especially far right hand columns.

The Districts are proposing to implement the flow regime summarized in Table 4.3.1 (above) and described in greater detail in Section 3.5.4 of this Exhibit E for the following aquatic resource objectives: (1) flows from June 1–June 30 to benefit *O. mykiss* fry rearing (2) flows from July 1–October 15 to benefit *O. mykiss* juvenile rearing, (3) flows from October 15–December 31 to provide habitat for fall-run Chinook spawning, (4) flows from January 1–February 28/29 to provide habitat for fall-run Chinook fry rearing, (5) flows from March 1 – April 15 to provide habitat for fall-run Chinook juvenile rearing, (6) fall-run Chinook outmigration baseflows from April 16–May 31, and (7) outmigration pulse flows from April 16–May 31.⁶³

The Districts also propose “flow hydrograph shaping,” which they describe as follows:

In spill years, the Districts would make reasonable efforts to shape the descending limb of the snowmelt runoff hydrograph to mimic natural conditions to promote seed dispersal and germination of cottonwoods and native willows. Increasing natural recruitment of snowmelt-dependent hardwoods would increase stands of trees that would eventually provide shade, which could over the long-term result in limited water temperature reduction, thereby contributing positively to cumulative effects on water quality in the lower Tuolumne River.⁶⁴

In general, as explained in AFLA Section 3.5, the values chosen for baseflows in July through October 15 are largely governed by water temperature. We have no quarrel with the values between La Grange and RM 25.9. Downstream of the location of the existing infiltration gallery, diversions proposed by the Districts would cause flows that are unacceptably low.

The Districts chose flows from October 15-December 31 were chosen for physical habitat for fall-run Chinook salmon spawning. The value in Wet, AN and BN years is very close to Conservation Groups’ recommended 300 cfs; lower values in Dry and CD years are unnecessarily inadequate.

The Districts appear to have gamed Weighted Usable Area in January-February by focusing on the Fry lifestage of Chinook salmon, whose preference for low velocities supports a general argument for lower flows. The result is a proposed flow of 225 cfs in these months. One could equally make the argument that if fall-run Chinook recover from the current generally depressed population level in the Tuolumne River, there will be a density-dependent need for increased physical habitat because low flows would not accommodate the number of fry that the Tuolumne is capable of producing. Conservation Groups’ percent-of-unimpaired flow requirement would start in February in most water-year types; the resulting flow variability would both provide increased room for juvenile salmon and would also likely facilitate some downstream migration, diversifying life-history strategy by moving some fry toward the San Joaquin River and the Bay-Delta estuary.

⁶³ *Id.* at Ex. E, p. 4-103.

⁶⁴ *Id.*

The Districts label the March 1-April 15 time period as focusing on fall-run Chinook “juvenile rearing.” This begs the question, where’s the habitat? Districts’ proposed flows for this time period would leave all the habitat in the thalweg of the river channel, except when flood flows pushed it out. The same is true for the baseflows in the April 15-May 31 time period.

Similar to the Districts’ use of habitat modeling for salmon in January and February, Districts’ proposed flows for June game Weighted Usable Area as a rationale for low releases. Districts choose the juvenile *O. mykiss* lifestage as the management focus because juvenile *O. mykiss* prefer lower velocities. This provides a rationale for low flows. Elsewhere, Districts elsewhere acknowledge the importance of mimicking the snowmelt recession in order to promote the recruitment of cottonwoods and other riparian vegetation. The snowmelt recession typically occurs in June. Districts do not directly address this potential conflict. Water temperatures also become elevated in June, but Districts elect to push the limits of water temperature in order to emphasize velocities as being of greater importance, thus providing a rationale to save water.

Overall, the greatest improvement in baseflows in the Districts’ Preferred Plan is in Dry and CD years. These are the only year types in which one sees consistent percentage improvement in flow compared to Base Case.

3. Districts’ Preferred Plan Pulse Flows

The ostensible sweetener in the Districts’ Preferred Plan is a pulse flow in the April 15-May 31 time period.⁶⁵ However, it means little in the river: the average annual additional amount of actual February-June flow in the Tuolumne River that would result under the Districts’ Preferred Plan compared to existing conditions would be 2%.⁶⁶

In Wet and AN water years, the nominal water budget for spring pulse flows is 150 TAF. However, the Districts’ modeling shows that the “resulting” increase from pulse flows in these water year types would be zero in almost every Wet, AN and BN year.⁶⁷ For Wet and AN years, this is because the pulse flow is not additive to the flood releases that will occur anyway. The pulses, instead, simply telescope into the flood releases. The only notable exception is the Wet year 1993, which had no flood releases because 1993 followed a prolonged drought. In the three BN years in the period of record, 1971 shows a slight increase, 2003 shows a slight decrease, and 2009 shows a greater increase. It is difficult to discern the reasons for the changes in these three water years, but it likely has to do with the nine different water year types under the 1995 Settlement Agreement flow schedule.

In Dry years and Critically Dry years, there would be benefits to the Districts Preferred Plan in comparison to Base Case. This is because the flows in these water-year types under the 1995 Settlement were extremely low. The addition of pulse flows in Dry years and CD years accounts for much of the improvement in those year types.

⁶⁵ The limited and late time period for the Districts’ spring pulse would favor the smolt lifestage of fall-run Chinook over the parr lifestage. This exclusive emphasis on a single lifestage reproduces a shortcoming of the defunct Vernalis Adaptive Management Program, which favored a late spring pulse in order to protect water supply, constricting pulse flow benefits to fish to a short window.

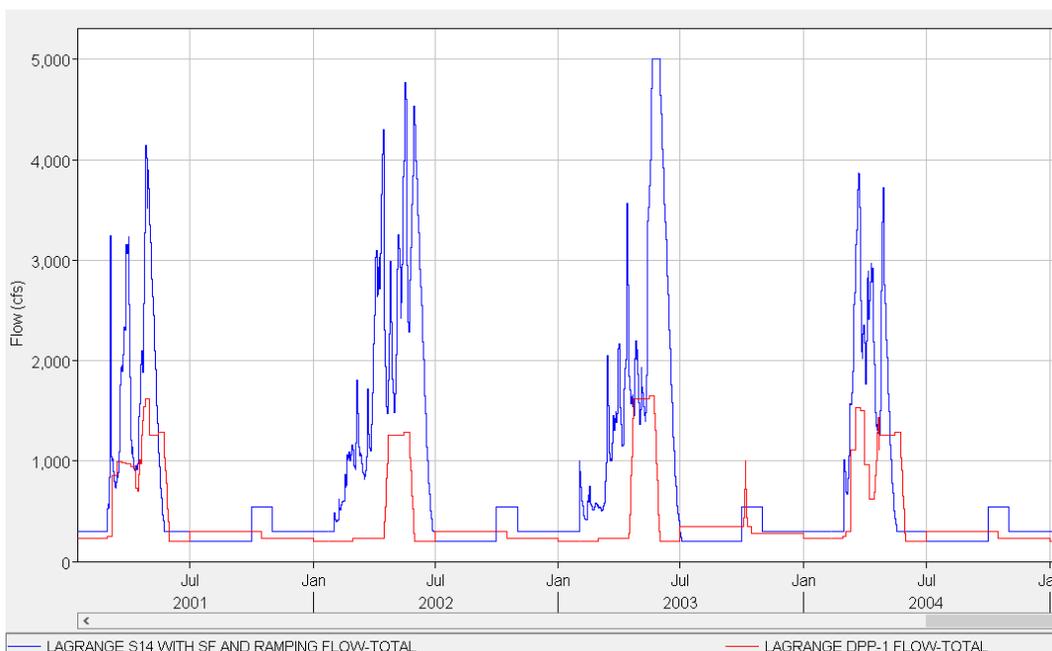
⁶⁶ AFLA Appendix E-1, Attachment G, Table 5.

⁶⁷ *Id.* at Appendix E-1, Attachment G, Table 4, far right column.

4. Comparison of Districts' Preferred Plan Flows and Conservation Groups' Proposed Flows in Below Normal and Dry Water Years

The most dramatic differences the Districts' and Conservation Groups' winter-spring flows in the lower Tuolumne River occur in Below Normal and Dry years. As an example, model output of the respective proposals' flows downstream of La Grange in 2001 (Dry), 2002 (BN), 2003 (BN) and 2004 (Dry) is pasted below.

Figure 2: Flows at La Grange Gage under Conservation Groups (blue line) and Districts' Preferred Plan flow proposals, 2001-2004 (model output)



In a nutshell, in the Conservation Groups' flows there is a hydrograph. Under the Districts' Preferred Plan, there is a flat line with a blip. Note this figure does not show that downstream of RM 25.9, Districts' flows would be lower by 225 cfs from June 1 through October 15 due to diversions at the Districts' infiltration gallery. Conservation Groups' flows downstream of RM 25.9 would be 100 cfs lower from July 1 through September 30.

Of the 42-year period of record used in the Don Pedro relicensing, twelve water years were CD or SCD water years and twelve water years were BN or Dry. District's Preferred Plan makes 24 of 42 years into effectively Critically Dry years, as described above. This is 57% of all years. Conservation Groups reduces the number of triage years in the period of record to 28.5%.

5. Comparison of Districts' Preferred Plan Flows and Conservation Groups' Proposed Flows in Critically Dry and Super Critically Dry Water Years

Under the Districts' Preferred Plan, flows at La Grange in Critically Dry years would be about 36,800 AFY less than those proposed by Conservation Groups; downstream of Geer Road

Districts' flows would be 70,000 less than those proposed by Conservation Groups. The Districts' flows at La Grange in Super Critically Dry years would be about 61,000 AFY less than those proposed by Conservation Groups; downstream of Geer Road, Districts' flows would be 100,000 AFY less than those proposed by Conservation Groups.

The difference in the volumes of flows under the Districts' Preferred Plan and Conservation Groups' flow proposal in CD and SCD water years has nothing to do with a percent-of-unimpaired flow requirement. In CD and SCD years, the Conservation Groups' flow proposal *does not require release of flow based on percent of unimpaired flow*. The flow difference upstream of RM 25.9 is almost entirely attributable to the difference in the baseflow requirements. The difference downstream of RM 25.9 is almost entirely attributable to the difference in baseflow requirement added to the Districts' proposed diversion of 23% of the flow at the infiltration gallery in CD years and 31% of the flow at the infiltration gallery in SCD years. The volumes of pulse flows in CD and SCD water years in the respective proposals are close.

The Districts' Preferred Plan keeps the Water Bank from going negative in the 1987 to 1992 drought by starving the Tuolumne River of flow in CD and especially in SCD water years. The Districts' proposed construction of a second infiltration gallery keeps annual flow to the Delta in CD years to 173 AF in CD years and 120 TAF in SCD years.⁶⁸ In SCD years, the required flow at RM 25.9 is at most 25 AFY greater than Base Case. Rather than starve the river, Conservation Groups propose to keep the Don Pedro Water Bank positive by adding the Groundwater Water Bank.⁶⁹

6. Comparison of Districts' Preferred Plan Flows and Conservation Groups' Late Spring Recession Flows

As described above, Conservation Groups recommend a defined rate of flow recession following the last day in the spring when a percent-of-unimpaired flow requirement, or when Districts regain control after flood releases, which comes last.

Districts identify the desirability of a late spring flow recession. The AFLA titles the measure "Hydrograph Shaping." The AFLA's rationale states in part: "If spill conditions allow, streamflow recession rates would be managed during the cottonwood seed dispersal period to provide soil moisture conditions that allow seeds to take up water, germinate, and form roots."⁷⁰ However, their proposed measure is vague, unspecific, and unquantified, saying: "In spill years, the Districts would make reasonable efforts to shape the descending limb of the snowmelt runoff

⁶⁸ AFLA Appendix E-1, Attachment G, Table 4 shows required flows and resulting flows at La Grange as being identical in CD and SCD years. Table 6 shows resulting flows at RM 25.9 as notably higher than required flows. Without actual model output with a flow compliance location added at RM 25.9, it is difficult to understand the discrepancy at RM 25.9.

⁶⁹ In 1989, the Don Pedro Water Bank goes negative in the Conservation Groups' flow proposal because of the year-round 300 cfs baseflow. It goes more negative in 1990, 1991 and 1992, and slightly negative in 1994. These are the only years in the period of record that the Don Pedro Water Bank goes negative under Conservation Groups' flow proposal. Application of the Groundwater Water Bank allows elimination of this negative balance and some of the low positive balances in CCSF Total System Storage at other times in the period of record.

⁷⁰ AFLA, Ex. E, p. 4-68.

hydrograph to mimic natural conditions to promote seed dispersal and germination of cottonwoods and native willows.”⁷¹

7. Comparison of Districts’ and Conservation Groups’ Timing of Change in Water-Year Type

Conservation Groups propose to adjust water-year types in February, March, April and May of each year. The water-year type would adjust with the release of DWR Bulletin 120 (or successor), based on forecast annual Tuolumne River flow at La Grange. Districts propose to change the water-year type only once per year, following the release of DWR Bulletin 120 in April. Districts’ proposal does not make sense from either a water supply perspective or from an environmental perspective.

If the preceding water year was a relatively wet year, carrying the water-year type forward into April risks running water supply low if the present year is relatively dry. Conversely, if the preceding year was a relatively dry year, carrying the water-year type forward into April unnecessarily reduces instream flow if the current year is relatively wet.

Part of the rationale for the Districts’ single change may be that Districts propose relatively small flow differences between water-year types in the February through early April time period. Conservation Groups believe it is important biologically for flow to respond to changing conditions in the crucial February through early April time period. Conservation Groups’ flow proposal may significantly change instream flow requirements in these months.

G. Costs of Conservation Groups’ Flow Proposal

Conservation Groups request that Commission staff analyze the costs of Conservation Groups’ flow proposal in the Developmental Analysis section of the DEIS and clearly describe the basis for its analysis. Conservation Groups request that the DEIS consider different contingencies that would allow Districts’ customers to mitigate the costs of having to maintain agricultural production with less surface water available for irrigation. Conservation Groups further request that the DEIS analyze Conservation Groups’ proposed Groundwater Water Bank as a means to mitigate water supply impacts of Conservation Groups’ flow proposal to CCSF.

II. The Conservation Groups’ Recommendation: Reservation of FPA § 18 Authority to Require Fish Passage for Spring-Run Chinook Salmon and Possibly Steelhead to the Upper Tuolumne River after 2025.

A. Recommended Measure

The National Marine Fisheries Service (NMFS) shall reserve its authority under § 18 of the FPA to require fish passage for spring-run Chinook salmon and possibly Central Valley steelhead past La Grange and Don Pedro dams to the upper Tuolumne River after 2025.

⁷¹ AFLA, Ex. E, p. 4-94. There is similar language on p. 5-39.

B. Rationale

1. Comprehensive Planning

The National Marine Fisheries Service (NMFS), the federal trustee for anadromous fisheries, has developed a comprehensive Final Central Valley Recovery Plan that defines actions for recovery of two federally listed species relevant to the Tuolumne River: the Distinct Population Segment (DPS) of Central Valley steelhead and the Evolutionarily Significant Unit (ESU) of spring-run Chinook salmon.⁷² NMFS released the Recovery Plan in July, 2014 and filed it in the Don Pedro and La Grange dockets as a comprehensive plan in October, 2014. The actions recommended in the plan include:

- Protect and enhance the Central Valley steelhead Distinct Population Segment and its critical habitat in extant habitat, including the lower Tuolumne River downstream of La Grange Dam.
- Expand the extant population of the Central Valley steelhead into formerly occupied habitats by establishing new viable populations upstream of the current limit of anadromy and into the upper watershed of at least one of the three major San Joaquin River tributaries.
- Reintroduce Central Valley spring-run Chinook salmon into formerly occupied habitats by establishing new viable populations upstream of the current limit of anadromy and into the upper watershed of at least one of the three major San Joaquin River tributaries, after 2025.

2. Jurisdiction

Licensees opposed analysis of fish passage in the initial stages of the Don Pedro relicensing on the grounds that La Grange Dam, the terminal barrier to fish passage on the Tuolumne River, was not jurisdictional to FERC. Licensees argued that no study of fish passage was warranted because blockage of passage was not a Project effect, and thus there was no Project nexus for fish passage. Following formal study dispute by NMFS, FERC staff's Study Plan Determinations upheld the Districts' position.

Following a series of pleadings by NMFS, Conservation Groups, Districts and others, the Commission ordered the licensing of the La Grange Hydroelectric Project.⁷³ Following request for rehearing and litigation, the Districts initiated a licensing proceeding. The Commission issued a notice initiating the proceeding on May 23, 2014.⁷⁴

⁷² National Marine Fisheries Services. 2014. *Final Recovery Plan for Sacramento River Winter-run Chinook Salmon, Central Valley Spring-run Chinook Salmon, and Central Valley Steelhead*. NMFS, West Coast Region, Sacramento, California. July 22, 2014. Entered into the records for the Don Pedro and La Grange licensings as a comprehensive plan, October 6, 2014, eLibrary no. 20141006-5095.

⁷³ 141 FERC ¶ 62,211, *Order Finding Licensing of Hydroelectric Project Required*, December 19, 2012.

⁷⁴ Notice of Filing of Pre-Application Document (PAD), Commencement of Pre-Filing Process, and Scoping; Request for Comments on the PAD And Scoping Document, and Identification of Issues and Associated Study Requests, May 23, 2014, eLibrary no. 20140523-3003.

In the La Grange licensing proceeding, the Districts proposed in their Revised Study Plan Proposal to perform a Fish Passage Alternatives Assessment. Subsequently, Districts performed a conceptual engineering analysis of fish passage past La Grange and Don Pedro dams.

In the Final License Application for the La Grange proceeding (FLA), the Districts argue that La Grange Dam itself is not jurisdictional to FERC even though the Commission determined that the La Grange Powerhouse falls under the Commission's jurisdiction.⁷⁵ Specifically, the Districts argue in the FLA that the blockage of fish passage by La Grange Dam pre-dates La Grange Powerhouse, and that La Grange Dam is used for purposes of water supply, not power generation. This argument fails, just as the Districts' arguments to try to separate functions of the Don Pedro Project also fail. See "Legal Basis for Conservation Groups' Recommendations," *infra*.

NMFS clearly has authority to issue a prescription for fish passage past La Grange Dam and Don Pedro Dam under § 18 of the FPA.

3. Preclusion of FPA § 18 Prescription for Spring-Run Chinook Salmon in the Tuolumne River until after 2025.

Under the terms of § 10011 of the San Joaquin River Restoration Settlement Act, NMFS is precluded from issuing an FPA § 18 fish passage prescription in the San Joaquin River watershed "until after the expiration of the term of the Settlement, December 31, 2025, or the expiration of the designation made pursuant to subsection (b), whichever ends first." Therefore, if NMFS were to make a § 18 prescription today in the instant La Grange and Don Pedro proceedings, NMFS would have to make that prescription on the basis that it is needed for steelhead and/or fall-run Chinook salmon.

4. Habitat and Source Stock in the Tuolumne River Upstream of Don Pedro Reservoir

Under the general umbrella of the La Grange licensing proceeding, Licensees conducted multiple studies of the habitat and relevant migration conditions in the Tuolumne River and major tributaries upstream of Don Pedro Reservoir. Licensees convened a series of workshops to present ongoing studies and study results and to discuss potential reintroduction of anadromous fish upstream of Don Pedro Reservoir. Licensees' scope of study exceeded studies directly required by the Commission. Notably, the Licensees undertook studies of the habitat in the Tuolumne River upstream of Don Pedro Reservoir as that habitat relates to the potential reintroduction of anadromous fish. Study results reported with the La Grange Final License Application (FLA) include evaluation of migration barriers and water temperature modeling and monitoring. Licensees also did field work to assemble assessment of holding pools, collected data on aquatic insects in the upper Tuolumne River, and collected data to support an instream flow study in the upper Tuolumne River; however, technical memos for this work are not part of the FLA.

⁷⁵ "The presence of the LGDD (not the Project) blocks the migration of anadromous fish. The diversion dam exists to support the primary purposes of water supply and M&I uses and would continue to operate as it does currently independent of hydroelectric generation." FLA, p. 3-110.

Since 2014, NMFS has also performed and commissioned several studies related to a potential reintroduction of anadromous fish to the Tuolumne River upstream of Don Pedro Reservoir. In 2017, NMFS produced a technical report on the genetics of *O. mykiss* found in the upper Tuolumne River and upper Merced River watersheds (“NMFS Genetics Report”).⁷⁶ In 2018, NMFS also produced a technical report on the habitat capacity of the upper Tuolumne River and upper Merced River for steelhead and spring-run Chinook salmon (“NMFS Capacity Report”).⁷⁷

In aggregate, the information from these studies demonstrates:

1. “The Tuolumne system maintained tolerable temperatures for holding Chinook in all years, and under existing flow management had a mean capacity that met or nearly met viability criteria for spring run Chinook salmon (>2500 spawning adults).”⁷⁸
2. “In all years assessed, the Merced system showed intolerable temperatures for holding Chinook from late June through early September, comprising most of the peak season for this life stage.”⁷⁹
3. There is suitable habitat for steelhead in both the upper Tuolumne River and upper Merced River.
4. There are genetically unique populations of *O. mykiss* in sections of both the upper Tuolumne watershed and the upper Merced watershed; these populations might serve as source stock to develop steelhead reintroduction programs to each upper watershed.

5. Engineering Issues for Reintroduction of Salmonids to the Upper Tuolumne River

In 2017, NMFS produced a technical report on conceptual engineering plans for fish passage facilities to support a program to reintroduce salmonids to the upper Tuolumne River (“NMFS Engineering Report”).⁸⁰ This report generally concludes that a “collection, handling, transport and release” (trap and haul) method passing fish from the lower Tuolumne watershed to the upper watershed and vice versa would be the most feasible.⁸¹

The NMFS Engineering Report evaluates two options for collection of juvenile salmonids migrating downstream from the upper Tuolumne River into Don Pedro Reservoir: a “hybrid” head-of-reservoir collection facility located just downstream of Ward’s Ferry Bridge⁸² and a floating surface collector, perhaps to be located near Moccasin Point.⁸³ The Report

⁷⁶ *Conceptual Analysis of Oncorhynchus Mykiss in the Upper Tuolumne and Merced Rivers to Evaluate Ancestry and Adaptive Genetic Variation*, November, 2017, eLibrary no. 20171117-5127.

⁷⁷ *On the Capacity of upper Tuolumne and Merced Rivers for Reintroduction of Steelhead and Spring-run Chinook Salmon*, January, 2018, eLibrary no. 20180124-5038.

⁷⁸ NMFS Capacity Report, p.5.

⁷⁹ *Id.*

⁸⁰ *Conceptual Engineering Designs for Fish Passage at La Grange and Don Pedro Dams on the Tuolumne River*, October 2017, eLibrary no. 20171133-5347.

⁸¹ NMFS Engineering Report, pp. 33-34.

⁸² *Id.*, p. 42 ff.

⁸³ *Id.*, p. 71 ff.

provides somewhat detailed costs for the “hybrid” option, and much less detail for the floating surface collector option. However, at first blush, the floating surface collector option appears to be half the cost or less (between \$50M and \$64M) of the “hybrid” option (\$152M).

As noted in the discussion of a whitewater take-out, *infra*, Conservation Groups have great concern over a facility that might affect whitewater boating in the Tuolumne River upstream of Don Pedro Reservoir. It appears, however, that a downstream fish capture facility well downstream of Ward’s Ferry, which would not affect boating in the upper Tuolumne River, would be much less expensive than a facility near Ward’s Ferry.

6. Conservation Groups’ Analysis of Fish Passage Issues in the La Grange Licensing and the Don Pedro Relicensing

The habitat and reliability of cold water in the upper Tuolumne River presents a strong argument for reintroduction of spring-run Chinook salmon to the upper Tuolumne River. As mentioned *supra*, the Merced River is thermally unsuitable for spring-run Chinook. The Stanislaus River has multiple water and power developments that segment its upper watershed and divert water out of its river reaches. Reliable cold water in the Stanislaus River, at least in the lower elevations upstream of New Melones Reservoir, is uncertain.

There are a number of questions related to a potential reintroduction program to the upper Tuolumne River that are likely to find answers in the next seven years. Those years are likely to determine whether the San Joaquin River Restoration Program can provide a source of reliable broodstock, not only for the San Joaquin but for one of its tributaries, especially with the conservation hatchery that supports that San Joaquin Program. It is unknown today whether spring-run Chinook from the San Joaquin River Restoration Program will stray into the Tuolumne River, but with adequate flows in the Tuolumne River and sufficient abundance of spring-run in the San Joaquin, such straying seems likely.

A number of organizations and individuals have questioned the efficacy of trap and haul programs in general and their application in California in particular. The Bureau of Reclamation’s ongoing pilot reintroduction program to reintroduce winter-run Chinook salmon upstream of Shasta Reservoir will likely tackle practical logistical issues of trap and haul ranging from permitting to on-the-ground operations. One or more pilot trap and haul programs elsewhere in the Central Valley may also be in planning or early implementation stages by 2025. As each program develops, cost estimates and program efficiencies are likely to evolve.

While at least some Conservation Groups would likely support a § 18 fish passage prescription for steelhead on the Tuolumne River today, an evaluation of the reintroduction of spring-run Chinook to the Tuolumne River in 2026, informed by experience over the next seven years, is more compelling.

III. Conservation Groups' Recommendation: Establish a Restructured Technical Advisory Committee

A. Recommended Measure

Licenseses shall re-establish and reconstitute a Tuolumne River Technical Advisory Committee (TAC).⁸⁴ The purpose of the new TAC shall be to review and approve resource management plans, restoration plans, and annual monitoring plans, as well as the implementation of these plans. The Tuolumne River TAC's voting members shall consist of the Turlock Irrigation District, Modesto Irrigation District, City and County of San Francisco, National Marine Fisheries Service, US Fish and Wildlife Service (USFWS), Bureau of Land Management (BLM), US Forest Service (USFS), California Department of Fish and Wildlife (CDFW), and two representatives from Conservation Groups, each representing a separate organization. Non-voting members shall include any organization or individual with an interest in fishery and recreation issues on the Tuolumne River.

Licenseses shall retain an independent, professional consultant to facilitate and coordinate TAC meetings. The facilitator shall be approved by the members of the TAC. The facilitator shall propose formal procedures or communication protocols including processes for decision making, assuring appropriate conduct, managing dispute resolution, drafting agendas, and recording meeting notes. The facilitator shall present the procedures and communication protocols to the TAC for consideration and adoption. The TAC facilitator shall notify the TAC and other interested stakeholders of the location, time and agenda of each TAC meeting at least 30 days in advance of that meeting.

The Licenseses shall convene the TAC each year for an annual consultation meeting. Licenseses shall make best efforts to convene the annual consultation meeting on a date that allows maximum attendance, in general prior to April 15 of each year. The agenda shall include opportunities for discussion of all of Licenseses' presentations.

The Licenseses shall make available to the TAC, at least four weeks prior to the annual meeting, an operations and maintenance plan for the upcoming year.

The goals of the annual meeting are to share information; mutually agree upon planned monitoring, maintenance, and restoration project implementation activities; identify concerns of Resource Agencies or other TAC members about activities and their potential effects on sensitive resources; and reach consensus on any measures required to avoid or mitigate potential effects.

Consultation at the annual meeting shall include, but not be limited to:

⁸⁴ Other entities filing conditions or recommendations have chosen a different name. We continue the name of the entity that was created in the 1995 Settlement Agreement. See discussion in the rationale for this section. We attach no particular importance to the title of the entity we propose. We believe there is some benefit in continuity, despite concerns we and others have had for the way the present Tuolumne River TAC has functioned in the last decade.

- Discussion of the implementation of license conditions, including those instream flow measures that have specific timing and duration components that require annual adjustment.
- Discussion of the results of monitoring studies performed over the previous year.
- Review of any non-routine maintenance.
- Discussion of any recent past or foreseeable changes to Project facilities or features.
- Discussion of any necessary revisions or modifications to implementation plans approved as part of this license.
- Discussion of needed protection measures for species newly listed as threatened, endangered, or sensitive.
- Changes to existing management plans due to delisting of a species or to new knowledge about a protected species.
- Discussion of elements of current-year maintenance plans, e.g. road and trail maintenance.
- Discussion of any planned pesticide use.

For at least the first five years after license issuance, the Licensees shall convene the TAC at least quarterly; one of these quarterly meetings may be the annual meeting. The purpose of such quarterly meetings shall be to consult on license conditions that require consultation or adaptive management. These conditions include instream flow (including timing of pulse flows), water temperature management planning, spawning and floodplain habitat restoration, and reservoir stocking. To the extent that some resource measures may be highly technical and narrowly focused, the TAC will have the option to designate issue-specific working groups to address technical matters and report back to the larger TAC. After the first five years, Licensees may modify the frequency of TAC meetings to less than quarterly, but no less than annually. Before reducing the frequency of TAC meetings, Licensees shall consult with other TAC participants to seek consensus on the appropriate frequency of meetings.

Licensees shall keep meeting records of all TAC meetings, which shall include all recommendations made by Resources Agencies or Conservation Groups. Licensees shall file the meeting records, along with results from ongoing and Project-specific monitoring, progress made towards the License conditions, and associated meeting materials, and file them as an annual report with the Commission no later than June 30 of each year.

The Licensees shall continue to maintain the previous TAC website (<http://tuolumnerivertac.com/>) to post meeting materials and information, to post related documents and information, and as a communication tool for TAC business.

B. Rationale

Section 14 of the 1995 Settlement Agreement⁸⁵ established a Technical Advisory Committee with a two-tier governance structure. Tier #1 was open to any interested party or organization with an interest in lower Tuolumne River fishery issues. Tier #2 was the Management Committee consisting of representatives of the Licensees, CCSF, USFWS, and

⁸⁵ Available at: <http://tuolumnerivertac.com/Documents/1995FSAfrom1996FEIR.pdf>

California Department of Fish and Game (now DFW). Though the Commission adopted specific elements of the Settlement Agreement as part of the Don Pedro license, the Commission never formally recognized the TAC. Nonetheless, the Licensees coordinated and staffed the TAC per the terms of the 1995 Settlement Agreement.

The Tuolumne River TAC was initially a successful forum for Settlement Agreement participants to work towards implementing many of the projects and monitoring elements of the Settlement Agreement. Over time, it became a more contentious body, and it lost the faith of many of the participants. By 2005, participation by most parties of the Settlement Agreement other than the Licensees and CCSF had almost completely ceased.

In 2005, during the required 10-year review of the terms of the Settlement Agreement and associated license requirements, many of the parties filed comments and recommendations for reforming the TAC. The Conservation Groups' comments read as follows:

We generally agree with the Districts that the TAC should continue to provide a forum for oversight of restoration projects, review of monitoring results, and discussion of fisheries-related issues. However, we believe that substantial changes should be made to its operation in order to make it a more effective element of the fish management program.

To date the TAC essentially has been facilitated and organized by the Districts, and as a result has not consistently provided a fair and objective forum for discussion and decision. The lack of an objective, independent facilitator is compounded by the fact that there are no formal process or communication protocols for the TAC meetings. There are no procedures for taking or approving meeting minutes, developing or approving the agenda, resolving disputes, confidentiality, participants' conduct, etc.

If the TAC is going to be continued through relicensing, and especially if it is going to play a role in reviewing the 2005 Report and reaching consensus on recommendations as to whether the Commission should require further monitoring studies and changes in project structures and operations to protect fishery resources in the Tuolumne River, then several reforms are necessary. We request that the Commission direct the Districts to establish protocols, in consultation with agencies and other interested stakeholders. We also request that the Commission support our recommendation that the Management Committee be convened in order to discuss reforms necessary to improve the effectiveness of the TAC. Other interested agency and non-governmental stakeholders should be allowed to participate in such a meeting. Possible reforms could include the Districts funding an outside, independent facilitator selected by the Management Committee, based on recommendations by the TAC, to facilitate meetings; the Districts' funding technical consultants selected by the Management Committee and directed by the TAC rather than exclusively by the Districts; developing process and communication protocols; formally adding NMFS and other interested stakeholders to the TAC membership; etc.

We also agree with the Districts' recommendation that reporting should continue through relicensing. However, we believe that there should be an opportunity for input from relevant agencies and interested stakeholders before reports are finalized and filed with the Commission. For example, the Districts did not provide a copy of the 2005 Report to the TAC in advance of filing. Thus, in order to improve the accuracy and objectivity of the reports, we request that the Commission require the Districts to distribute draft reports and provide for a 30-day minimum comment period prior to finalizing the reports and filing them with the Commission.⁸⁶

Similarly, the California Department of Fish and Game (now DFW) and Friends of the Tuolumne, Inc. (now Tuolumne River Conservancy) referenced specific failings of the TAC as it had been operated and made similar recommendations to the Commission for reform.^{87,88,89} For example, the Tuolumne River Conservancy noted shortcomings in the taking and keeping of meeting notes, deviations in the consensus structure in designing and implementing monitoring efforts, and other weaknesses in the decision-making process.

As configured in 1995, the TAC did not provide a voting role for non-governmental organizations with a conservation mission. In the new license, Conservation Groups recommend two voting positions self-selected from among the Conservation Groups. We believe that Conservation Groups have earned this recognition. Conservation Groups are extremely well-informed and bring important meeting and collaborative skills to the TAC. We are willing to compel decisions even when they are difficult. In addition, Conservation Groups' personnel are often more durable than agency representatives: at least half of the signatories of this letter have a decade or more of involvement with regulatory and on-the-ground activities on the Tuolumne River.

A notable shortcoming of the 1995 Settlement Agreement is that it did not include NMFS. Subsequent to the adoption of the Settlement Agreement, Central Valley steelhead were listed as a federally-listed Threatened species. In these licensing proceedings, NMFS will issue a Biological Opinion to protect Central Valley steelhead. NMFS may also issue a fish passage prescription as part of this relicensing proceeding or may reserve its authority to do so. Therefore, it is reasonable to anticipate that upper Tuolumne river fishery issues may take on new importance during the next license term. Thus, we recommend the addition of NMFS as a voting member of the TAC.

The Licensees, in their AFLA for the Don Pedro Project, have proposed to construct a whitewater take-out facility near Ward's Ferry Bridge. Conservation Groups support construction of such a facility, though we recommend modifications to the facility the Districts have proposed. Licensees also propose to construct new day-use facilities near the upper end of Don Pedro Reservoir. These facilities will fall under the jurisdiction of the United States Forest Service (USFS) and the Bureau of Land Management (BLM) or will affect areas jurisdictional to

⁸⁶ Comments of Conservation Groups on Ten Year Summary Report, eLibrary no. 20050725-5060, pp. 15-17

⁸⁷ Comments of DFW on Ten Year Summary Report, eLibrary no. 20050725-5055, pp. 1-2

⁸⁸ Comments of Friends of the Tuolumne on Ten Year Summary Report, eLibrary no. 20050725-5024, p. 4

⁸⁹ Recommendations for Terms and Conditions of Friends of the Tuolumne, Inc., eLibrary no. 20051122-5001, pp. 1-2

these agencies. Thus, we also recommend the addition of USFS and BLM as voting members of the TAC.

Finally, our recommendation notably would result in the Commission formally incorporating the TAC into the Project licenses, which would ensure a more defined formal role for the TAC that the Commission had previously declined to order.

C. Cost of Measure

Annual facilitation, staff time, record-keeping, website, and reporting: \$100,000

IV. Conservation Groups' Comments and Recommendation: Increase Floodplain Rearing Habitat for Juvenile Salmonids

A. Recommended Measure

1. Licensees shall restore and create salmon fry and juvenile rearing habitat by lowering historical floodplain surfaces that currently inundate at flows greater than 5000 cfs. Licensees shall achieve specified quantities of floodplain creation by either:
 - a) Designing and implementing the lowering of sufficient floodplain habitat such 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:
 - In Above Normal years, a median of at least 100,000 acre-days;
 - In Below Normal years, a median of at least 65,000 acre-days;
 - In Dry years, a median of at least 36,000 acre-days.

OR

- b) Creating 810 acres of 100% suitable floodplain habitat or equivalent based on habitat suitability. (As the floodplain habitat quality decreases, acreage shall increase *e.g.*, 2314 acres for 35% suitability, 4050 acres for 20% suitability, 8100 acres for 10% suitability, etc.). Of this acreage, 25% shall inundate at 1500 cfs or lower flow; 50% shall inundate at 3000 cfs or lower flow; 75% shall inundate at 4000 cfs or lower flow; and 100% shall inundate at 5000 cfs or lower flow.

Licensees shall implement whichever of these two alternatives would have created the greater amount of suitable floodplain acreage in the Below Normal years under the hydrology of the 1971-2012 period of record.

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 Conservation Groups' flow proposal as a license condition, then flows alone would have attained a median of 25,237 acre-days of inundation

in Below Normal years 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 40,362 acre-days of inundation per Below Normal year, above and beyond what flows are attaining alone.

Licensee shall select no fewer than six restoration locations distributed along the lower river to ensure that outmigrating and rearing juveniles have adequate access to floodplain habitat along the entire length of the river. Restoration designs shall emphasize floodplain terraces, benches, and swales with through-flow. Licensees shall incorporate silt importation into floodplain restoration designs to mitigate for loss of silt due to Project operations. Licensees shall plant floodplain surfaces with native riparian trees, shrubs, forbes, and grasses. Licensees shall complete restoration within 10 years of the new license term.

2. Licensees shall complete, within two years of the new license term, a Floodplain Rearing Habitat Restoration Plan (FRHRP). Licensees shall consult with the Tuolumne River Technical Advisory Committee to develop the plan. Licensees shall use the plan as the guiding document for designing and implementing the Floodplain Rearing Habitat Restoration Program. The specific objective of this Floodplain Rearing Habitat Restoration Program shall be to restore or create additional salmon fry and juvenile rearing habitat that, in conjunction with instream flows and other non-flow restoration measures (such as LWD addition and gravel augmentation), is sufficient to achieve the AFRP Doubling Goal for the Tuolumne River.

The FRHRP shall identify the river reaches with the greatest need for rearing habitat, a target amount of rearing habitat for each reach, potential locations for new rearing habitat, a floodplain inundation analysis to identify elevations for flooding at flows of 1500 to 3000 cfs, and a revegetation plan. The FRHRP shall also evaluate land ownership and the potential for acquisition, permitting requirements and timelines, and other relevant details.

As part of this planning effort, Licensees shall refine the Licensees' existing TUFLOW model. The refined model shall incorporate vegetative cover (in addition to depth and velocity) to analyze floodplain rearing habitat needs and opportunities and to quantify habitat quality at flows of 1500 to 3000 cfs. The refined model shall also reduce the cell size of the TUFLOW model (smaller than 30' x 30') to a size appropriate to quantifying habitat quality. Licensees shall, to the greatest extent possible, prioritize project sites that have the potential to produce the highest quality habitat. Project site selection shall prioritize floodplain areas with a higher river frontage to acreage ratio. Licensees shall develop project-specific plans in coordination with the Tuolumne River Technical Advisory Committee. Licensees may develop specific projects in conjunction with projects they develop as part of the Gravel Augmentation Program. Licensees may use floodplain restoration sites as sources gravel and may create new floodplains in concert with the filling of Special-Run Pools.

B. Rationale

There are a number of studies that document the interrelationship between outmigration success of juvenile salmonids and the amount and quality of rearing habitat on Central Valley

ivers. Historically, the Central Valley had extensive, seasonally inundated, shallow-water habitat that allowed for salmonid rearing.^{90,91,92} This habitat is associated with increased growth and survival of juvenile salmonids.^{93,94,95,96} Most of these shallow-water rearing habitats have been eliminated throughout the Central Valley, and the Tuolumne is no exception. Flow modifications from Project operations have dramatically reduced the magnitude, frequency, and duration of flows, thus reducing the total amount, duration, and frequency of inundated floodplain acreage.^{97,98} Additionally, inundation under Project operation often occurs at times that are not optimal for outmigrant success.

Conservation Groups have developed a detailed set of draft biological goals and objectives for the Tuolumne River. These goals and objectives grew out of an initial report produced for the Stanislaus River by a collaborative of conservation groups, resource agencies, academics, consultants and water project personnel. This collaborative is known as the Scientific Evaluation Process (SEP). Participants in the SEP attributed continuing declines in salmon and steelhead stocks in the San Joaquin Basin, in part, to a lack of common vision of conservation success among resource agencies, conservation groups, and water purveyors. Many policies have focused on particular Central Valley salmonid stocks and have not defined outcomes for other stocks. The SEP participants ultimately determined that they should use science-based methods to establish desired outcomes (including goals, biological objectives, and environmental objectives) in each of the three major tributaries to the San Joaquin River and in the lower San Joaquin mainstem. These desired outcomes can serve as metrics to evaluate conservation proposals.

The SEP partnership developed a vision of restoration success that expresses and harmonizes relevant policies as science-based and achievable goals and objectives. This vision prioritizes the relative importance of various barriers (stressors) to the attainment of these desired conditions and provides a framework for developing, evaluating, and implementing strategies for

⁹⁰ [TBI] The Bay Institute. 1998. *From the Sierra to the Sea: The Ecological History of the San Francisco Bay-Delta Watershed*. Novato, California. Available at <http://www.bay.org/publications/from-the-sierra-to-the-sea-the-ecological-history-of-the-san-francisco-bay-delta-waters>

⁹¹ Moyle, P. B. 2002. *Inland fishes of California*. University of California Press.

⁹² Williams, J.G., 2006. *Central Valley Salmon: A Perspective on Chinook and Steelhead in the Central Valley of California*. San Francisco Estuary and Watershed Science 4:416.

⁹³ Sommer, T.R., Nobriga, M.L., Harrell, W.C., Batham, W., Kimmerer, W.J., 2001. *Floodplain rearing of juvenile Chinook salmon: evidence of enhanced growth and survival*. Can. J. Fish. Aquat. Sci. 58:325–333. Available at: <http://dx.doi.org/10.1139/f00-245>

⁹⁴ Sommer, T.R., W.C. Harrell, A.M. Solger, B. Tom, and W. Kimmerer, 2004. *Effects of flow variation on channel and floodplain biota and habitats of the Sacramento River, California, U.S.A.* Aquatic Conservation: Marine and Freshwater Ecosystems. 14: 247-261. Available at: <http://www.water.ca.gov/aes/docs/AquaticConservManuscript.pdf>

⁹⁵ Sommer, T.R., W.C. Harrel, M.L. Nobriga. 2005. *Habitat use and stranding risk of juvenile Chinook salmon on seasonal floodplain*. North American Journal of Fisheries Management, 25: 1493-1504. Available at: <http://citeseerx.ist.psu.edu/viewdoc/download?doi=10.1.1.591.7404&rep=rep1&type=pdf>

⁹⁶ Jeffres, C.A., J.J. Opperman, P.B. Moyle. 2008. *Ephemeral floodplain habitats provide best growth conditions for Chinook salmon in a California river* Environmental Biology of Fishes, 83(4): 449-458

⁹⁷ McBain & Trush, 2000. Habitat Restoration Plan for the Lower Tuolumne River Corridor. Available at: <http://tuolumnerivertac.com/Documents/tuolplan2.pdf>

⁹⁸ AFLA Att. C, *Lower Tuolumne River Floodplain Hydraulic Assessment Study Report*, W&AR-21, p. 6-2

conservation and restoration. Established quantifiable goals and objectives are also a prerequisite to the application of science-based adaptive management.

The SEP vision provides a common scientific foundation that will be useful for all parties pursuing a comprehensive approach to restoring native species and habitats in the San Joaquin River basin and in establishing a framework for addressing relevant regulatory processes that include:

- The State Board’s update of the Water Quality Control Plan, as called for under both the state Porter-Cologne Water Quality Control Act and the federal Clean Water Act, and
- Federal Energy Regulatory Commission relicensing proceedings.

The overarching purpose of the SEP is to restore conditions in the lower San Joaquin River and its tributaries that will support sustainable native fish populations and other living resources. The SEP is designed to:

- Articulate a clear, scientifically justified expression of policy guidance regarding the desired status of fall-run and spring-run Chinook salmon and *O. mykiss* (both resident [rainbow trout] and anadromous [steelhead] forms) in the San Joaquin River basin;
- Provide well-documented and transparent technical guidance on the conditions necessary to attain that vision; and
- Provide a foundation for evaluating the effectiveness of proposed actions to achieve the conditions necessary to realize the vision.

The SEP approach to conservation planning begins by describing a vision of conservation success that integrates and harmonizes a suite of policy goals and objectives, which are described in laws, policies, and plans. This vision is articulated as specific outcomes that are grounded in the best available science. Defining goals and objectives provides a transparent basis for evaluating implications of proposed actions and trade-offs among these actions, implementing actions efficiently within a specific timeframe, and managing actions towards attainment of desired conditions.

The initial SEP Report focused on the Stanislaus River. The Report is included as Attachment 3 to these comments and recommendations.⁹⁹ This Report provides the methodological context and approach that Conservation Groups used to develop the biological and environmental objectives for the Tuolumne River.

One of the foundational policy goals driving the specific biological goals and objectives for the Tuolumne River is Section 3406(b)(1) of the Central Valley Project Improvement Act (CVPIA). Section 3406(b)(1) directed the Secretary of the Interior to:

[d]evelop within three years of enactment and implement a program which makes all reasonable efforts to ensure that, by the year 2002, natural production of anadromous fish

⁹⁹ *Scientific Evaluation Process (SEP) Report: Conservation Planning Foundation for Restoring Chinook Salmon (Oncorhynchus Tshawytscha) and O. mykiss in the Stanislaus River*, Anchor QEA, 2016

in Central Valley rivers and streams will be sustainable, on a long-term basis, at levels not less than twice the average levels attained during the period of 1967-1991.

This directive is commonly referred to as the Anadromous Fish Restoration Program (AFRP) Doubling Goal. The Conservation Groups' draft biological and environmental objectives for restoring salmon and steelhead in the Tuolumne River, whose development Conservation Groups based on the same approach as those applied by the SEP collaborative, are included as Attachment 4. With the AFRP Doubling Goal as its basis, the biological objective for total freshwater survival of fall-run Chinook in the San Joaquin system is 10%. To achieve this basin-wide objective, the Tuolumne's juvenile survival rate would need to be similar to that of the Stanislaus, 15-35% depending on water year type.

To further round out the original SEP Report, SEP participants have also completed a draft detailed assessment of stressors limiting Tuolumne (and Merced) River fall-run and spring-run Chinook salmon and Central Valley steelhead. Stressors are conditions (physical, biological, or ecological) within the system that limit or inhibit the attainment, existence, maintenance, or potential for desired conditions, as characterized by the Biological and Environmental Objectives. Identification of stressors:

- Highlights components of desired conditions that are not being achieved; and
- Identifies specific obstacles (i.e., stressor[s]) inhibiting desired conditions.

As a complement to the identification of stressors, ranking stressors accomplishes the following:

- Enables the development of specific actions to achieve desired conditions by resolving stressors; and
- Facilitates the prioritization and sequencing of those actions to maximize benefit by addressing the most significant stressors first.

In cases where other prioritization considerations (e.g., financial and political) prevent stressors from being addressed in order of importance, stressor ranking also helps to correctly set expectations about the extent of progress towards desired conditions that a given action will achieve, and/or the suite and scale of actions necessary to achieve or make progress towards desired conditions. The draft stressors analysis and prioritization for the Tuolumne and other San Joaquin tributaries is included as Attachment 5. As part of this analysis, the SEP participants observed that there is a lack of sufficient rearing habitat for juvenile salmon, and this lack of rearing habitat has a high expected sustained major population-level effect.

In support of the Central Valley Flood Protection Plan Conservation Strategy (CVFPPCS), existing and historical suitable rearing habitat was estimated using the Estimated Annual Habitat (EAH) approach¹⁰⁰ that uses measured hydrology and modeled hydraulic relationships between flow and inundation area to calculate areas of inundation with timing,

¹⁰⁰ Matella, M. M., and K. Jagt. 2013. *An Integrative Method for Quantifying Floodplain Habitat*. Journal of Water Resources Planning and Management.

duration, and frequency to support juvenile Chinook salmon. Suitable rearing habitat required to satisfy the AFRP Doubling Goal was calculated using the Emigrating Salmonid Habitat Estimation (ESHE) model, developed by Cramer Fish Sciences and Flow West. The ESHE model considers territory size required for emigrating juvenile salmonid cohorts of a target population size, using empirically derived migration rates, growth rates, and survival rates. In implementing these two approaches, consistent assumptions were adopted about the duration, timing, and frequency of flows and the physical suitability of inundated areas required to provide suitable rearing habitat for juvenile salmonids.¹⁰¹

The ESHE model is based on the theory that territory size limits the density and production of stream/river-dwelling salmonids.^{102,103,104} Salmonids either defend or rely on food from an area of territory.¹⁰⁵ As juvenile salmonids increase in size, the area they defend also increases to meet their growing food and energy requirements.¹⁰⁶ As a result, the density of juvenile salmonids decreases as the average body size within a cohort increases.¹⁰⁷ The ESHE model applies a territory size curve (a function of fish size) to empirical data on fish outmigration distribution under different flow scenarios to estimate the spatially and temporally explicit habitat area needed to support a given number of juvenile fish. The model simulates stationary growth (rearing) and downstream movement (emigration) of individual daily groups (cohorts). The model tracks numbers of fish (abundance), average emigration speed, size, survival, and territory size. The ESHE model assumes that habitat is 100% suitable with sufficient food and cover for salmonids.

ESHE model parameters include:

- Initial abundance, i.e., the number of juveniles entering the model based on the target number of parent fish. The number of juveniles included in the ESHE model run whose results are discussed in the present document was calculated using the AFRP Doubling Goal.
- Initial timing and size, which is the number and average size of fish that exit the spawning grounds each day, informed by rotary screw trap tagging studies within the Central Valley.

¹⁰¹ [DWR] California Department of Water Resources. 2016. *Central Valley Flood Protection Plan Conservation Strategy*. Appendix H Central Valley Chinook Salmon Rearing Habitat Required to Satisfy the Anadromous Fish Restoration Program Goal.

¹⁰² Chapman, D. W. 1966. *Food and Space as Regulators of Salmonid Populations*. *American Naturalist* 100:345–357.

¹⁰³ Allen, K. R. 1969. *Limitations on Production in Salmonid Populations in Streams*. in T. G. Northcote (Editor), *Symposium on Salmon and Trout in Streams*. University of British Columbia, Vancouver. 3-18.

¹⁰⁴ Grant, J. W. A., and D. L. Kramer. 1990. *Territory Size as a Predictor of the Upper Limit of Population Density of Juvenile Salmonids in Streams*. *Canadian Journal of Fisheries and Aquatic Sciences* 47:1724–1737.

¹⁰⁵ Cramer, S. P., and N. K. Ackerman. 2009. *Linking Stream Carrying Capacity for Salmonids to Habitat Features*. Pages 225–254 in E. E. Knudsen and J. H. Michael, Jr. (Editors), *Pacific Salmon Environmental and Life History Models: Advancing Science for Sustainable Salmon in the Future*. American Fisheries Society, Symposium 71, Bethesda, Maryland.

¹⁰⁶ Keeley, E. R., and P. A. Slaney. 1996. *Quantitative Measures of Rearing and Spawning Habitat Characteristics for Stream-Dwelling Salmonids: Implications for Habitat Restoration*. *Watershed Restoration Project Report 2*. British Columbia Ministry of Environment, Lands and Parks. Available at: http://www2.isu.edu/~keelerne/k_s96.pdf

¹⁰⁷ Grant and Kramer, 1990.

- Migration speed, which is the speed of the daily downstream movement of juvenile salmon.
- Survival, or the number of fish that avoid death each day, calculated from tagging studies in rivers tributary to the Sacramento-San Joaquin Delta.
- Growth, which represents the daily growth and resulting size of juveniles, calculated from lab studies.
- Territory size, which is the territory size requirement of juveniles based on their size, calculated based on field and lab studies.

The output of ESHE calculates the required suitable habitat needed to support juveniles and includes estimates of fish/reach. The ESHE model run completed for Appendix H of the Central Valley Flood Protection Plan Conservation Strategy (CVFPPCS) estimated that 810 acres of rearing habitat that is 100% suitable is needed in the lower Tuolumne River to support the AFRP salmonid population Doubling Goal.¹⁰⁸

However, on-the-ground suitability studies on the San Joaquin River found that actual habitat suitability per acre was between 7% and 30%.¹⁰⁹ As a result of the fact that habitat is not 100% suitable, the number of acres of juvenile rearing habitat needed on the lower Tuolumne River to support the AFRP Doubling Goal is significantly larger than 810 acres. For example, at 35% suitability 2314 acres is needed, at 20% suitability 4050 acres is needed, and at 10% suitability 8,100 acres is needed.¹¹⁰ Suitability as defined here is a threshold, not a weighting. In other words, an acre that meets the suitability criteria across all parameters specified in the environmental objectives is suitable. An acre that only meets some of the suitability criteria is not suitable. For example, 10% suitability means that out of 100 acres, 10 meet suitability criteria across all parameters. To be clear, it does not mean that of the 100 acres, each of the individual acres achieves the threshold across 10% of the parameters. If this were the case, then 0 acres of the 100 would be suitable.

Existing habitat availability on the lower Tuolumne River is far less than what is estimated as required to recover listed salmonid species populations. The CVFPPCS concluded that there is between 28-45 acres of suitable rearing habitat along the lower Tuolumne River.¹¹¹ The habitat deficit on the lower Tuolumne River is thus significant, and addressing this deficit requires a combination of flow improvements and channel modifications. The Licensees' own studies suggest that between 31-242 acres of usable habitat exist along the lower Tuolumne River for fry and juvenile Chinook salmon at flows of 1000-3000 cfs.¹¹² However, the Licensees' analysis has several flaws, which are explained in greater detail below, that both inflate the amount of habitat available identified in their report and create an incorrect conclusion that there is sufficient floodplain rearing habitat.

¹⁰⁸ Flow West and Cramer Fish Sciences, Unpublished Data.

¹⁰⁹ [SJRRP] San Joaquin River Restoration Program. 2012. *Minimum Floodplain Habitat Area for Spring and Fall-Run Chinook Salmon in the SJRRP*.

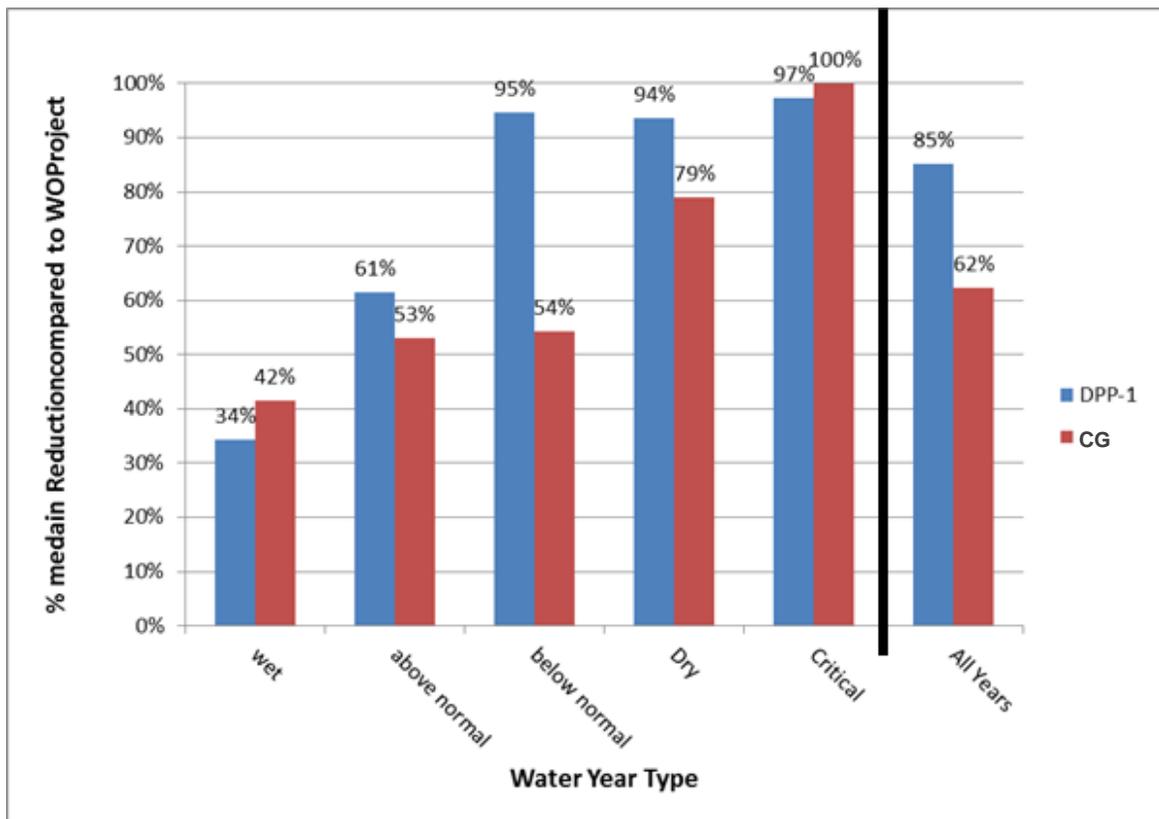
¹¹⁰ SEP Tuolumne Floodplain Rearing Environmental Objectives

¹¹¹ DWR 2016. CVFPPS Appendix H.

¹¹² W&AR-21, Table 5.2-1, p. 5-3.

USFWS’s analysis supports the conclusion that there is a significant deficit in floodplain rearing habitat. The USFWS’s analysis quantified the amount of floodplain inundation under different flow scenarios in order to identify the impact of the Project on inundation (see Figure 3). When inundation from the Licensees’ proposed flows is compared to without-project hydrology, median inundation is reduced by 85% for all water year types and as high as 97% for some water year types.¹¹³ The USFWS also identified that 77,640 acre-days would need to be attained to mitigate the Project’s inundation reductions resulting from lower flows and provide necessary components for high quality rearing habitat (Table 10). The specific flow schedule that is ultimately required by the Commission will affect the amount of floodplain habitat creation necessary to attain 65,599 acre-days of inundation in a median Below Normal year in the period of record. For example, if the Commission adopts the Licensees’ flow measures, then the flows alone would attain only a median 3553 acre-days of inundation (Table 10) and thus require sufficient floodplain lowering to attain an additional 62.046 acre-days of inundation (Table 11). Alternatively, if the Commission adopts the Conservation Groups’ flow measures, then flows alone would attain 25,237 acre-days of inundation (Table 10) and thus require sufficient floodplain lowering to attain an additional 40,362 acre-days of inundation in a Below Normal year (Table 11).

Figure 3. Percent decrease in floodplain inundation for DPP-1 flows and CG flows, by water year type, compared to what inundation would be under Without Project flows



¹¹³ US Fish & Wildlife Service. 2017. *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.* Rationale in support of USFWS 10(j) Conditions.

Table 10: Median inundation, expressed as cumulative acre-days, in areas that become inundated at flows greater than 1,000 cfs for three different hydrological regimes by schedule water year type. DPP-1 represents the Licensees flow proposal presented in the Amended Final License Application for the Don Pedro Project. CG represents the Conservation Groups' flow proposal.

	Median inundation expressed as cumulative acre-days		
	<i>WO Proj</i>	<i>DPP-1(flows only)</i>	<i>CG (flows only)</i>
All Years	77,640	7563	30,176
Wet	144,938	89,945	78,954
Above Normal	100,107	35,620	46,197
Below Normal	65,599	3553	25,237
Dry	36,258	2104	8465
Critically Dry	15,245	39	0

Table 11: Change in inundation of DPP-1 flows and Conservation Groups' Proposed flows in relation to Without Project flows. A negative value means that the flow resulted in a loss of inundation when compared to Without Project. This assumes that inundation begins at flows greater 1,000 cfs.

	Inundation change compared to Without Project, expressed as acre-days	
	<i>DPP-1</i>	<i>CG Proposal</i>
All Years	-70,077	-47,464
Wet	-54,993	-65,984
Above Normal	-64,487	-53,910
Below Normal	-62,046	-40,362
Dry	-34,154	-27,793
Critically Dry	-15,206	-15,245

Although the Licensees' Study Report for the *Lower Tuolumne River Floodplain Hydraulic Assessment* concluded that there is sufficient rearing habitat in the Tuolumne River for salmon and *O. mykiss* fry and juveniles, the study had several flaws that must be addressed to provide a more accurate analysis of the rearing habitat conditions on the river.

First, the Licensees' study has not given full consideration to the floodplain habitat needed to support the AFRP Doubling Goal. The Licensees' study quantified the amount of usable/suitable habitat for salmon fry and juveniles.¹¹⁴ The Licensees also calculated the

¹¹⁴ AFLA Att. C. *Lower Tuolumne River Floodplain Hydraulic Assessment* W&AR-21, p. 4-18.

corresponding carrying capacity for salmon fry for each flow using maximum fry densities per Grant and Kramer (1990) and the carrying capacity for juveniles using maximum densities per USFWS (1991)¹¹⁵. These results are summarized in Table 12.

Table 12. Usable Floodplain Habitat for Salmon Fry and Juveniles at Select Flows (TID & MID 2017)

	1,000 cfs Total Area of Usable Habitat (acres)	1,000 cfs Carrying Capacity	2,000 cfs Total Area of Usable Habitat (acres)	2,000 cfs Carrying Capacity	3,000 cfs Total Area of Usable Habitat (acres)	3,000 cfs Carrying Capacity	5,000 cfs Total Area of Usable Habitat (acres)	5,000 cfs Carrying Capacity
Chinook Salmon Fry	53.3	3.3M	134.8	8.5M	202.9	12.7M	293.3	18.4M
Chinook Salmon Juveniles	32.0	0.6M	129.5	2.6M	243.0	4.9M	434.8	8.8M

Though the carrying capacity estimates exceed the number of fry and juveniles produced in the Tuolumne in all years since 1995,¹¹⁶ none of these years had the number of juveniles required to meet the AFRP Doubling Goal. To attain the AFRP doubling goal, the Tuolumne River must produce on average 25,759,250 juveniles annually,¹¹⁷ which will require substantially more high quality floodplain rearing habitat than is inundated under current conditions.

Second, the Licensees' study assumes that in-channel and floodplain rearing habitat are of equal value for outmigrating salmon. As described above, an increasing number of studies demonstrate the importance of seasonally or ephemerally inundated floodplain and off-channel areas for salmonid rearing and growth.^{118,119,120,121} Functioning riparian and floodplain ecosystems are important for producing healthy juvenile salmonids because they increase primary productivity¹²² and food production¹²³ and create cover during high flow events. Areas

¹¹⁵ [USFWS] US Fish & Wildlife Service. 1991. *Trinity River Flow Evaluation-Annual Report*. U.S. Fish and Wildlife Service, Division of Ecological Services. Sacramento, CA.

¹¹⁶ See e-Library no. 20171011-5067, *Salmonid Population Information Integration and Synthesis Study Report*, W&AR-05, Table 5.2-3, pp. 5-24 – 5-25.

¹¹⁷ DWR 2016. CVFPPS Appendix H. Table 5-2, p. 5-7.

¹¹⁸ Sommer et. al. 2001.

¹¹⁹ Jeffres et. al. 2008.

¹²⁰ Grosholz, E. & Gallo, E. 2006. The influence of flood cycle and fish predation on invertebrate production on a restored California floodplain. *Hydrobiologia* 568: 91.

¹²¹ Merz, J.E., D.G. Delaney, J.D. Setka, and M.L. Workman. 2016. *Seasonal rearing habitat in a large mediterranean-climate river: Management implications at the southern extent of pacific salmon (oncorhynchus spp.)*. *River Research and Applications*, 32:1220-1231.

¹²² Ahearn, D.S., J.H. Viers, J.F. Mount, and R.A. Dahlgren. 2006. *Priming the productivity pump: flood pulse driven trends in suspended algal biomass distribution across a restored floodplain*. *Freshwater Biology*. 51(8): 1417-1433.

whose inundation creates hydraulic interaction with riparian vegetation and floodplain-associated geomorphology provide abundant and high-quality salmonid rearing habitat. Such areas increase food availability and growth opportunities as well as overall salmonid productivity. In these inundated areas, the territory size of fish decreases, thus increasing the carrying capacity per unit area.¹²⁴ The important result is a greater number of emigrating juvenile salmonids that can successfully migrate to the ocean and later return as adults.

Finally, the Licensees' study estimated the total suitable floodplain habitat for salmonid juveniles and fry. The Licensees utilized TUFLOW Classic modeling package, which links one-dimensional channel habitat solutions with two-dimensional floodplain habitat solutions. Floodplain habitat suitability was based upon TUFLOW model predictions of depth and velocity as a function of discharge. However, this does not provide a complete picture of habitat quality, because vegetation is a critically important variable in determining habitat quality. The primary energetic driver of riparian ecosystem function is organic matter from riparian vegetation and riparian insects.^{125,126,127,128,129} 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.^{130,131,132,133} 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

¹²³ Jeffres et. al. 2008.

¹²⁴ Grant and Kramer 1990.

¹²⁵ Allan, J.D. Wipfli, M.S., Caouette, J.P., Prussian, A. and Rodgers, J. 2003. Influence of streamside vegetation on inputs of terrestrial invertebrates to salmonid food webs. *Canadian Journal of Fisheries and Aquatic Science*, 60, 309-320.

¹²⁶ Cederholm, C.J., Johnson, D.H., Bilby, R.E., Dominguez, L.G., Garrett, A.M., Graeber, W.H., Greda, E.L., Kunze, M.D., Marcot, B.G., Palmisano, J.F., Plotnikoff, R.W., Percy, W.G., Simenstad, C.A., and Trotter, P.C. 2000. *Pacific salmon and wildlife-ecological contexts, relationships, and implications for management. Special Edition Technical Report*, Prepared for D.H. Johnson and T.A. O'Neil, Managing Directors, Wildlife-Habitat Relationships in Oregon and Washington. Washington Department of Fish and Wildlife, Olympia, Washington. Available at: <https://wdfw.wa.gov/publications/00063/>

¹²⁷ Cummins, K.W., Wilzbach, M.A., Gates, D. M., Perry, J.B., and Taliaferro, W. B. 1989. Shredders and riparian vegetation. *BioScience* 39:24–30.

¹²⁸ Pozo, J., Gonzalez, E., Diez, J. R., Molinero, J., and Elosegui, A. 1997. *Inputs of particulate organic matter to streams with different riparian vegetation*. *Journal of the North American Benthological Society*, 16: 602–611.

¹²⁹ Ward JV, Stanford JA. 1995. *Ecological connectivity in alluvial river ecosystems and its disruption by flow regulation*. *Regulated Rivers* 11: 105-119.

¹³⁰ Mason, C. F.; Macdonald, S. M. 1982: The input of terrestrial invertebrates from tree canopies to a stream. *Freshwater Biology* 12: 305-311.

¹³¹ Nakano, S. and Murakami, M. 2001. Reciprocal subsidies: Dynamic interdependence between terrestrial and aquatic food webs. *Proceedings of the National Academy of Sciences*. 98: 166-170. doi: 10.1073/pnas.98.1.166

¹³² Nakano, S., Fausch, K.D. and Kitano, S. 1999. Flexible niche partitioning via a foraging mode shift: a proposed mechanism for coexistence in stream-dwelling charrs. *Journal of Animal Ecology*, 68: 1079-1092. DOI: 10.1046/j.1365-2656.1999.00355.x

¹³³ Wipfli, M. S. 1997. Terrestrial invertebrates as salmonid prey and nitrogen sources in streams: contrasting old-growth and young-growth riparian forests in southeastern Alaska, USA. *Canadian Journal of Fisheries and Aquatic Sciences* 54 (6): 1259–1269

biomass in some systems.^{134,135} 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.¹³⁶ Because of this difference in seasonal bioavailability, terrestrial invertebrates are the primary food source for rearing and over-summering salmonids. The TUFLOW analysis omitted vegetation as an important variable and thus does not present a complete picture of habitat quality that is available.

The Licensees did not propose the creation or restoration of any floodplain habitat. However, the Licensees' analysis is flawed, and their conclusion that there is sufficient rearing habitat for salmon is unsupported. In fact, there is insufficient rearing habitat. The Don Pedro Project must mitigate for significant reductions in floodplain inundation due to Project operations. This is accomplished through a higher minimum flow schedule as proposed by the Conservation Groups in conjunction with the lowering/creation of floodplain terraces. The higher the minimum flows, the less floodplain habitat that will be required to mitigate for this Project effect. Conversely, lower minimum flows will require a greater amount of floodplain creation and restoration.

Based on the rationale above, the Licensees must attain the higher of the median values for acre-days BN water years in the period of record or 810 acres of 100% suitable floodplain habitat or equivalent. Licensees must describe the specific design and program for implementing this measure in a Floodplain Rearing Habitat Restoration Plan developed in coordination with the Tuolumne River Technical Advisory Committee.

C. Monitoring and Reporting

Licensees shall monitor the following parameters immediately following the completion of any individual project:

- Floodplain Inundation: Licensees shall monitor pre- and post-project floodplain inundation frequency, duration, depth, timing, velocity, and temperature.
- Fish Utilization: Licensees shall monitor the pre- and post-project utilization of the restored project sites by fish, particularly juvenile salmonids.
- Vegetation Survival: Licensees shall monitor survival of planted riparian species at newly constructed restoration sites.
- Licensees shall report the results of floodplain monitoring to the TAC at the annual meeting and in the annual report.

¹³⁴ Allan et. al. 2003.

¹³⁵ Kawaguchi, Y., Taniguchi, Y., & Nakano, S. (2003) Terrestrial invertebrate inputs determine the local abundance of stream fishes in a forested stream. *Ecology*, 84, 701-708.

¹³⁶ Nakano, S. and Murakami, M. 2001

D. Cost of measure

Costs are based on land acquisition and restoration projects in which Conservation Groups have been involved over the past 10 years.

Floodplain Rearing Habitat Restoration Plan:	\$75,000
Site acquisition (assuming 2,600 acres) @ \$5,000/ac:	\$13,000,000
Restoration – Earthwork @ \$5,000/ac:	\$13,000,000
Restoration: Planting @ \$4,000/ac:	\$10,400,000
Pre- and Post-Project Monitoring \$50,000/yr for 3 yrs:	\$150,000
Total:	\$36,625,000

V. Conservation Groups' Comments and Recommendation: Develop and Implement a Large Woody Debris Placement and Management Plan**A. Recommended Measure**

Within six months of License Issuance, Licensees shall develop a Large Woody Debris Placement and Management Plan in consultation with the Tuolumne River Technical Advisory Committee. The Plan shall:

1. Describe potential collection locations of Large Woody Debris (LWD) in Don Pedro Reservoir or other locations in the Tuolumne River watershed.
2. Describe potential options for moving LWD from Don Pedro Reservoir to the Tuolumne River downstream of LaGrange Dam.
3. Identify suitable locations in the Tuolumne River downstream of La Grange Dam down to the confluence with the San Joaquin River where LWD can be placed within the active channel.
4. Require consultation with State and Federal agencies regarding effects of LWD on safety or maintenance of bridges.
5. Require consultation with qualified recreational boating groups to ensure safety with regard to placement of LWD in the context of channel design.
6. Evaluate the efficacy, costs, and permitting requirements of providing permanent anchorage to the placed LWD.
7. Include a long-term LWD management plan to re-install LWD annually to ensure no net loss of LWD.
8. Describe a regular LWD effectiveness monitoring and reporting process.
9. Describe necessary permits and a permitting timeline.

Licensees shall submit the Plan to the Agencies for comment and approval prior to submitting the final plan to the Commission for approval. Licensees shall implement the Plan once the Commission approves it.

For purposes of the LWD enhancement and management plan, “LWD” is defined as structurally sound logs, a minimum of 24 inches in diameter and 18 feet in length.

The LWD augmentation plan shall meet the following criteria:

1. Licensees shall place a total of 1600 pieces of LWD from La Grange Dam down to the confluence with the San Joaquin River.
2. Licensees shall place LWD at an appropriate distribution, density and configuration as recommended by a restoration ecologist and in consultation with the Agencies.
3. Licensees shall place LWD pieces within or adjacent to floodplain-lowering and planting sites where feasible.
4. Licensees shall secure or embed a minimum of 10% of LWD pieces (160 pieces) in the bank to provide at least partial inundation of these pieces at 300 cfs upstream of the Licensees’ existing Infiltration Gallery and at 200 cfs in areas downstream of the Infiltration Gallery.
5. A minimum of 50% of LWD pieces that Licensees install shall have a crown or rootwad attached.
6. Licensees may include existing pieces of LWD that meet the size criteria as part of the total number of required pieces of LWD.

The Licensees shall place 50% of LWD pieces by Year 5 of the new license and the remaining LWD by Year 10 of the new license. The Licensees shall distribute the LWD equally among the following reaches:

- RM 51.7 to RM 40
- RM 40 to RM 21.5
- RM 21.5 to the confluence with the San Joaquin River

Licensees shall place LWD at an appropriate distribution, density, and configuration as approved by agencies in consultation. Licensees shall source the majority of LWD augmentation pieces from local collection at the Project reservoir. However, due to the episodic nature of LWD transport and unquantified rate of LWD delivery into Don Pedro reservoir, Licensees may need to use resources outside of the Project within the Tuolumne Watershed to source the LWD augmentation pieces. Licensees shall strive to match LWD from outside sources to the species composition native to the Tuolumne watershed. However, Licensees may also include local hardwoods used in agricultural production (*e.g.*, walnut trees) that are being retired from production.

Licensees shall place LWD such that it does not compromise the safety of recreational boaters, per American Whitewater design recommendations.¹³⁷

The Licensees shall conduct a LWD census no later than three years after issuance of a new license to assist in making initial decisions regarding LWD placement. Licensees shall conduct a LWD census every 10 years thereafter. The purpose of the census shall be to

¹³⁷ American Whitewater, 2012. *Integrating Recreational Boating Considerations into Stream Channel Modification & Design Projects*. <https://www.americanwhitewater.org/content/Document/fetch/documentid/1006/.raw>

determine the effectiveness and function of the LWD already placed and to identify the need to replenish LWD.

The Licensees shall replenish LWD as needed downstream of La Grange Dam down to the confluence with the San Joaquin River within three years after completion of each LWD census. Licensees shall conduct the first LWD census in License Year 10 and shall conduct a census every 10 years thereafter until a new license is issued. The Licensees shall replenish the LWD such that 1,600 pieces that meet the minimum size criteria are in place. Following each census, Licensees shall also replace or re-attach any of the 160 LWD pieces secured in the bank that are no longer in place.

Within 60 days of completing the implementation of each placement of LWD, the Licensees shall conduct effectiveness monitoring for each LWD site and shall summarize the results of the monitoring in a report. Licensees shall provide the report to the Tuolumne River TAC within 120 days of completion of the monitoring.

B. Rationale and Consultation

Large Woody Debris provides habitat structure in streams and can influence sediment storage and channel morphology through its effects on flow, water velocity, and sediment transport. LWD provides cover and refugia zones for juvenile fish rearing and adult fish holding, serves as substrate for the growth of algae and invertebrates (which are important components of the aquatic food web), and affects patterns of sediment deposition and scouring. Loss of LWD can result in reduced complexity of aquatic habitat and reduced carrying capacity for Central Valley steelhead and fall-run Chinook salmon.

Project facilities trap and eliminate the entire upper watershed's supply of LWD to the lower Tuolumne River. The Project also significantly reduces the frequency and magnitude of high flows in the lower Tuolumne River, which directly limits wood transport and also 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.

FERC staff's Study Plan Determination of July 25, 2012 approved with modifications the revised *O. Mykiss Habitat Survey Study Plan*.¹³⁸ In this Determination, the Director of FERC's Office of Energy Products (OEP) ordered the Licensees to estimate the average annual volume and frequency of LWD removed from Don Pedro Reservoir using quantitative and anecdotal historical data, including appropriate aerial photography analysis. The Director of OEP also required Licensees to conduct two annual quantitative surveys of LWD in Don Pedro Reservoir, timed to begin just after the cessation of seasonal high flows. FERC staff also ordered the development of a basic LWD budget that compares the average annual volume and frequency of LWD removed at Don Pedro Reservoir with the average annual volume and frequency of LWD stored in the lower Tuolumne River.

Licensees surveyed LWD in the lower Tuolumne River as part of the *O. Mykiss Habitat Survey Study* (W&AR 12). Licensees conducted the LWD survey in the lower Tuolumne River

¹³⁸ See Director's Study Plan Determination, July 25, 2012, e-Library no. 20120725-3008

between RM 52 and to RM 24. In addition, Licensees surveyed LWD in Don Pedro Reservoir as part of the study, in order to estimate LWD recruitment to the system.

As reported in the *O. Mykiss Habitat Survey Amended Study Report*,¹³⁹ the lower Tuolumne River has limited LWD. Licensees' survey found a total of 118 pieces of LWD in the 16,905 linear feet of habitat surveyed in 2012. Licensees extrapolated this number to the reach extending from RM 52 to RM 39, and thus estimated 453 pieces¹⁴⁰ or about 35 pieces per mile. The Report did not provide an analysis of the quality of the LWD in terms of its habitat value.

This amount of LWD per mile is an extremely low density of LWD pieces for a Central Valley river. In a 2012 survey of 19 Central Valley rivers that support Chinook salmon, the median number of pieces of large wood per mile was 130. A 2010 study of the Mokelumne River, a nearby highly regulated river that supports anadromous fish, found 112 large pieces of wood per mile.¹⁴¹

The lack of LWD is an important stressor or limiting factor for salmonid habitat. Adding LWD along with gravel, and providing a new instream flow schedule that mimics the natural hydrograph, would substantially improve lower Tuolumne River salmonid habitat over its currently degraded condition.

The Licensees state that the woody debris captured in the Don Pedro Reservoir is too small to act as favorable LWD-induced habitat in the lower Tuolumne River.¹⁴² Rather than placing large wood in the lower Tuolumne River, Licensees propose to place boulder-size stones in select locations between RM 43 and RM 50 to increase river complexity. Boulders provide habitat that is much less complex than wood. A downed tree in a river, particularly if it has a rootwad or small branches, can provide cover for hundreds of juvenile salmon or *O. mykiss*. Boulders also do not provide organic substrate for benthic invertebrates. In addition, Licensees' proposed extent of boulder placement is extremely limited.

Conservation Groups recommend and request that the Commission condition the Don Pedro license to require development and implementation of a LWD plan to mitigate the loss of wood and to improve salmonid habitat in the Tuolumne River downstream of La Grange Dam.

C. Cost of Measure

Conservation Groups request that Commission staff evaluate costs of this measure in the EIS.

¹³⁹ See *O. Mykiss Habitat Survey Amended Study Report*, W&AR-12, p. 6-2, submitted by Licensees as an attachment to the AFLA.

¹⁴⁰ *Id.*

¹⁴¹ Senter, A.E. and G.B. Pasternack. 2010. Large wood aids spawning Chinook salmon (*Oncorhynchus tshawytscha*) in marginal habitat on a regulated river in California. *River Res. Applic.* 2010. Published online by John Wiley & Sons, Ltd. DOI: 10.1002/rra.1388.

¹⁴² W&AR-12, p. 6-4

VI. Conservation Groups' Comments and Recommendation: Gravel Augmentation and Rehabilitation and Reduction of Habitat for Piscivorous Fish

A. Recommended Measure

1. Licensees shall place at least 200,000 cu yds/year of sediment annually for 10 years to mitigate for Project impacts, until Licensees have filled Special Run Pools (SRPs) in the river with a total of at least 1,950,824 cubic yards of sediment.
2. Licensees shall also conduct annual maintenance spawning gravel augmentation projects. The Licensees shall apply the bedload transport rating curve developed for the Coarse Sediment Management Plan¹⁴³ to any new flow schedule required by the Commission or the State Water Resources Control Board for the Don Pedro or La Grange Projects to calculate average annual bedload transport rates for sediment > 8 mm. The Licensees shall annually add this amount of gravel to the lower Tuolumne River to ensure no net loss of spawning habitat. At a minimum, the Licensees shall annually add 2500 cu yd/year of cleaned spawning size gravel.¹⁴⁴ The size of gravel added under this provision shall be identified in consultation with the Tuolumne River Technical Advisory Committee (TAC) as described below.
3. Licensees shall update the 2004 Coarse Sediment Management Plan¹⁴⁵ and implement the updated plan. Licensees shall develop project designs in consultation with the TAC within two years of license issuance. Licensees shall consult with the TAC on the annual implementation of gravel augmentation as an adaptive management program.

The updated Coarse Sediment Management Plan (CSMP) shall be used as the guiding document for designing and implementing the gravel augmentation plan. The specific objective of this gravel augmentation program shall be to:

- a. Mitigate for the loss of gravel and sediment (both spawning-sized gravel and fine sediment) due to direct effects of Project operations.
- b. Mitigate for the abundance of habitat for piscivorous fish that was created by Project effects.

The updated Coarse Sediment Management Plan shall:

- a. Describe potential locations for gravel collection for the reaches of the Tuolumne River between La Grange Dam (RM 52.1) and Geer Road Bridge (RM 24.0), or, alternatively on other feasible locations.
- b. Describe potential options for providing and placing gravel in the reach of the Tuolumne River between La Grange Dam (RM 52.1) to Geer Road Bridge (RM 26).

¹⁴³ McBain & Trush, 2004. *Coarse Sediment Management Plan for the Lower Tuolumne River Revised Final* (CSMP). Available at: http://tuolumnerivertac.com/Documents/7-2004_Revised_CSMP_Report.pdf

¹⁴⁴ *Id.*, p. 75.

¹⁴⁵ *Id.*

- c. Require and describe consultation with the TAC on annual gravel augmentation, including how the TAC will evaluate and respond to geomorphic and hydrologic variability.
- d. Provide plans for annual gravel augmentation, taking into account geomorphic and hydrologic factors, access, and suitability of locations for gravel addition;
- e. Provide an implementation timeline.
- f. Report and evaluate any legal constraints on gravel placement, and any federal, state, or local permits that may be needed, and provide a permitting timeline.

Project designs shall focus on:

- a. Enhancing Chinook salmon and *O. mykiss* spawning habitat.
- b. Reducing holding and spawning habitat for piscivorous fish.
- c. Maintaining or enhancing *O. mykiss* holding habitat above RM 42.
- d. Creating floodplain habitat of medium to high quality for juvenile salmon rearing that meets criteria outlined in the Floodplain Rearing Habitat recommendation.

Licensees may implement the Coarse Sediment Management Plan in conjunction with floodplain restoration projects, as described in the Floodplain Restoration Recommendation. When Licensees complete the CSMP update, Licensees shall provide the plan to the TAC for a three month review. After the review period, Licensees shall assemble recommended edits, revisions and additions, prepare a final report, including an appendix documenting consultation, and file the plan with FERC.

4. Once gravel placement has commenced, Licensees shall annually monitor the quantity and quality of placed gravel, the locations and durations of placement, the short-term results of the placement of gravels, and the subsequent geomorphic distributions (movement, representative gravel quality, and bedload morphological change) and improvement (additions) of suitable anadromous salmonid spawning and rearing habitat by individual reach. Licensees shall document this monitoring in a draft annual report that they will provide to the TAC by March 1 of each year. After a two month review period by the TAC, Licensees shall assemble recommended edits, revisions and additions, prepare a final report, and submit the report to FERC. The final report will include an appendix documenting annual consultation with the TAC, including both general adaptive management consultation and consultation specific to the annual report.

B. Rationale

The Licensees' study report *Spawning Gravel in the Lower Tuolumne River* concluded that 373,966 tons/yr of total sediment and 37,397 tons/yr of coarse sediment is trapped by the Project reservoir.¹⁴⁶ Using a conversion factor of 1.6 tons/cu yd, this is equivalent to 233,728 cu yds/yr of total sediment and 23,373 cu yds/yr of coarse sediment. These amounts are roughly in agreement with the amounts identified in the 2004 CSMP: 18,800 cu yds/yr of coarse sediment trapped in the reservoir.¹⁴⁷

¹⁴⁶AFLA Att. C., *Spawning Gravel in the Lower Tuolumne River Study Report*, W&AR-12, p. 6-2

¹⁴⁷CSMP, p. 23.

During the early twentieth century, the Tuolumne River channel and floodplain were dredged for gold. The gold dredges excavated alluvial deposits in the channel and floodplain to the depth of bedrock and often realigned the river channel. After recovering the gold, the dredges deposited the remaining tailings back onto the floodplain, creating large, cobble-armored windrows that replaced the alluvial deposits and floodplain soils. By the end of the gold mining era, the majority of the floodplain adjacent to 14.5 miles of the river had been converted to dredger tailing deposits.¹⁴⁸ In the 1960's, much of the tailings were excavated to provide construction aggregate for Don Pedro Dam.¹⁴⁹ Much of this floodplain remains today as barren, unproductive surfaces, with exposed gravel/cobble and little or no soil layer and little or no native riparian vegetation.¹⁵⁰

The Tuolumne River has also been extensively mined for aggregate. Large-scale aggregate mining began in the 1930s and continues today.¹⁵¹ Historically, aggregate mines extracted sand and gravel directly from the active river channel, creating large in-channel pits. Contemporary mining operations excavate sand and gravel from floodplains and terraces adjacent to the river channel. These operations create large pits that are poorly separated from the river by narrow dikes that often fail during even moderate flows.¹⁵²

Many of the remnant gravel pits, called Special Run Pools (SRPs), remain today because of the lack of sediment input due to Project operations. As shown in Table 1, the SRPs are of substantial size and, in conjunction with flow conditions, create substantial warm water habitat for piscivorous fish, most notably largemouth and smallmouth bass.

Table 13. Estimated Gravel Quantities to Fill SRP Habitat¹⁵³

SRP Name	Volume (cubic yards)
La Grange Pool	17,284
Basso Pool	47,737
SRP 3	20,912
SRP 4	32,891
SRP 5	175,000
SRP 6	219,000
SRP 7	320,000
SRP 8	825,000
SRP 9	Filled in 2002 – 169,000
SRP 10	293,000
TOTAL	1,950,824 (not counting SRP 9)

¹⁴⁸ McBain & Trush, 2000. *Habitat Restoration Plan for the Lower Tuolumne River Corridor*, pp. 29-30, 40, 129, 167.

¹⁴⁹ *Id.*

¹⁵⁰ *Id.*

¹⁵¹ *Id.*

¹⁵² *Id.*

¹⁵³ CSMP, *Habitat Restoration Plan*, and Scott McBain, pers. comm.

Were it not for the total sediment capture and flow regulation by the Project reservoir, the river would transport enough sediment to fill the SRPs and recover geomorphic features within 10 years. Although availability of spawning gravel is not currently a limiting factor for recent escapement levels, it will become a factor as the population recovers. Don Pedro Reservoir's capture of gravel prevents its movement downstream, which has contributed to the net loss of gravel supply to the lower Tuolumne River and arrested the recovery of channel habitat types. Comparing 1999-2001 spawning habitat area to historical estimates indicates a loss (due to the Project) of 1.8 million sq ft (73%) of Chinook spawning habitat compared to historical conditions.¹⁵⁴

Licensees proposed an initial augmentation of 55,600 cu yd of gravel at 6 sites (upper Basso Pool, lower Basso Pool, A6, A5, A3, and A2) (RM 51.7-RM 47.0). Licensees did not recommend any maintenance gravel additions after the initial augmentation has occurred.

Based on the rationale above, the quantity of gravel proposed by the Licensees does not mitigate for Project effects. The Project completely blocks and traps 233,728 cu yds/yr of total sediment and 23,373 cu yds/yr of coarse sediment. The disruption in sediment transport, in combination with the Project flow schedule, has prevented the recovery of channel geomorphology and supported the continuing persistence of abundant habitat for piscivorous fish. The Licensees' proposal is inadequate for mitigating Project impacts.

C. Cost of Measure

If gravel and rock is available on-site, estimated cost of sorting available gravel ranges from \$11.00 to \$15.00 per cu yd, with an additional cost for transportation and permitting \$9/ per cu yd. Total cost of gravel rehabilitation: \$20.00-\$24.00 per cu yd. Cost estimates are based on restoration activities on the Merced River from 2009 to 2013 (Merced Fly Fishing Club and AFRP).

- Gravel Rehabilitation, Annual Cost: \$4M to \$4.8M for 10 years
- Gravel Maintenance, Following Rehabilitation: Annual Cost: \$50,000 to \$60,000
- Annual Cost for TAC Activities: \$25,000
- Annual Cost for Gravel Monitoring and Reporting: \$75,000

VII. Conservation Groups' Comments and Recommendation: Annual Fish Counting Weir and Installation of a Temporary Weir to Capture and Remove Non-Salmonid Piscivorous Fish in Critically Dry and Super Critically Dry Water Years

A. Recommended Measures

1. Each year, from September 15 through at least December 31, Licensees shall annually install a fish counting weir at or near RM 24, with the same basic configuration as the facility that Licensees have deployed since 2009.

¹⁵⁴ CSMP, p. 42 and Table 10, p. 44.

2. Licensees shall install a temporary weir between River Mile 25.9 and River Mile 25 in Critically Dry and Super Critically Dry years, for the purpose of capturing and removing striped bass, largemouth bass and smallmouth bass and other non-salmonid piscivorous fish¹⁵⁵ that are migrating past the location of the temporary weir. Licensees shall commence installation of the temporary weir no later than April 15 of each CD or SCD year, at the conclusion of the spring pulse flow. Licensees shall staff the temporary weir with personnel who service the weir with sufficient frequency to allow release in good condition of any downstream or upstream migrating salmonids and to allow the capture in live condition of migrating striped bass. Licensees shall staff and maintain the temporary weir until September 1, at which time they shall remove the weir.
3. Licensees shall design the temporary weir in consultation with CDFW, USFWS and NMFS, who shall approved the design prior to construction.
4. Licensees may co-locate the annual counting weir and the temporary weir if they so choose.
5. Licensees shall not install permanent infrastructure related to the weir.
6. Licensees shall allow juvenile and adult salmonids to pass the removal weir as quickly as reasonably possible, upstream or downstream as the case may be.
7. Licensees shall relocate striped bass captured at the temporary weir to San Francisco Bay. Licensees shall relocate largemouth bass, smallmouth bass, and other warm-water piscivorous fish captured at the temporary weir to reservoirs where salmonids are not present and from which they cannot escape to the Tuolumne River or other salmonid-bearing waters.
8. Licensees shall complete all required permitting for weir installation and operation and for fish capture and relocation.
9. Licensees shall conduct two snorkel surveys between April 20 and June 30 in any year that the weir is installed. Licensees shall conduct these surveys three hundred feet upstream and downstream of the temporary weir. Licensees shall report the initial results to the TAC as soon as data is compiled. Licensees shall present a written report on the results of the snorkel surveys within 6 months of the removal of the weir.
10. Licensees shall monitor the numbers, species and size of fish captured at the weir. Licensees shall record timing of capture, mortality, and the condition of any salmonids and striped bass captured. Licensees shall present a written report on fish captured at the weir to the TAC within 6 months of the removal of the weir.

B. Rationale

Predation on salmonids by piscivorous fish is one of the factors that limits successful outmigration and survival of juvenile salmonids in the Tuolumne River. This factor becomes more pronounced in Critically Dry years when low flows constrict available rearing habitat and migration corridors for juvenile salmonids, potentially delaying outmigration and increasing encounters with piscivorous fish. Circumstances where seasonally inundated rearing habitat along the channel margins and on floodplains is limited are especially of concern for rearing and

¹⁵⁵ *O. mykiss* are known to eat salmon roe and fry. Conservation Groups do not propose to remove or otherwise harm *O. mykiss*, and do not refer to *O. mykiss* in this measure or section in discussing “piscivorous fish.” While most of the other piscivorous fish in the Tuolumne River are bass, there are multiple other warm-water species in the lower Tuolumne River that eat juvenile salmonids.

outmigrating juvenile salmonids. Low flows also increase water temperatures sooner in the spring, increasing thermal stress on juvenile salmonids and creating habitat and energetic conditions more conducive to warm-water piscivorous fish such as bass.

Installing a facility that traps migrating piscivorous fish is an effective means of actually capturing these fish. While installation of a separation weir blocks that does not capture upstream migrants prevents them from passing upstream, it relies on secondary methods of capture that are unlikely to be effective. Any barrier that does not capture upstream migrating fish is also highly likely to concentrate them downstream of the barrier.

The limited sampling the Districts conducted in their 2012 Predation Study found that outmigration of juvenile salmon was more rapid and more successful at 2100 cfs than it was at 415 cfs or 280 cfs. 37 of 75 tagged salmon released at Hickman Bridge (RM 31.6) at a flow of 2100 cfs were detected at Grayson (RM 5.2). Of 75 tagged salmon released at Hickman Bridge at a flow of 280 cfs, only 1 was detected at Grayson. None of the tagged salmon released at Hickman Bridge at a flow of 410 cfs was detected at Grayson.¹⁵⁶

An earlier study on the Tuolumne River also found that flow is the most effective defense for salmonids in avoiding piscivorous fish. The McBain & Trush 2007 *Special Run Pool 9 and 7/11 Reach: Post-Project Monitoring Synthesis Report* reported:

During the years following the [1997] flood, largemouth bass abundance was controlled by spring and summer flow conditions that were unfavorable for reproduction. Largemouth bass require low water velocities and warm water temperatures to reproduce (Moyle 2002, Swingle and Smith 1950, Harlan and Speaker 1956, Mraz 1964, Clugston 1966, Allan and Romero 1975; all as cited in Stuber et al. 1982)...

In 1998, water temperature was below the preferred spawning range until mid-June, and flow fluctuations through spring and summer could have caused sufficient disturbance to reduce egg viability or destroy the nests (Eipper 1975) (Figure 4-7). In fall 1998, adult abundance remained low and few juvenile bass were captured. In 1999, flow and water temperature were favorable for largemouth bass for the first time since the 1997 flood...

High flow velocity was more important than depth in limiting largemouth bass habitat area at the channel sites.¹⁵⁷

Under the Conservation Groups' flow proposal, flows in the February through June time period in most years will be relatively high, providing habitat conditions more suitable to salmonid outmigrants. A weir designed to capture migrating piscivorous fish during such higher flows is not only less necessary, it would also present logistical challenges both in installation

¹⁵⁶ Predation Study Report (W&AR-07), Table 5.4-2. (Version included as Part of Attachment C, file 82 of AFLA).

¹⁵⁷ McBain & Trush, *Special Run Pool 9 and 7/11 Reach: Post-Project Monitoring Synthesis Report*, 2007, pp. 130-132. Available at: <http://tuolumnerivertac.com/Documents/Project%20Monitoring%20Synthesis%20Rpt1.pdf> <http://tuolumnerivertac.com/Documents/Project%20Monitoring%20Synthesis%20Rpt2.pdf> (2 volumes).

and in staffing. For these reasons, Conservation Groups propose to limit installation of a temporary weir to CD and SCD water years.

A removable counting weir is an effective monitoring and management tool that the Districts have deployed effectively since 2009. We recommend that the new license require continuation of this practice.

C. Licensees’ “Predator Control and Suppression Plan,” Including Permanent Barrier Weir and Fish-Counting Facilities

The Licensees propose a plan attempting to reduce striped bass, largemouth bass and smallmouth bass that includes the following elements:

1. Installation of a permanent barrier weir at RM 25.5.
2. Construction and operation of a permanent fish counting facility as part of the permanent barrier weir.
3. Other forms removal and/or isolation methods of bass, including boat electrofishing, seining, fyke netting, and other collection methods
4. Advocacy for changes to current fishing regulations for the lower Tuolumne River (e.g., length of season, bag limit, catchable size, requested removal of black bass/striped bass caught, allowing a bounty program)
5. Establishment of a fund to carry out predator control activities and to disseminate information to the public on the adverse effects of non-native fish on fall-run Chinook in the Tuolumne River in an effort to encourage participation in the removal program and advocacy of changes to fishing regulations that facilitate such removal. Activities mentioned could include developing educational materials about the effects of predatory fish, community outreach, or kiosks.

D. Comments on Licensees’ “Predator Control and Suppression Plan”

The “*Districts’ Predator Control and Suppression Plan,*” Appendix E-1, Attachment C of the AFLA, describes its overall goals and objectives as follows:

The goal of the Plan is to reduce population-level impacts on juvenile Chinook salmon and *O. mykiss* production through a combination of predator exclusion, reduction, and removal or relocation efforts.

To achieve this goal, this Plan proposes the following objectives:

- Exclude striped bass from the reach upstream of RM 25.5.
- Reduce and eventually eliminate smallmouth bass upstream of RM 25.5.
- Reduce black bass populations downstream of RM 25.5 by 10 percent.¹⁵⁸

¹⁵⁸ AFLA, Appendix E-1, Attachment C, p. 1-2.

The primary feature of the Districts' plan to reduce the impact of piscivorous fish on salmonids is the proposed construction of a permanent "barrier weir" at RM 25.5. The price tag for this proposed facility is very high: \$12 million, plus O&M costs.

The "barrier weir" depicted in the AFLA¹⁵⁹ would more accurately be described as a dam. It may in fact be designed in part to provide additional head to facilitate diversion of water at the infiltration gallery just upstream. Like any dam, it will create a navigation hazard to recreational boaters, replacing the existing Dennett Dam downstream, whose removal by the Tuolumne River Trust has just been funded by the California Department of Fish and Wildlife. There are no launch facilities currently downstream of RM 25.5; the "weir" would segment the river, at least for motorized vessels, such as those used by CDFW for fish, carcass and redd surveys.

In addition to the obstacle for boaters, adding permanent structure in the river is likely to further constrain channel morphology, sediment and large wood mobility, and within-river movement of native species, including but not limited to salmonids.

As discussed *supra*, another major problem with such a facility would be the creation of a predation hot spot directly downstream of the facility. A comparable condition exists downstream of Woodbridge Irrigation Diversion Dam on the Mokelumne River, where a fish ladder allows upstream migration of salmonids but whose engineering prevents the upstream passage of striped bass, other bass, and most other fish species. Striped bass and other species concentrate downstream of Woodbridge in the spring, and are particularly effective at preventing successful outmigration of salmonids in Critically Dry years.

Licensees' own analysis acknowledges some of the potential problems that a permanent weir may present. In Attachment A of the proposed Predator Control Plan ("Review of the Predator Control Methods"), the Licensees note that a permanent weir could:

- Block/disrupt native migratory species such as *O. mykiss* and Pacific lampreys.
- Have an unknown impact on striped bass behavior, including factors such as spawning site selection.
- Be a barrier to recreational watercraft.
- Could promote poaching if fish were to "stack up" below the weir.
- Clog with debris.
- Introduce vandalism to the river.¹⁶⁰

The Districts propose a weir design that would not allow use of the weir to capture bass and other target species as they migrate through the weir. Instead, the Districts propose a series of additional measures to capture and remove bass upstream and downstream of the weir. Each of the Districts' proposed methods of capture has problems.

¹⁵⁹ Ex. E, p. 3-178.

¹⁶⁰ Predation Control and Suppression Plan, AFLA Ex E., Appendix E1, Attachment C. See Attachment A to the Plan, p. A-11.

Districts plan to boat electrofish as the “primary method of predator removal.” Districts acknowledge that electrofishing in deep water is ineffective.¹⁶¹ Therefore, they plan to focus effort at times of year when bass are concentrated on nests and when juvenile bass are concentrated in edgewater habitat. However, largemouth and smallmouth bass spawn in the spring. Spring electrofishing will shock migrating salmonids.

The Tuolumne River contains massive deep Special Run Pools that are perfect bass habitat. Boat electrofishing, the “primary” means of removal, will be ineffective in these pools. Much more effective would be filling in these pools that were created when the river was mined for gravel. Settling parties identified this approach during 1995 settlement discussions. But the agreed-upon approach had too many contingencies and no certain funding source, and little infill was actually accomplished. Conservation Groups propose to require Licensees to fill in these pools. See Conservation Groups’ gravel measure, *infra*. This is consistent with Conservation Groups’ general approach of restoring the habitat rather than attacking the fish and other biota that thrive in degraded habitat.

Districts also propose to use fyke nets and beach seining to capture bass. Districts acknowledge that both techniques are best suited to shallow water and are generally ineffective in deep pools.

Districts propose to seek changes in fishing regulations, to promote fishing derbies, and to promote a bounty-reward system that would pay anglers for bass caught in the lower Tuolumne River. It is altogether unclear whether Districts can achieve changes in fishing regulations that would be needed to initiate these activities, including the proposed bounty program. This aspect of the Plan pushes responsibility to undefined parties with no accountability.

The Plan makes no attempt to describe how the Districts plan to achieve the objective of eliminating smallmouth bass upstream of RM 25.5. Districts’ more modest objective to achieve 10% reduction of black bass downstream of RM 25.5 raises the fundamental question of whether Districts achieving this objective, even on an annual basis, would assist in achieving the overall goal, to “reduce population-level impacts on juvenile Chinook salmon and *O. mykiss* production.”

In Tables 2.3-1 and 2.3-1 of the *Districts’ Predator Control and Suppression Plan*, Districts display much of the conceptual basis for the effort downstream of RM 25.5. We reproduce these tables below.

¹⁶¹ *Id.*, p. A-2.

Table 2.3-1. Estimated abundance of key predators >150 mm FL in the lower Tuolumne River.

Species	Estimated 2012 River Wide Abundance ¹ (SE)	Estimated 2012 Abundance in RST Reach ² (SE)
Largemouth bass	4,185 (± 261)	3,013 (± 156)
Smallmouth bass	6,764 (± 260)	3,626 (± 111)
Striped bass	588 (± 57)	235 (± 21)

Source: TID/MID 2013.

¹ Based on shoreline length between RM 0 and 39.4.

² Between Grayson (RM 5.2) and Waterford (RM 29.8) RSTs.

Table 2.3-2. Target removal numbers per year of piscivorous-size predators of each species between the Waterford (RM 29.8) and Grayson (RM 5.2) RSTs for the first year of implementation of removal efforts and estimated range in reduction of daily salmon predation following removal.

Species	10% Removal Target	15% Removal Target	2012 Predation Rate (Salmon/Day)	Potential Reduction in Predation (Salmon/Day)	
				10% removal	15% removal
Largemouth bass	301	452	0.1	30	45
Smallmouth bass	363	544	0.11	40	60
Striped bass	24	35	1.1	26	39
Total reduction in predation (salmon/day)				96	144

As noted in our comments on the Initial Study Report, we dispute the statistical accuracy of the estimated numbers of bass in the Tuolumne River, whose basis appears to be limited to the results of the 2012 Predation Study (W&AR-07). Even more, we dispute the reliability of the estimated predation rate, which was extrapolated from a total of 45 juvenile salmon recovered from the stomachs of bass during the 2012 Predation Study.¹⁶²

Even assuming the accuracy of the Districts' extremely shaky foundation, we question even more the notion that removal of a certain number of piscivorous fish per day will reduce overall consumption of salmon by bass. We particularly question the figures for the numeric potential reduction in consumption of salmon per day. These estimates assume that each bass is eating the same number of fish. They assume that no bass is limited in consumption by competition with other piscivorous fish. They assume that the number of bass will be the same every year. They assume that the total number of bass is not limited by bass-on-bass predation, and that this dynamic does not overwhelm the significance of a slight reduction in the overall numbers of bass.

The 10% and 15% targets for the reduction of bass downstream of RM 25.5 appear to be patterned on the efforts in the Columbia River to reduce the numbers of northern pikeminnow. However, after 25 years of a "sport-reward" bounty system that pays anglers for harvested pikeminnow, the number of pikeminnow caught in the Columbia River appears to be as large as ever. As stated in the California Fisheries Blog:

The Columbia pikeminnow population dynamics likely are best described with a standard Ricker-Type Population Model, with reduced recruitment of young at high adult

¹⁶² See Conservation Groups' Comments on Don Pedro Initial Study Report, eLibrary 20130311-5169, pp. 4-8.

population levels because of competition and cannibalism. The introduction of a light harvest can actual increase recruitment of young by reducing competition and cannibalism, with the increased recruitment replacing the harvest, even providing a constant harvest or yield. This is how fishery quotas may be sustained year after year, such as in Alaska's Bristol Bay Sockeye salmon fishery.¹⁶³

The 10% and 15% targets assume that eliminating some bass one year will not stimulate greater reproductive success juvenile survival the following year, creating an equal or greater number of bass as in the previous year. In particular, these targets assume that elimination of large migrating striped bass will not also increase the number of surviving largemouth and smallmouth (not eaten by striped bass). This assumption is unfounded.

E. Conservation Groups' Flow and Non-Flow Measures, in Combination with Installation of a Temporary Fish Capture Weir in Critically Dry and Super Critically Dry Years, Will Be More Effective than Districts' Plan in Reducing the Effects of Piscivorous Fish on Juvenile Salmonids.

In sum, improved flows are the most effective means of reducing the effects of piscivorous fish and juvenile salmonids. Increased flows both favor salmonids and disfavor bass. Non-flow measures such as increasing juvenile salmonid rearing habitat and floodplain food production, and filling in Special Run Pools where bass thrive, will also be effective. When Critically Dry and Super Critically Dry water years limit the ability of the system to produce flows favorable to successful migration of juvenile salmonids, a temporary weir that captures migrating fish is a feasible option that is likely to be more effective than other methods of capturing bass and other target species.

Capture weirs and fish traps are widely used throughout the Pacific Northwest to capture and separate salmonids.¹⁶⁴ Though trapping of predatory fish in California on the proposed scale is largely untested,¹⁶⁵ it is known that Licensees' proposed capture methods are ineffective, rely on low flows that largely defeat the goal of the proposed program, and are based on a biological hypothesis of gradual population reduction that appears to be unfounded on the Columbia River.

¹⁶³ <http://calsport.org/fisheriesblog/?p=1271>

¹⁶⁴ See multiple examples of weir and traps at:

https://www.google.com/search?q=river+salmon+traps&client=safari&hl=en-us&prmd=sivn&tbn=isch&tbo=u&source=univ&fir=sN_Kll_UVDtwpM%253A%252CPwS12kIANu9XMM%252C%253BhopQnleHJoh2GM%253A%252CnKwWOinq53pFBM%252C%253BOChpHHI5WE5xAM%253A%252CGaXt1ONimAKOEM%252C%253BYTUJyKGTi0ZDKM%253A%252CGaXt1ONimAKOEM%252C%253B7rvV3u2SY-0CM%253A%252CDknGIUI_Y53jPM%252C%253BoA5YZ-jWPFet7M%253A%252C9CJE8FcrLgfI_M%252C%253B7rhbuK9Lex5gVM%253A%252CA_lqfMqkXoz8rM%252C%253BeyDb-2HDEQzRFM%253A%252CA_lqfMqkXoz8rM%252C%253Bgy3rYNFgnvAm3M%253A%252CQnkzhBGIGaZ40M%252C%253BeiHLcx1Gs3oebM%253A%252CEb0WaXbhF4VnsM%252C&usq=nQ5CaFRPZxw5qXR_NuIyMy-UUhsI%3D&sa=X&ved=0ahUKEWjQn7vyz4zYAhVQ3mMKHVPfBX8Q420Idw&biw=834&bih=1010#imgrc=v39w6zb7h3F_HM

¹⁶⁵ A contemporary weir on the Shasta River offers a design option. See photo at https://www.wildlife.ca.gov/Portals/0/Images/Science_institute/Morgan%20Knechtle-Shasta%20River_400px.jpg?ver=2018-01-25-153753-330

F. Cost of Conservation Groups' Proposed Measure

The cost of a temporary weir will depend on its design. However, by its nature it will be far less expensive than the \$12 million capital cost estimate for the Licensees' proposed permanent weir structure. A significant cost consideration is that if the temporary weir approach as monitored over multiple years proves ineffective or creates undesirable collateral effects, its temporary nature will allow Licensees and the TAC to pursue a license amendment to eliminate the requirement with little associated cost. An approach on this scale is much more cost-effective than construction of a permanent dam-like weir that, if it is ineffective or creates undesirable collateral effects, will also be very costly to remove.

VIII. Conservation Groups' Recommended Measure: Ward's Ferry Bridge Whitewater Boating Take-Out and Day-Use Facility

A. Recommended Measure

1. The Licensees shall design and construct a new whitewater boating take-out facility and a day-use facility, and associated recreational facilities, in the immediate vicinity of Ward's Ferry Bridge. These recreational facilities shall accommodate all users safely, including commercial outfitters, private individual boaters, and day users. Licensees shall develop the design for these facilities in coordination with the U.S. Bureau of Land Management, U.S. Forest Service, National Park Service, California State Water Resources Control Board and Tuolumne County, and in consultation with recreational stakeholders including American Whitewater, Tuolumne River Trust, Central Sierra Environmental Resource Center and Tuolumne River Outfitters.
2. The Licensees shall provide motorized vehicle access to the river at the new Ward's Ferry take-out that functions at all water levels and that safely and functionally accommodates six simultaneous river trip take-outs, *i.e.*, up to 36 rafts taking out simultaneously. The vehicle access design shall accommodate vehicle turn-around, passing, staging, and loading of equipment. The Licensees shall provide gates and signage for the motorized vehicle access to minimize user conflicts.
3. The Licensees shall provide pedestrian access to the river at or near Ward's Ferry Bridge that is functional at all water levels, that minimizes conflicts with motorized vehicles, and that is sufficient to meet current and future needs.
4. The Licensees shall provide maintenance, management and daily staffing for the Ward's Ferry take-out and associated facilities during the US Forest Service's (USFS) Tuolumne Wild and Scenic River permit season from May 1st to October 15th of each year. Staff shall provide security and ensure that the takeout is being utilized in a safe and orderly fashion.
5. The Licensees shall provide at least two ADA toilets in close proximity to the Ward's Ferry take-out that will be open to the public throughout the USFS Tuolumne Wild and Scenic River permit season from May 1st to October 15th.

6. The Licensees shall develop and provide adequate and safe day parking areas for vehicles, trucks, trailers and busses at or in proximity to Ward's Ferry Bridge. These day parking areas shall accommodate 25 parking spots located off Ward's Ferry Road, and shall include parking on both sides of the river.
7. The Licensees shall provide a means for reliable public communication (cell service) at the Ward's Ferry take-out to ensure safety during emergencies.
8. The Licensees shall provide a safe passenger loading area in close proximity to Ward's Ferry Bridge for all river trip passengers.
9. The Licensees shall provide a Day Use area in close proximity to Ward's Ferry Bridge for non-whitewater boating related recreational users. The area shall include picnic tables and shall be located in an area that avoids conflicts with whitewater boaters.
10. The Licensees shall charge fair and reasonable use fees for the Ward's Ferry take-out for the duration of the license.
11. The Licensees shall maintain a fair and transparent process for determining any changes to use fees for the Ward's Ferry take-out and shall consult recreational stakeholders regarding any prospective fee changes.
12. The Licensees shall consult with all interested public stakeholders on any future fish passage designs that might affect recreational use from the downstream boundary of the Wild & Scenic corridor to the Ward's Ferry Bridge and/or recreational facilities at Ward's Ferry Bridge.
13. The Licensees shall manage large woody debris to maintain river navigability from the downstream boundary of the Wild & Scenic corridor to Ward's Ferry Bridge, and keep all access points in this reach clear and open.

B. Rationale

Conservation Groups have met on numerous occasions with the Licensees, BLM, the USFS, the National Park Service, Tuolumne County, and other interested parties to discuss recreational facilities at Ward's Ferry Bridge. In these discussions, Conservation Groups have emphasized the importance of safety for all user groups and the desired level of efficiency for a whitewater boating take-out.

Licensees propose to build a deck near Ward's Ferry Bridge that would be suitable to accommodate crane trucks and hauling vehicles to service the take-out of rafts that have run the Tuolumne River upstream. The Districts' proposal falls short of comprehensive improvements needed to provide safe and efficient recreational facilities for all user groups, which include not only commercial outfitters, but also private individual boaters and day users.

The Conservation Groups acknowledge that the Licensees' proposal would help to reduce the congestion found on Ward's Ferry Bridge during the peak of whitewater boating take-out. However, only commercial outfitters either own or operate crane trucks to remove equipment and boats from the river. Commercial outfitters do not provide services to private boaters. In addition, the outfitters utilize crane truck operations as an imperfect solution for the lack of vehicle access at the site today.

The Licensees have included the *Ward's Ferry Take-out 2016 Observations Technical Memorandum* as an attachment to the AFLA. The Districts prepared the methods, objectives and monitoring forms for this memorandum without any input from the U.S. Bureau of Land Management, other resource agencies, and recreational stakeholders participating in the relicensing process. The Conservation Groups specifically question the results of monitoring that characterize parties and vehicles as either commercial, private whitewater boaters, or non-whitewater boaters. The methodology for distinguishing commercial outfitters, private individual boaters, day users and their vehicles is undefined. Additionally, the memo does not include a comparison of observed numbers with the permits issued by the USFS Groveland Ranger District. Overall, 3948 commercial permits and 933 private whitewater permits were reported by the Groveland Ranger District for the 2016 season.¹⁶⁶

Ward's Ferry Bridge is the take-out location for thousands of annual commercial and private individual boaters who enjoy paddling the upstream section of the Wild & Scenic Tuolumne River.¹⁶⁷ Many boaters come from around the country, and indeed around the world, to raft the Tuolumne River. Ward's Ferry Bridge also attracts day users who come to the Tuolumne River to flatwater paddle, swim, fish, or picnic.

The AFLA asserts in a number of places that the current boating take-out problems experienced at Ward's Ferry are not related to Don Pedro Project operations.¹⁶⁸ The Licensees also assert that "the essential problem with take-out at Ward's Ferry is the resulting congestion and extensive road blockage, with the additional congestion on the bridge caused by the exiting customers."¹⁶⁹ We strongly disagree with these assertions.

The essential problem with the existing take-out is that there is no actual take-out facility. Changing reservoir levels in combination with the very steep shoreline and extreme difference between low reservoir levels and high reservoir levels combine to make take-out under existing conditions dangerous and difficult. The Don Pedro Project is a complete unit of development whose operation affects recreational conditions and access at Ward's Ferry Bridge by causing reservoir level fluctuations that typically range from 30 to 80 vertical feet, between 750 ft. and 830 ft. msl.¹⁷⁰ Changes in water level at this location contribute to the erosion of the Tuolumne River shoreline and the erosion of pedestrian trails. Relatively high reservoir levels reduce usable shoreline. Low reservoir levels create the need for a steep uphill hike to reach the

¹⁶⁶ *1978-2016 Tuolumne Wild & Scenic River Use*, USDA Forest Service Stanislaus National Forest, Groveland Ranger District

¹⁶⁷ *Id.*

¹⁶⁸ AFLA Ex. E, pp. 2-16, 3-279, 3-292, 5-40.

¹⁶⁹ *Id.* at p. 5-68.

¹⁷⁰ *Id.* at Att. C, *Whitewater Boating Take-Out Improvement Feasibility Study Report* (RR-02), p. 5-1.

Tuolumne County road. These conditions are compounded by congestion during peak whitewater take-out hours, widespread graffiti, and vehicle break-ins. (See *Ward's Ferry Recreation Site Don Pedro Recreation Area: Overview of Current Situation and Safety Concerns* by Bob Stanley, USFS River Ranger – Attachment 6).

The Don Pedro Project also affects how and where USFS-permitted commercial and non-commercial boaters take-out (exit) from the Wild & Scenic reach of the Tuolumne River after float trips that originate on the Stanislaus National Forest. Prior to the construction of the Don Pedro Project, boaters were able to take out at the now submerged town of Jacksonville, on a large gravel area accessible by vehicles with trailers. Since the Project was constructed, boaters have had to carry their rafts, equipment, and supplies up steep, rocky, and unstable slopes to Tuolumne County's Ward's Ferry Bridge, or have been compelled to try to row, paddle, or be towed over five miles of flat water to Moccasin Point Marina.

Presently, boating on the Tuolumne River relies on the release schedule from CCSF's upstream facilities. CCSF releases flow pulses for approximately a four-hour period each day during the summer (except one day per week when there is no release for maintenance purposes). All boaters must put on the river in that same limited time window. This means that the various groups of boaters all arrive at Ward's Ferry Bridge at about the same time in the mid- to late-afternoon. This creates significant congestion on the "trails" up to the bridge, on the road, and on the bridge itself. Typically, groups that arrive later must wait for as long as an hour, until prior groups have cleared out. Currently, the USFS permit system allows for 52 commercial boaters and 96 private boaters per day on one, two, or three day trips. There may be as many as six groups arriving from these trips at the bridge simultaneously. This is why there is a need to provide space for six groups to be able to take-out simultaneously.

Towing boats over flat water to the Moccasin Point Marina is dangerous. A wide variety of sharp objects are exposed when the river channel cuts its way through the sediments downstream of Ward's Ferry. As the reservoir elevation declines, narrow mini-canyons develop that release silt avalanches large enough to bury boats passing by in the narrow channels. When the river reaches high elevation, it spreads out thinly over the sediments, creating sand waves that in turn create quicksand. Even very light boats often run aground, creating a dangerous situation when boaters then get out of their boats to decrease draft and/or to push their boat.

All boating interest groups as well as the National Park Service, BLM and USFS have informed the licensee's consultant since the beginning of the Don Pedro relicensing that Moccasin Point Marina is not a viable alternative to improved take-out facilities at Ward's Ferry Bridge. Being towed to the marina is inconsistent with the experience of non-motorized whitewater boating through the primitive river canyon setting upstream. User fees at the marina and the cost of towing add expense to river trips, especially for non-commercial boaters. There is no designated space at the marina for unloading rafts and loading them on to a trailer. The process of loading/unloading rafts and equipment is more time-consuming than loading motorized boats, and any increase in non-motorized boat traffic at the marina would increase the congestion at a location that is already crowded. A designated non-motorized ramp area would need to be identified and improved.

Commercial and private whitewater boating provides a large economic benefit to the economy of Tuolumne County and the community of Groveland. Groveland's economy is heavily dependent on tourism. According to a 1995 study completed by the Highway 120 Association, the town of Groveland received an annual net economic benefit of nearly \$5 million from rafting-generated tourism dollars (\$8 million in 2017 dollars). Improved take-out facilities on the Tuolumne River are likely to increase the number of boaters on the river and provide further benefit to the local economy.

The number of people engaged in whitewater boating nationally has grown substantially in recent years. Licensees' Reservoir Recreation study references the tremendous growth in recreation at all of their other Project-related facilities. An estimated 142 million Americans went boating in 2016, 36% of U.S. households, according to the 2016 Recreational Boating Participation Study published in August 2017 by the National Marine Manufacturers Association. The facilities at Ward's Ferry need substantial improvements to support future as well as existing demand.

The Ward's Ferry Bridge is also a popular location for day recreation use. Many people use the bridge area for swimming, fishing, and simply getting outdoors during the summer. It is also one of the closest places for water-based recreation to the largest communities in Tuolumne County. As such, there are often many people congregating at the bridge and competing for space along the shoreline and on trails. The popularity of this location creates the potential for conflicts and unsafe conditions. As rafters carry or boom out their heavy rafts, day-users are often nearby and at times are underneath rafts that are being raised up to the bridge by boom trucks. This equipment has great potential to cause harm if boats or part of the equipment were to break loose and fall. For this reason, it is important to provide adequate facilities for day users.

It is possible that NMFS may issue a fish passage prescription to restore anadromous fish upstream of Don Pedro Reservoir. One of the options evaluated in NMFS's October, 2017 report entitled *Conceptual Engineering Plans for Fish Passage at La Grange and Don Pedro Dams on the Tuolumne River*¹⁷¹ is a downstream capture facility for juvenile salmon and steelhead that could be located in the relative vicinity of Ward's Ferry Bridge. This report estimated that the cost of such a facility near Ward's Ferry Bridge would be almost double the cost of a capture facility close to Don Pedro Dam. Regardless of how likely top-of-reservoir infrastructure relating to fish passage may be, whitewater boaters would be very concerned about any potential for such facilities to interfere with whitewater boating on the river. Licensees should coordinate with the boating community to ensure that any future fish passage facilities work with boating and do not diminish the recreational values of the whitewater experience.

Woody debris is also a critical component of ensuring safe recreation conditions. The Licensees estimate that Don Pedro Reservoir captures on average 70,761 cubic feet/year of woody debris per year.¹⁷² This estimate is likely low, because the survey period that led to this estimate was 2005-2012. Thus, surveys ended before significant events affected the upper watershed's production of large woody debris. These events include the 2013 Rim Fire, the five

¹⁷¹ See eLibrary no. 20171113-5347.

¹⁷² AFLA, Att. C, *O. mykiss Habitat Survey Amended Study Report*, W&AR-12, p. 6-2

year drought of 2012-2016, and the record-wet year of 2017. The abundance of trees killed by fire, drought, and beetles led to a massive volume of woody debris washing into the reservoir during the very wet winter of 2017. Local newspapers reported the logjam on Don Pedro Reservoir in 2017 to be 30-40 acres in size.^{173,174}

Article 52 of the existing FERC license requires the implementation of the Districts' Log and Debris Removal Plan. Under the Plan, the Districts collect and remove woody debris at Don Pedro Dam and from other areas in the reservoir as needed so that this debris does not impede rafting and other recreational uses. Debris is collected in boom rafts, piled in un-vegetated areas below the high-water mark along the reservoir's edge, and burned during fall and winter. The Districts have proposed continuing this support for recreational uses of Don Pedro Reservoir through the implementation of a Woody Debris Management Plan. Conservation Groups are strongly supportive of continuing woody debris removal. However, Conservation Groups believe that licensees should re-evaluate the suitability of LWD collected in Don Pedro for placement in the lower Tuolumne River, and should place suitable LWD collected in Don Pedro Reservoir in the Tuolumne River downstream of La Grange Dam.

Article 53 of the existing FERC license requires the Licensees to provide restroom facilities at the Ward's Ferry Bridge. Conservation Groups are strongly supportive of a license requirement in the new license that would require that Licensees continue to maintain these restroom facilities.

There are several errors in the description of whitewater boating and the Licensees' proposed whitewater take-out in AFLA Exhibit E. First, the Licensees identify "known whitewater boating runs on the Tuolumne River upstream of the Project area."¹⁷⁵ In addition to the runs identified in Table 3.9-5, the North Fork of the Tuolumne is paddled by kayakers.¹⁷⁶ Also, the Clavey River is commonly paddled from the upper bridge (Stanislaus National Forest Road 1N04) to the Tuolumne River itself, not just downstream from the lower bridge, as cited in Table 3.9-5. Licensees state that a description of the proposed improvements at Ward's Ferry is included in Exhibit B.¹⁷⁷ Licensees also state that the Ward's Ferry take-out will be part of the Recreation Facility Development Program within the Recreation Resource Management Plan.¹⁷⁸ Though the Recreation Facility Development Program describes new recreational facilities at RM 25.5, it does not identify the Ward's Ferry take-out.¹⁷⁹ Finally, in Exhibit E the Licensees state an estimated cost to construct the facility they have proposed at Ward's Ferry at \$6M, with annual O&M costs of \$25,000/year. However, the cost for the Ward's Ferry facility listed under the Recreation Resource Management Plan in Exhibit D is \$1.167M.^{180,181}

¹⁷³ The Modesto Bee, 5/16/16. "Rain, snowmelt have filled Tuolumne River with debris." Available at: <http://www.modbee.com/news/article138973328.html>.

¹⁷⁴ The Union Democrat, 4/20/17. "40 acres of floating logs choke part of Don Pedro Reservoir." Available at: <http://www.uniondemocrat.com/localnews/5248255-153/40-acres-of-floating-logs-choke-part-of>.

¹⁷⁵ AFLA Ex. E, p. 3-260.

¹⁷⁶ California Creeks, *North Fork Tuolumne near Sonora*. Available at: <http://www.cacreeks.com/tuol-nf.htm>

¹⁷⁷ AFLA Ex. E, p. 2-5.

¹⁷⁸ *Id.* at Ex. E, p. 3-292.

¹⁷⁹ AFLA Ex. E, Appendix E-7 *Recreation Resource Management Plan*, p. 3-1.

¹⁸⁰ *Id.* at Ex. E, p. 5-41.

¹⁸¹ *Id.* at Ex. D, *Statement of Costs and Financing*, p. 5-41.

Overall, our recommendations seek to mitigate existing unsafe and inefficient conditions and to provide a recreational area that can be safely used by commercial outfitters, private individual boaters and multiple day users. Improving the Ward’s Ferry take-out is the most feasible, lowest cost option for providing a safe and adequate take-out. The Licensees’ Updated Study Report states: “Whitewater take-out improvements at Ward’s Ferry Bridge appear to be technically feasible.”¹⁸² We hope this thinking will carry forward to a complete improvement proposal that meets the needs of all boating and non-boating users.

IX. Conservation Groups’ Summary of Responses to Districts’ Preferred Plan and Additional Comments on Districts’ Proposals

Summary Table B: Conservation Groups’ (CGs) responses to Licensees’ proposed measures

AFLA Measure	Name	Notes
RPM 1	Augment Current Gravel Quantities through a Course Sediment Management Program	The Licensees’ proposal is inadequate. CGs propose a more extensive and robust gravel augmentation program that in combination with other CG restoration measures mitigates Project effects and achieves the AFRP Doubling Goal.
RPM 2	Provide Gravel Mobilization Flows of 6,000 to 7,000 cfs	CGs support providing gravel mobilization flows. CGs’ flow proposal either provides flows that will more frequently and reliably mobilize gravel or can be modified with no water cost to do so.
RPM 3	Improve Instream Habitat Complexity	The Licensees’ proposal is inadequate. CGs do not support the Licensees’ proposal, which relies on installation of large boulders in only the upper ten miles of the lower river. CGs’ proposal to install LWD, rather than boulders, along the entire length of the lower Tuolumne will better mitigate Project effects and more effectively improve habitat complexity.
RPM 4	Gravel Cleaning	CGs oppose the proposal. CGs’ flow proposal will achieve gravel cleaning objectives more effectively and in a less damaging manner than the Licensees’ proposal.

¹⁸² *Id.* at Att. C, *Whitewater Boating Take-Out Improvement Feasibility Study Report* (RR-02), p. 6-3.

RPM 5	Contribute to CB&W's Efforts to Remove Water Hyacinth	CGs oppose this proposal. CGs' flow proposal will more effectively remove water hyacinth from the river without application of pesticides as proposed by the Licensees.
RPM 6	Construct a Fish Counting and Barrier Weir	CGs strongly oppose the installation of a permanent barrier weir. CGs support the installation of a temporary seasonal fish counting weir. CGs support the installation of a temporary weir to capture striped bass and black bass in CD and SCD years only.
RPM 7	Predator Control and Suppression	CGs oppose this proposal. CGs' flow proposal in combination with CG's gravel augmentation proposal, targeted at reducing predator habitat, will more effectively reduce predation in the river.
RPM 8	Superimposition Reduction Program	CGs do not support this proposal.
	Tuolumne River Fall-run Chinook Restoration Hatchery	CGs oppose this proposal. CGs support the abundant natural production that the Tuolumne River is capable of producing. An abundant Tuolumne population is the best means of improving fall-run genetics.
	Flow-Related Measures	CGs do not support the Licensees' flow proposal, which starves the Tuolumne River of flow in just under 60% of all years. CGs' flow proposal will more effectively contribute to achieving biological and environmental objectives while balancing water supply needs.
	Operation of Two Infiltration Galleries	CGs are neutral towards the operation of the existing infiltration gallery. CGs oppose the expense of a second, new infiltration gallery and the Licensees' proposed excessive diversions from it. Licensees must establish a flow compliance point within one mile downstream of the infiltration gallery.
	Whitewater Boating Take-Out Facility at Ward's Ferry Bridge	CGs support a larger, safer and more efficient take-out facility than the facility proposed by the Licensees.
	Enhancements to Recreational Boating in the Lower Tuolumne River	CGs support providing recreational boating flows in the lower Tuolumne River. CGs' flow proposal accommodates the recreational flow needs.
	La Grange Project: Foot path trail construction and maintenance	CGs support a foot path trail to the La Grange Reservoir.

A. Additional Responses to Districts' Proposals

1. Fall-Run Chinook Salmon Hatchery

The Licensees propose to build a fall-run Chinook salmon hatchery downstream of the Project's La Grange Diversion Dam on the Tuolumne River. The intended purpose of the \$36 million hatchery is to establish genetic integrity of salmon in the Tuolumne River and to supplement population abundance. The Licensees propose that CDFW operate the hatchery for a period of 20 years and that Licensees fund projected annual O&M costs of about \$200,000.

The proposal to construct a hatchery is dependent on implementation of 100% hatchery parental-based tagging (PBT) throughout the Central Valley. Licensees project that cost would be \$350,000 annually. The Licensees assume that funds to implement 100% PBT outside the Tuolumne River would derive from state (Department of Water Resources) and federal (U.S. Bureau of Reclamation) sources associated with operation of the State Water Project and the Central Valley Project. The California Department of Fish and Wildlife has for many years expressed concerns that a requirement to mark all hatchery fish would end up being an unfunded mandate placed on the Department. Commercial anglers have expressed concerns that 100% marking of hatchery fish would be a gateway to a mark-selective salmon fishery, further limiting resource opportunities for a commercial salmon fleet already in precipitous decline. Regardless of what various parties may think of 100% marking of hatchery fish, there is substantial uncertainty that CDFW will implement it in the near future.

The Tuolumne River is the largest sub-watershed in the San Joaquin River system. In combination with appropriate physical habitat improvements, the lower Tuolumne River is capable of sustaining a viable population of naturally produced fall-run Chinook salmon. Currently, salmon populations in the Tuolumne River are limited by decades of flow deprivation and habitat degradation.

It is generally accepted that the entire Central Valley fall-run Chinook salmon population is intermingled after decades of hatchery operations and straying throughout the state. While this can improve, in the short term it is very unlikely to end. The best way to develop a distinct Tuolumne River fall-run salmon population is to make use of the river's hydrological and physical potential. With flow improvements and such non-flow improvements as floodplain expansion, gravel augmentation, and restoration of LWD, the Tuolumne River can support large numbers of salmon. The Conservation Groups recommend that the Licensees allocate the proposed \$36 million capital cost for a hatchery, along with the O&M costs, to the restoration of spawning and rearing habitats in the Tuolumne River, in combination with implementation of the Conservation Groups' flow proposal.

2. Recreational Boating Flows in the Lower Tuolumne River

The Licensees propose a measure that will provide limited enhancements in recreational boating flows in the lower Tuolumne River that is focused primarily on providing more reliable boating from RM 52 to RM 25.9 only, while leaving the river below RM 25.9 with very

infrequent boatable flows in summer that depend on the water year type and the operation of the infiltration galleries. The Conservation Groups support a flow schedule that supports year-round recreational boating in the entire lower Tuolumne.

3. La Grange Project: Footpath Trail Construction and Maintenance

The Conservation Groups support the construction of a footpath trail to La Grange Reservoir. Conservation Groups strongly support allowing fishing at La Grange Reservoir and suggest that Licensees create a setting conducive to low impact activities such as birdwatching and nature viewing at La Grange Reservoir.

LEGAL BASIS FOR CONSERVATION GROUPS' RECOMMENDATIONS FOR ENVIRONMENTAL ANALYSIS AND PROPOSED LICENSE CONDITIONS

This section addresses the legal basis for Conservation Groups' comments and recommended alternatives for the Projects that the Commission should analyze in the EIS. The Commission is required under the FPA and NEPA to analyze reasonable alternatives to the proposed Project, assess the Project's direct and cumulative effects on the environment and develop and adopt appropriate protection, mitigation or enhancement measures to mitigate the adverse effects of the Project. This section also contains Conservation Groups' responses to Districts' arguments in the AFLA that seek to preemptively limit the Commission's and other jurisdictional agencies' authority to consider alternatives for purposes of the NEPA analysis, and to ultimately condition the license. The Conservation Groups' responses maintain that the Commission has both a substantive and procedural duty to undertake a thorough study of alternatives and potential mitigation measures based on a complete record. The Commission may not avoid its legal obligations to conduct this analysis simply because the dams serve purposes other than hydroelectric power generation, or because the Commission lacks authority to authorize the alternatives and/or mitigation measures.

I. The FPA requires that the Commission analyze the Conservation Groups' proposed alternatives.

The Commission has substantive obligations under FPA § 10(a)(1), 16 U.S.C. § 803(a), and § 15(a)(2), 16 U.S.C. § 808(a)(2), to undertake a thorough study of alternatives as the basis for its required finding that a new license is best adapted to a comprehensive plan of development and to serve the public interest. *See Scenic Hudson Pres. Conference v. Fed. Power Comm'n*, 354 F.2d 608, 612 (2d Cir. 1965); *Green Island Power Auth. v. F.E.R.C.*, 577 F.3d 148, 168 (2d Cir. 2009) (“*Green Island*”).

Section 10(a) establishes a “broad public interest standard, requiring consideration of all factors affecting the public interest.” *Green Island* 577 F.3d at 167 (quoting H.R.Rep. No. 99–507, at 12 (1986)). Section 10(a) also requires that “the project adopted . . . will be best adapted to a comprehensive plan for improving or developing a waterway.” 16 U.S.C. § 803(a)(1).

Section 15(a)(2) requires “that FERC rigorously scrutinize[] any application for a new license for an existing hydroelectric project, so that it can determine that the existing project is ‘best adapted to serve the public interest.’” *Green Island*, 577 F.3d at 167.

The Commission must demonstrate that its decision was based on “substantial evidence” and that it “considered all of the germane factors” by providing “a reasoned explanation.” *Idaho Rivers United v. F.E.R.C.*, 189 F. App’x 629, 634 (9th Cir. 2006).

To meet these FPA requirements, the Commission must thoroughly analyze alternatives to demonstrate on the record: 1) that it considered all beneficial public uses of the waterway; 2) that a license granted is consistent with any comprehensive plan of development for the waterway; and 3) that a license granted is conditioned to best serve the public interest.

A. The Commission must consider all beneficial public uses of the waterway in determining which alternative is best adapted to a comprehensive plan of development.

A license may be granted only if it is “subject to conditions that the Commission finds best suited for power development and other public uses of the nation’s waters.” *Am. Rivers v. F.E.R.C.*, 201 F.3d 1186, 1191 (9th Cir. 1999). The FPA “requires the Commission to consider *all* beneficial public uses when it grants a license.” *Confederated Tribes & Bands of Yakima Indian Nation v. F.E.R.C.*, 746 F.2d 466, 471 (9th Cir. 1984) (“*Confederated Tribes*”) (emphasis added). Specifically, these beneficial public uses include “the adequate protection, mitigation, and enhancement of fish and wildlife (including related spawning grounds and habitat), and . . . irrigation, flood control, water supply, and recreational and other purposes . . .” 16 U.S.C. § 803(a)(1).

The Commission must demonstrate that it considered these beneficial uses *before* it issues a license. “Prior to issuance of a new license, FERC must study the effect of a project on the fishery resource and consider possible mitigative measures.” *Confederated Tribes*, 746 F.2d at 471. Here, the FPA requires that the Commission analyze the Conservation Groups’ alternatives which will benefit fish populations in the Tuolumne River, including improving their spawning grounds and habitat and meet the purpose and need of the Projects.

B. The Commission should consider alternatives that would better achieve the objectives of comprehensive plans for the waterway prepared by other Federal or State agencies.

As stated above, the Commission must ensure that the new license is best adapted to a comprehensive plan of the development for the beneficial uses of the Tuolumne River. In making this determination, the Commission must consider “[t]he extent to which the project is consistent with . . . comprehensive plan[s] for improving, developing or conserving a waterway or waterways affected by the project” developed by other State or Federal agencies. 16 U.S.C. § 803(a)(2). Pursuant to FPA section 10(a)(2), Conservation Groups have previously requested that the Commission consider several comprehensive plans in preparing its DEIS and making its

required NEPA and FPA findings including the Forest Service Wild and Scenic Management Plan and the National Marine Fisheries Service Recovery Plan for Central Valley Steelhead.¹⁸³

The State Board's Bay-Delta Plan qualifies as a comprehensive plan for the Tuolumne River pursuant to FPA section 10(a)(2) and the Conservation Groups will be submitting it to the Commission for approval upon its finalization (expected in summer 2018).¹⁸⁴ Order No. 481-A (April 27, 1988) notes that "the Commission will accord FPA section 10(a)(2)(A) comprehensive plan status to any Federal or state plan that:

- (1) Is a comprehensive study of one or more of the beneficial uses of a waterway
- (2) Specifies the standards, the data and the methodology used and
- (3) Is filed with FERC"

Furthermore, Order No. 481-A specifies that "[a] comprehensive plan should contain the following:

1. A description of the waterway or waterways that are the subject of the plan, including pertinent maps detailing the geographic area of the plan;
2. A description of the significant resources of the waterway or waterways;
3. A description of the various existing and planned uses for these resources; and
4. A discussion of goals, objectives, and recommendations for improving, developing, or conserving the waterway or waterways in relation to these resources."

Order No. 481-A also specifies that "[t]he description of the significant resources in the area should contain, among other things:

1. Navigation;
2. Power development;
3. Energy conservation;
4. Fish and wildlife;

¹⁸³ See Conservation Groups Comments Regarding Pre-Application Document and Scoping Document 1, and Study Requests for the Don Pedro Project "Scoping Comments." e-Library 20111024-5102. The Scoping Comments recommend the consideration of the following comprehensive plans: 1) The Anadromous Fish Restoration Program (AFRP); 2) SWRCB 2010 Integrated Report and Final 303(d) list; 3) San Joaquin River National Wildlife Refuge Comprehensive Conservation Plan (2006); 4) State Parks Central Valley Vision; 5) NMFS Critical Habitat for CV steelhead; 6) NMFS Draft Recovery Plan for Steelhead; 7) San Joaquin River Management Plan (1995); 8) TRTAC Restoration Plan; 9) Forest Service Wild and Scenic Management Plan; and 10) California Department of Water Resources, California Water Plan Update 2009.

¹⁸⁴ It is reasonably foreseeable that the Bay-Delta Plan will be finalized before the Commission issues final orders for the Projects. See State Water Resources Control Board Executive Director's Report Item 6 (December 19, 2017) noting that "[s]taff anticipates that the final SED (including responses to public comments) and [Bay-Delta] Plan Amendment will be released for public review in the spring of 2018 and will be brought to the Board for consideration in mid-2018."

5. Recreational opportunities;
6. Irrigation;
7. Flood control;
8. Water supply; and
9. Other aspects of environmental quality.”

Finally, Order No. 481-A specifies that “[t]he plan should contain an examination of how the different uses will promote the overall public interest.”

The Bay-Delta Plan meets these criteria. The Bay-Delta Plan examines all the beneficial uses of the waterway (including the Tuolumne River). Additionally, it includes significant scientific information and data supporting the methodology used to develop revised water quality objectives and assess the potential benefits and impacts of implementation of the objectives. The Bay-Delta Plan contains an adequate description of the applicable waterways, identifies the significant resources that comprise the waterways, identifies the current and planned uses for the resources of the waterway, and contains a recommendation for how to best utilize the waterway in relation to the many beneficial uses that rely upon it. As specified in *Light*, “the function of the Water Board has steadily evolved from the narrow role of deciding priorities between competing appropriators to the charge of *comprehensive* planning and allocation of waters.” *Light v. State Water Res. Control Bd.*, 226 Cal. App. 4th 1463, 1481 (2014) (emphasis added).

As part of the Bay-Delta Plan update process, the State Board released recommended flow objectives for the Tuolumne River (as well as the Merced and Stanislaus rivers) that require release of 30-50% of the February-June unimpaired flow in each river, with a beginning value of 40%.¹⁸⁵ To meet these flow objectives, the Licensees will be required to increase flow releases from Project facilities, including Don Pedro Dam, at certain times of the year. In the Bay-Delta Plan proceeding and several past water right proceedings, the State Board has identified Fish and Game Code section 5937 and the public trust doctrine as sources of authority to require the release of stored water for the benefit of fish and wildlife beneficial uses.¹⁸⁶

The Conservation Groups’ do not believe the AFLA supports a finding that the Districts’ proposed flow regimes are consistent with the planned update of the State Board’s Bay-Delta

¹⁸⁵ SWRCB, “Bay Delta Plan Update: Draft San Joaquin River Flow and Southern Delta Salinity Requirements Released for Public Comment,” *available at* http://www.waterboards.ca.gov/waterrights/water_issues/programs/bay_delta/bay_delta_plan/water_quality_control_planning/2012_sed/docs/sjr_factsheet2012.pdf.

¹⁸⁶ *See, e.g.*, Comments of State Water Resources Control Board Chair Felicia Marcus at the Public Hearing on the Draft San Joaquin River Flow and Southern Delta Salinity Requirements. Dec. 16, 2016 Tr., p. 216, ln. 3-11; Dec. 19, 2016 Tr., p. 152-153. *See also* Decision 1644 In the Matter of Fishery Resources and Water Right Issues of the Lower Yuba River. State Water Resources Control Board 2001. p. 31. (“Decision 1644”). These authorities are appropriately cited by the State Board. Fish and Game Code 5937 is a legislative expression concerning the public trust doctrine that should be taken into account when the State Board acts under its public trust authority. *California Trout* 207 Cal. App. 3d 585, 626, 631 (Cal. Ct. App. 1989). The State Board acts under its public trust authority when it approves revised water quality objectives and when it revises water right authorizations to ensure implementation of the revised water quality objectives. It is well within the State Board’s authority under the public trust doctrine to require the release of stored water for the benefit of instream resources particularly in cases where the storage project in question presents a continuing harm to those resources. *See* Decision 1644 at 32.

Plan. By contrast, the Flow, Habitat and River Management Alternative proposed by the Conservation Groups was expressly developed to meet the objectives set out in the State Board's Bay-Delta plan. The Commission's DEIS should evaluate the flow proposals to determine which would be more consistent with the relevant objectives set out in the Bay-Delta Plan. To the extent, the Commission disagrees with the flows recommended in the Bay-Delta Plan, it still has an obligation to provide a "reasoned explanation" as to why the conditions of the license are consistent with the objectives of the Bay-Delta Plan. *Idaho Rivers* 189 F. App'x at 634.

C. The Commission must analyze the proposed alternatives to show that a license granted is conditioned to best serve the public interest.

Pursuant to FPA sections 10(a) and 15(a)(2), the Commission must find that the project as licensed will be best adapted to a comprehensive plan of development and serve the public interest.¹⁸⁷ This requires more than a finding that the project will serve the applicant's interests, or otherwise preserve the status quo. In *Municipal Elec. Ass'n of Mass. v. FPC*, 414 F.2d 1206, 1207 (D.C. Cir. 1969), the D.C. Circuit interpreted this requirement to mean that the project as licensed must represent the "highest and best use" of the waterway. In other words, the Commission must determine how *best* to balance the competing beneficial uses of the Tuolumne River.

While not binding, the Commission's balancing analysis should be informed by the State Board's analysis in the SED for the Bay-Delta Plan. The SED reflects the State's interest in protecting water supply and fish resources as co-equal goals. Given the scarcity of water available to protect these and other uses, the SED also highlights the prohibition on waste and unreasonable use of water. SED, p.1-5. The state can terminate or restrict a water use that is found to be wasteful or unreasonable. Cal. Const. art. X, § 2. The State Water Board has found that uses that harm public trust resources, like fish are unreasonable and courts have agreed.¹⁸⁸

As part of its public interest finding, the Commission should consider whether the Districts' proposed flow operation constitutes the best balance of competing beneficial uses for the Don Pedro Project. It is in the public interest to strategically and flexibly manage reservoir storage levels to minimize effects on water deliveries and maximize water resources available for a variety of uses. Accordingly, the Commission should consider the Conservation Groups' alternatives which seek to optimize water resources and address impacts to instream flows consistent with the SED's rationale for the State Board's Bay-Delta Plan.

¹⁸⁷ FPA Section 15(a)(2) requires "that FERC rigorously scrutinizes any application for a new license for an existing hydroelectric project, so that it can determine that the existing project is 'best adapted to serve the public interest.'" *Green Island*, 577 F.3d at 167.

¹⁸⁸ See Decision 1644 p. 95 concluding that "there is ample evidence showing that the continuing diversion of water from the Yuba River through existing facilities at the South Canal has reasonably avoidable adverse impacts on anadromous fish in the Yuba River. To continue the diversions at the South Canal without taking actions to reduce fish loss would be an unreasonable method of diversion with unnecessary harmful effects on public trust resources." See also *Environmental Defense Fund, Inc. v. East Bay Municipal Utility District* 26 Cal.3d 183 (1980) noting that a "particular water use or method of diversion may be determined to be unreasonable based on its impact on fish, wildlife, or other instream beneficial uses."

D. The Commission may not avoid its obligations under FPA to analyze the Conservation Groups' proposed alternatives in detail.

1. The Districts' Fourth Agreement with the City of San Francisco does not limit the ability of the Commission to analyze Conservation Groups' Proposed Alternatives.

As noted in section I(c) *supra* the Commission's public interest balancing analysis should be informed by the State Board's analysis in the SED for the Bay-Delta Plan. The SED contains the State Board's recommended flow requirements for the San Joaquin River and its tributaries (including the Tuolumne) and represent the State Board's findings that anything less would constitute unreasonable use of water in light of the potential harm to public trust resources, including fish and wildlife.

The State Board regulates water use within the state in order to prevent unreasonable or wasteful use. *See Light*, 226 Cal. App. 4th at 1472-73. In doing so, the Board "can weigh the use of water for certain public purposes, notably the protection of wildlife habitat, against the commercial use of water" by those holding rights of priority to the water. *Id.* Specifically, the Board's broad regulatory authority extends to setting legally enforceable standards as to which uses of water are reasonable and which are not. *See id.* at 1484-86 (confirming that the Board may decide, under its regulatory authority, that using sprinkled water to prevent crop frost damage is not reasonable unless it can be managed to avoid harm to salmon populations). In fact, such regulatory activity is necessary because "[w]hat constitutes an unreasonable use of water changes with circumstances, including the passage of time." *Id.* at 1488.

The Districts' contend that they cannot comply with the State Board's recommended flow requirements because it would jeopardize or interfere with the terms and/or performance of their Fourth Agreement with the City. This argument is without merit. A contract between the licensee and a third party does not limit the Commission's authority to issue licenses under FPA section 4(e) nor can it be read to limit the scope of the Commission's alternatives analysis under NEPA. To the extent the Fourth Agreement seeks to interpret the priority of the District and CCSF's water rights or otherwise affect the State's authority to regulate appropriate water rights, those issues are properly reserved to the state pursuant to FPA section 27. *California v. FERC*, 495 U.S. 490 (1990). Accordingly, the Commission should not take action or limit the scope of the EIS in any way that interferes with the State's exercise of its reserved authority.

While the right to use water is a legally protected interest, the right is usufructuary and thereby limited by nature. *Allegretti & Co. v. Cty. of Imperial* 138 Cal. App. 4th 1261, 1271 (2006) ("Overlying water rights are usufructuary only, and while conferring the legal right to use the water, they confer no right of private ownership in public waters."). Unreasonable use of water is not protected by any property or usage right. Cal. Const. art. X, § 2; *see also Light*, 226 Cal. App. 4th at 1479. The State Board decides what uses of water are reasonable, and California does not recognize any property right tied to unreasonable use, even if such use was once considered reasonable in the past. *See id.* at 1487 (quoting *United States v. State Water Res. Control Bd.*, 182 Cal. App. 3d 82, 106 (1986) ("*Racanelli Decision*") ("[N]o water rights

are inviolable; all water rights are subject to governmental regulation.”); *Tulare Irrigation Dist. v. Lindsay-Strathmore Irrigation Dist.*, 3 Cal. 2d 489, 567 (1935). This means that the Districts are required to comply with increased flow requirements and other conditions that the Board deems necessary to ensure continuously reasonable use.

Furthermore, not only are water uses—even long-established ones—subject to the dynamic reasonable use standard, but they are also subject to the public trust doctrine. *See El Dorado Irrigation Dist. v. State Water Res. Control Bd.*, 142 Cal. App. 4th 937, 966 (2006) (quoting *Nat’l Audubon Soc’y v. Superior Court*, 33 Cal. 3d 419, 445-46 (1983) (noting that the state’s “affirmative duty to take the public trust into account” prevents “any party from acquiring a vested right to appropriate water in a manner harmful to the interests protected by the public trust”). Thus, “when the public trust doctrine clashes with the rule of priority, the rule of priority must yield.” *Id.* The Districts must abide by California’s strong policy of protecting the public trust, which includes ecological values. *See id.*

The State Board’s proposed flow requirements in the Bay-Delta Plan should be seen as an updating of the rights to which the Districts are entitled under a constitutionally-mandated reasonableness analysis, rather than a disruption of said rights. Meanwhile, the Fourth Agreement, founded in part on the fact that the Districts’ water rights have priority over the City’s, is enforceable only to the extent that the rights in play therein are still recognized under the law. That the parties to the Agreement formed a contractual relationship does not absolve them of their duty to comply with the basic principles of California’s water law. After all, their contract is based on rights that are always subject to change.¹⁸⁹

2. The Takings Doctrine does not limit the ability of the Commission to analyze Conservation Groups’ Proposed Alternatives.

The Districts claim that implementation of the State Board’s revised water quality requirements will constitute a physical taking under the Fifth Amendment.¹⁹⁰ The Districts are mistaken: 80 years of case law underscores that such regulatory action by the State Board (e.g., minimum reservoir carryover storage targets and flow release requirements) does not constitute a compensable physical taking.

The Districts will not be deprived of a protected property interest because water rights in California are not absolute. As noted in sections I(c) and I(d)(i) *supra*, water rights are

¹⁸⁹ On page 10 of their March 17, 2017 letter to the Board, the Districts suggest that the “California Constitution prohibits legislative or judicial actions which significantly impair the obligations of an existing contract.” The Districts draw this conclusion from a 1957 case involving alimony payments. *See Bradley v. Superior Court*, 48 Cal. 2d 509, 519 (1957). What the *Bradley* court meant was that a court cannot rule in such a way that the sole aim and effect would have been to modify a property settlement agreement between a divorced couple. This is hardly apposite to the present situation, where the contract involves management of an important public utility and natural resource, and—more importantly—was formed subject to continued regulation. Moreover, even if this were the type of situation that would implicate the contracts clause, the Board’s findings do not run afoul of it because they are properly and necessarily directed toward protecting the public interest. *See Fourth La Costa Condominium Owners Ass’n v. Seith*, 159 Cal. App. 4th 563, 584 (2008) (holding that the contracts clause is not violated if (1) there is no substantial impairment of the contract at issue, or (2) there is a significant and legitimate public purpose behind the state regulation at issue and the regulation operates in a way appropriate to that public purpose).

¹⁹⁰ TID and MID Letter to the State Water Resources Control Board, dated March 17, 2017, at pp. 5-7.

usufructuary and limited by the reasonable use and public trust doctrines. *Racanelli Decision*, 182 Cal. App. 3d 103-05. Water rights are not exempt from reasonable regulation; on the contrary, they are frequently subject to regulation in the public interest. *See, e.g., People v. Murrison* 101 Cal. App. 4th 349, 360 (2002) (“Legislation with respect to water affects the public welfare and the right to legislate in regard to its use and conservation is referable to the police power of the state.”); *People ex rel. State Water Res. Control Bd. v. Forni* 54 Cal. App. 3d 743, 753 (1976) (“[T]here is a well-recognized distinction between a ‘taking’ or ‘damaging’ for public use and the regulation of the use and enjoyment of a property right for the public benefit. The former falls within the realm of eminent domain, the latter within the sphere of the police power.”). This means that no owner of California water can acquire a protected right to use water in an unreasonable manner or in a manner that harms the public trust.

In this case, the Districts have not acquired a protected right to divert, store or release water in a manner that the State Board judiciously deems unreasonable, or that may harm the public trust. In short, the Districts’ takings claim is premised on a type of protected property right that does not exist under California law.

a. No compensation is due to the Districts.

Compensation is not due to the Districts because the implementation of the State Board’s revised water quality requirements will not constitute an appropriation, or taking, of a protected property right. While correctly noting that a protected property right cannot be taken without just compensation, the Districts fail to first establish the legal existence of a compensable property interest. There is no compensable property right to the unreasonable use of water. *Forni*, 54 Cal. App. 3d at 751-53 (further noting that “the overriding constitutional consideration is to put the water resources of the state to a reasonable use.... In order to attain this objective, the riparian owners may properly be required to endure some inconvenience or to incur reasonable expenses”). By extension, this argument cannot credibly be used to limit the Commission’s ability to consider other reasonable alternatives to the Districts’ Proposed Alternative, such as the Conservation Groups’ alternatives.

3. Contrary to arguments in the AFLA, the Commission must analyze the proposed alternatives under the FPA even if it lacks authority to authorize them.

The Commission must consider reasonable alternatives to the propose and existing flow regimes under the FPA. This extends to alternatives that are outside of the Commission’s authority. The FPA imposes upon the Commission “a statutory duty to give full consideration to alternative plans even where it ha[s] no authority to command the alternative.” *Green Island*, 577 F.3d at 167 (internal quotation marks and citations omitted); *see also Scenic Hudson*, 354 F.2d at 617 (“that the Commission has no authority to command the alternative does not mean that it cannot reject the (original) proposal”) (internal citation omitted).

The AFLA erroneously argues that “[h]ydroelectric generation is a secondary purpose of the Don Pedro Project” and, citing the Commission’s Scoping Document 2, that recommended alternatives to change the consumptive use of water “could not replace the Don Pedro

hydroelectric project” and therefore “are not reasonable alternatives for the NEPA analysis.” AFLA Exhibit E, Environmental Report, at 3-1 (September 2017). Conservation Groups’ disagree that the Commission lacks authority to modify the flow regimes. Regardless, the Commission may not avoid analyzing water flow alternatives under the FPA simply because it “ha[s] no authority to command the alternative.” *Green Island*, 577 F.3d at 167. (An explanation of why this argument is also incorrect under NEPA is provided *infra*.)

Conservation Groups’ alternatives include measures that may be beyond the Commission’s authority. However, as discussed in NEPA Recommendations section I *infra*, they were developed to protect all beneficial uses of the Tuolumne River, striking a balance between instream beneficial uses (i.e., fish and wildlife and boating) and consumptive uses.

II. NEPA requires that the Commission analyze the Conservation Groups’ proposed alternatives.

In addition to the substantive obligations to analyze alternatives under the FPA, the Commission is subject to parallel, procedural obligations under NEPA to analyze a reasonable range of alternatives. It is critical that the Commission’s NEPA document contain a robust alternatives analysis-- the “heart” of NEPA -- to provide “a clear basis for choice among options by the decision-maker and the public.”¹⁹¹ The Commission’s NEPA document is intended to support its final licensing decision as well as the decisions of other jurisdictional agencies, including FWS, NMFS and the State Board. While the State Board has traditionally prepared its own environmental document under the California Environmental Quality Act, its practice is to rely as appropriate on the Commission’s NEPA document.¹⁹² Accordingly, the DEIS should consider a range of operational alternatives that the State Board will likely to consider in making its CWA section 401 decision. This includes the Conservation Groups’ alternatives, which are reasonable means to meet the objectives of the State Board’s Bay-Delta Plan and the purpose and need of the Projects.

A. NEPA requires that the Commission analyze and provide a detailed statement on reasonable alternatives to the actions proposed in the AFLA.

NEPA § 102(2)(C), 42 U.S.C. § 4332(2)(C), requires the Commission to provide a “detailed statement” on the following:

¹⁹¹ See, e.g., *Simmons v. U.S. Army Corps*, 120 F.3d 664 (7th Cir. 1997); *Davis v. Mineta*, 302 F.3d 1104, 1118 (10th Cir. 2002); see also 40 CFR 1502.14.

¹⁹² See Initial Study and Mitigated Negative Declaration for the Poe Project *available at* https://www.waterboards.ca.gov/waterrights/water_issues/programs/water_quality_cert/docs/poe_ferc2107/poe_final_mnd_stamped.pdf noting that:

"CEQA Guidelines section 15221 states that when a project requires compliance with both CEQA and NEPA, state agencies should use the Environmental Impact Statement (EIS) or Finding of No Significant Impact (FONSI) rather than preparing an Environmental Impact Report or Negative Declaration if the EIS or FONSI complies with the provisions of CEQA. Consistent with this section, this IS refers to appropriate sections of the final EA to avoid repetition of information. This IS was prepared in compliance with CEQA and assesses the environmental effects of the Proposed Project. To the extent that the Proposed Project incorporates conditions to ensure that potential impacts have been mitigated to insignificance, the applicant agreed to incorporate the conditions into the Proposed Project. The IS includes information necessary to comply with CEQA not included in the final EA."

- (i) the environmental impact of the proposed action,
- (ii) any adverse environmental effects which cannot be avoided should the proposal be implemented,
- (iii) *alternatives to the proposed action*,
- (iv) the relationship between local short-term uses of man's environment and the maintenance and enhancement of long-term productivity, and
- (v) any irreversible and irretrievable commitments of resources which would be involved in the proposed action should it be implemented.

42 U.S.C. § 4332(2)(C) (emphasis added). To fulfill this NEPA requirement, the Commission must show that it took a “hard look” at the environmental impacts of its licensing decision. *Am. Rivers v. F.E.R.C.*, 201 F.3d 1186, 1195 (9th Cir. 1999).

NEPA § 102(2)(E), 42 U.S.C. § 4332(2)(E), also imposes an independent, broader obligation to analyze alternatives than the EIS requirement under § 102(2)(C). *Bob Marshall Alliance v. Hodel*, 852 F.2d 1223, 1229 (9th Cir. 1988). § 102(2)(E). Under the Council for Environmental Quality’s (CEQ) rules, the presentation of alternatives

is the heart of the environmental impact statement. Based on the information and analysis presented in the sections on the Affected Environment (§ 1502.15) and the Environmental Consequences (§ 1502.16), it should present the environmental impacts of the proposal and the alternatives *in comparative form, thus sharply defining the issues and providing a clear basis for choice among options by the decisionmaker and the public*. In this section agencies shall:

...

(b) *Devote substantial treatment to each alternative considered in detail including the proposed action so that reviewers may evaluate their comparative merits.*

40 C.F.R. § 1502.14 (emphasis added).

Furthermore, “[a]n EIS must address the *cumulative impacts* of a project and consider adequate alternatives.” *Muckleshoot Indian Tribe v. U.S. Forest Serv.*, 177 F.3d 800, 809 (9th Cir. 1999) (emphasis added). Negative impacts and mitigation measures must also be discussed. 40 C.F.R. § 1502.16.

Pursuant to NEPA, the Commission stated that it intends “to prepare an environmental impact statement (EIS) that describes and evaluates the probable effects, including an assessment of the site-specific and cumulative effects, if any, of the proposed action and alternatives.” FERC, Office of Energy Projects, Scoping Document 2 for the Don Pedro Hydroelectric Project, at 6 (July 25, 2011).

B. The Conservation Groups' proposed alternatives are reasonably related to the purpose and need of the Don Pedro Project.

For purposes of NEPA, “[t]he scope of an alternatives analysis depends on the underlying purpose and need specified by the agency for the proposed action.” *League of Wilderness Defs.-Blue Mountains Biodiversity Project v. U.S. Forest Serv.*, 689 F.3d 1060, 1069 (9th Cir. 2012) (“League of Wilderness”) (internal quotation marks omitted). The Commission “need only evaluate alternatives that are reasonably related to the purposes of the project.” *Id.* (internal citation and quotation marks omitted). However, the Commission may not define the purpose and need of the project so narrowly as to curtail a full assessment of reasonable alternatives. See *City of Carmel-By-The-Sea v. U.S. Dep’t of Transp.*, 123 F.3d 1142, 1155 (9th Cir. 1997) (“The stated goal of a project necessarily dictates the range of ‘reasonable’ alternatives and an agency cannot define its objectives in unreasonably narrow terms”). Only a sufficiently broad statement allows the full analysis of an adequate range of alternatives to enable the EIS to provide “a clear basis for choice among options by the decisionmaker and the public.” 40 C.F.R. § 1502.14.

The AFLA notes that for purposes of NEPA, “any alternatives to mitigate the Don Pedro Project’s effects (‘mitigation strategies’) must be reasonably related to the purpose and need for the Proposed Action, *which in this case is whether, and under what terms, to authorize the continuation of hydropower generation.*” AFLA Exhibit E, Environmental Report, at 3-80 (September 2017) (emphasis added).

The Commission must structure its purpose and need statement so as not to preclude the analysis of reasonable alternatives. The Commission is licensing project works that affect the flow of water in the Tuolumne River. Regardless of whether those project works serve multiple purposes, the Commission is obligated to consider alternative operations that would avoid or minimize the existing conflicts between beneficial uses of the waterway.

C. The Commission may not avoid its obligations under NEPA to analyze the Conservation Groups' proposed alternatives in detail.

The Commission must analyze proposed alternatives in detail under NEPA. However, the Commission improperly asserts multiple times in Scoping Document 2 that it need not analyze *any* alternatives “designed to alter or reduce consumptive use of water”:

alternatives that address the consumptive use of water in the Tuolumne River through construction of new structures or methods designed to alter or reduce consumptive use of water are . . . alternative mitigation strategies that could not replace the Don Pedro hydroelectric project. As such, these recommended alternatives do not satisfy the NEPA purpose and need for the proposed project and are not reasonable alternatives for the NEPA analysis.

FERC, Office of Energy Projects, Scoping Document 2 for the Don Pedro Hydroelectric Project, at 15–17 (July 25, 2011). The AFLA’s Environmental Analysis repeats this statement. AFLA Exhibit E, Environmental Report, at 3-1 (September 2017). This statement is incorrect.

The EIS must consider a reasonable range of alternatives, including alternative flow scenarios that better protect fish and wildlife resources. This obligation applies regardless of whether the dam serves multiple purposes; regardless of whether the Commission has exclusive authority to authorize the alternatives; to satisfy the requirement that cumulative effects be taken into account; and to satisfy the requirement that environmental consequences and mitigation measures be considered.

1. The AFLA improperly separates the Don Pedro Project’s hydroelectric power purpose from its other purposes in an attempt to evade comprehensive review of the Project’s impacts under NEPA.

The AFLA notes that “the purpose and need for the Proposed Action . . . is whether, and under what terms, to authorize the continuation of hydropower generation.” AFLA Exhibit E, Environmental Report, at 3-80 (September 2017). However, the AFLA also states that there are “primary” and “secondary” purposes for the Don Pedro Project. “Flood control and water supply for irrigation and M&I uses, are primary purposes of the Don Pedro Project.” AFLA Exhibit E, Environmental Report, at 3-80 (September 2017). Additionally, it states that “water management is driven by the primary Don Pedro Project purposes; hydropower generation is a consequence of flows scheduled for release to satisfy the primary purposes of the Don Pedro Project.” *Id.* The Report thus describes hydropower generation as “a secondary consideration with respect to flow scheduling.” AFLA Exhibit E, Environmental Report, at 3-80 (September 2017). *See also id.* at 3-1, 4-2 (“Hydroelectric generation is a secondary purpose of the Don Pedro project”).

FERC has jurisdiction to regulate “project works,” such as the Don Pedro facilities, that are necessary for project operation, regardless of whether those works serve other purposes. The Commission’s jurisdiction to issue licenses for hydroelectric projects under Part I of the FPA is set forth in Section 4(e), which authorizes the Commission, in pertinent part:

To issue licenses . . . 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.

16 U.S.C. § 797(e). “Project works” are defined as “the physical structures of a project.” 16 U.S.C. § 796(12). The FPA defines a “project” as:

[a] complete unit of improvement or development [of hydropower], consisting of a power house, all *water conduits*, all dams and appurtenant works and structures . . . which are a part of said unit, and all storage, diverting or forebay reservoirs directly connected therewith, . . . all miscellaneous structures used and useful in connection with said unit or any part thereof, and all water-rights, rights-of-way, ditches, dams, reservoirs, lands, or interests in lands the use and occupancy of which are necessary or appropriate in the maintenance and operation of such unit

16 U.S.C. § 796(11) (emphasis added). In this case, the infrastructure that supports those other purposes, such as irrigation and flood control, is necessary for hydropower generation and

qualifies as “project works” that the Commission is authorized to regulate by means of granting a conditioned license for hydroelectric power generation.

It is irrelevant that hydroelectric power generation is not the sole purpose of operations. Regardless of the impetus for operational decisions, the effects that result from the operation of project works are by definition project effects, and are thus relevant for an analysis of environmental impacts. The disassociation of power and water supply functions is a fiction that cannot be used to circumvent NEPA requirements. The project works were specifically designed to have multiple purposes, and they will continue to do so unless the Project is decommissioned. The impacts of the flow regime dictated by the integrated Project operations, and alternatives to those operations, should be analyzed.

2. Conservation Groups’ alternatives must be analyzed as the record shows that the Proposed Action will not protect fish and aquatic resources over the term of the new license.

Protection of fish and other aquatic resources has been a relevant concern for purposes of licensing the Project since its original license was granted in 1964. Indeed, the Commission expressly refuted the 1964 applicants’ argument that the license should not require water flow releases specifically for the protection of fish.

In concluding that releases for fish should be required as a condition of the license, we do not seriously question the applicants’ contention that even without such a condition the salmon runs would be preserved longer with New Don Pedro than with existing Don Pedro. On the basis of the record, we would expect that New Don Pedro could be operated without adverse effect on the salmon runs until after 1985, when San Francisco’s upstream diversions reach 295 mgd; whereas without New Don Pedro it appears that the fish would be seriously affected, if not destroyed, after 1968, when San Francisco’s diversions reach 210 mgd. This evidence, however, does not substantiate the applicants’ contention that no fish water releases should be required in the New Don Pedro license. In our judgment such releases are required as hereinafter prescribed if the project is to be found to be best adapted to a comprehensive plan for development of the waterway, since only by making the releases a condition of the license can we be sure that the project will be operated so as to utilize the available water in the best interest of all parties and provide the best plan for comprehensive development for all public uses.

Re Turlock Irrig. Dist., 53 P.U.R.3d 18 (1964).

The evidence in the record indicates that the proposed flow schedule will not protect fish and other aquatic resources over the term of the new license. Regardless, the AFLA argues that “the Proposed Action would have no adverse effects on fish and aquatic resources in the reach between Don Pedro Reservoir and La Grange Diversion Dam.” AFLA Exhibit E, Environmental Report, at § 3.5.3.3. (September 2017). It also argues that “[c]ontinuation of existing hydropower operations at Don Pedro Dam would have no adverse effect on flows, temperature, water quality, or any other environmental conditions in the lower Tuolumne River, because the lower river flow regime is dictated by the independent, non-interrelated primary

purposes of the Don Pedro Project . . . and flow releases to protect aquatic resources.” *Id.* § 3.4.2.3.

The Commission’s NEPA analysis should include consideration of alternatives such as those that “enhance fish and wildlife resources and reduce negative impacts attributable to a project since its construction” even if the presently existing project conditions are adopted as the project baseline. *Am. Rivers v. F.E.R.C.*, 201 F.3d 1186, 1197–98 (9th Cir. 1999).

3. Conservation Groups’ alternatives must be analyzed under NEPA regardless of whether the Commission has authority to authorize them.

The Commission has authority to authorize the proposed alternatives. As explained above, FERC has jurisdiction to regulate “project works,” such as the Don Pedro facilities, that are necessary for project operation, regardless of whether those works serve other purposes. As also explained above, in 1964 the original license for the Project granted by the Commission was “issued to Turlock and Modesto upon the conditions for fish water releases recommended by staff.” *Re Turlock Irrig. Dist.*, 53 P.U.R.3d 18 (1964).

For purposes of NEPA, however, it is irrelevant whether the Commission has authority to authorize the proposed alternatives. NEPA regulations, 40 C.F.R. § 1502.14(c), require that agencies “include reasonable alternatives not within the jurisdiction of the lead agency.” *Muckleshoot Indian Tribe v. U.S. Forest Serv.*, 177 F.3d 800, 814 (9th Cir. 1999) (internal citation omitted). The AFLA argues that “[h]ydroelectric generation is a secondary purpose of the Don Pedro Project” and, citing the Commission’s Scoping Document 2, that recommended alternatives to change the consumptive use of water “could not replace the Don Pedro hydroelectric project” and therefore “are not reasonable alternatives for the NEPA analysis.” AFLA Exhibit E, Environmental Report, at 3-1 (September 2017). This is an incorrect legal conclusion.

Contrary to the AFLA’s argument, the Commission may not avoid its obligations under NEPA for lack of authority to authorize a proposed alternative. In *Muckleshoot*, the Ninth Circuit held that the Forest Service could not avoid analyzing an alternative that would involve purchasing land with Federal Land and Water Conservation Fund funds, despite that the Forest Service lacked authority to appropriate the funds. *Id.* at 814. The Court stated that the Forest Service did have the ability to *request* the funds, and its failure to analyze this reasonable option rendered its NEPA alternatives analysis inadequate. *Id.* Here, even if the Commission lacked authority to require a different water flow regime—which it does not, as explained above—it may discuss or request a different regime from those entities that have authority to change the regime. Failure to analyze this reasonable alternative would render the Commission’s NEPA analysis inadequate.

III. NEPA requires that the Commission’s EIS address cumulative effects.

The EIS must address cumulative effects, which are defined as “[t]he impact on the environment which results from the incremental impact of the action when added to other past,

present, and reasonably foreseeable future actions regardless of what agency (Federal or non-Federal) or person undertakes such other actions.” (40 C.F.R. § 1508.7.)

The Commission’s policy is to “address and consider cumulative impact issues at original licensing and relicensing *to the fullest extent possible* consistent with the Commission’s statutory responsibility to avoid undue delay in the relicensing process and to avoid undue delay in the amelioration of individual project impacts at relicensing.” 18 C.F.R. § 2.23 (emphasis added).

The Commission must analyze the Conservation Groups’ proposed alternatives to determine whether it would avoid or better mitigate project effects, including cumulative effects.

“An EIS must address the *cumulative impacts* of a project and consider adequate alternatives.” *Muckleshoot Indian Tribe v. U.S. Forest Serv.*, 177 F.3d 800, 809 (9th Cir. 1999) (emphasis added). This requirement includes consideration of “the incremental impact of the action when added to other past, present and reasonably foreseeable future actions *regardless of what agency (Federal or non-Federal) or person undertakes such other actions.*” *Id.* (quoting 40 C.F.R. § 1508.25(a)(2)) (emphasis added). The Commission may not circumvent its obligation to analyze the proposed alternative flow regimes by arguing that the primary impacts of the Don Pedro Project are attributable to other agencies. The proposed alternatives would have positive effects on the incremental, cumulative impacts of the Project regardless of what actions other agencies have taken or will take in the future. These proposed alternatives must be analyzed.

IV. NEPA requires the Commission to analyze the Conservation Groups’ alternatives to inform its analysis of potential mitigation measures for the Project’s adverse effects.

When the Commission is evaluating the environmental consequences of proposed and alternative Project operations, it should also analyze any reasonable measures that would mitigate those consequences. The Commission’s EIS must “discuss the extent to which adverse effects can be avoided.” *Robertson v. Methow Valley Citizens Council*, 490 U.S. 332, 352 (1989). This required step is a crucial aspect of the NEPA analysis. “Without such a discussion, neither the agency nor other interested groups and individuals can properly evaluate the severity of the adverse effects.” *Id.* As explained above, the Commission may not be excused from analyzing mitigation measures just because it may not have authority to require them.

The Commission must analyze reasonable alternatives as part of its required analysis of mitigation measures to reduce negative environmental consequences. This requirement is codified in 40 C.F.R. § 1502.16(d), which states that the NEPA analysis “shall include discussions of: . . . [t]he environmental effects of alternatives including the proposed action.” *See also Robertson v. Methow Valley Citizens Council*, 490 U.S. 332, 351 (1989) (“To be sure, one important ingredient of an EIS is the discussion of steps that can be taken to mitigate adverse environmental consequences.”) The Conservation Groups’ alternatives are reasonable measures that would mitigate the environmental impacts of the Project. Therefore, the Commission must analyze them to meet its obligations under 40 C.F.R. § 1502.16(d).

V. FERC's Issuance of a New License for the Don Pedro Project Would Trigger CWA Section 401's Requirement for a Water Quality Certification.

Under CWA section 401 states must provide a water quality certification for any activity that may result in a discharge into intrastate navigable waters before a federal license or permit may be issued for that activity.¹⁹³ A request for certification may be granted, denied, or waived by the relevant state agency. If granted, the certification must set forth what conditions and limitations on the effluent and project are necessary to ensure that the certified project complies with the provisions of the CWA and with any applicable state law requirements.¹⁹⁴ The limitations set forth in this certification become a condition on any federal license or permit for the project.¹⁹⁵ The application process for a federal permit or license which triggers § 401 cannot be completed without properly applying for § 401 certification from the relevant state or tribe.¹⁹⁶

Section 401 is triggered when an applicant seeks “a Federal license or permit to conduct any activity including, but not limited to, the construction or operation of facilities, which may result in any discharge into the navigable waters” of the United States.¹⁹⁷ The discharge need not involve any addition of pollutants in order to trigger § 401. The Supreme Court held in *S.D. Warren Co. v. Maine Board of Environmental Protection et. al.* that, when discussing water, “‘discharge’ commonly means a ‘flowing or issuing out,’ and this ordinary sense has consistently been the meaning intended when this Court has used the term in prior water cases.”¹⁹⁸ This interpretation of the term “discharge,” the Court further noted, was consistent with its previous holding in *PUD No. 1 v. Washington Dep’t of Ecology*,¹⁹⁹ as well as with the interpretations of the EPA and FERC, which “have each regularly read ‘discharge’ as having its plain meaning and thus covering releases from hydroelectric dams.”²⁰⁰ Because the Don Pedro Dam would create a “discharge” under the CWA, it is subject to the requirements of § 401 of the Act.

¹⁹³ CWA § 401(a)(1); 33 U.S.C. 1341(a)(1)

¹⁹⁴ CWA § 401(d)

¹⁹⁵ *Id.*

¹⁹⁶ EPA Office of Wetlands, Oceans, and Watersheds, Clean Water Act Section 401 Water Quality Certification: A Water Quality Protection Tool For States and Tribes 15 (2010) (hereinafter “EPA Handbook”) (“Section 401 indicates that an application for a federal permit or license that may result in a discharge to waters of the U.S. cannot be considered complete unless accompanied by a grant or waiver of §401 certification. ‘No license or permit shall be granted until the certification . . . has been obtained or has been waived.’ As a result, the applicant is responsible for requesting the necessary §401 certification from the state or tribe.”) (citations omitted).

¹⁹⁷ CWA § 401(a)(1) (emphasis added).

¹⁹⁸ 547 U.S. 370, 376 (2006) (quoting Webster’s New International Dictionary 742 (2d ed. 1954)).

¹⁹⁹ 511 U.S. 700 (1994).

²⁰⁰ *S.D. Warren*, 547 U.S. at 377 (citing EPA, Water Quality Standards Handbook § 7.6.3, p. 7-10 (2d ed. 1994) (“EPA has identified five Federal permits and/or licenses that authorize activities that may result in a discharge to waters[, including] licenses required for hydroelectric projects issued under the Federal Power Act”); *FPL Energy Maine Hydro LLC*, 111 FERC P61,104 p. 61,505 (2005)(rejecting, in a recent adjudication, the argument that Congress “used the term ‘discharge’ as nothing more than a shorthand expression for ‘discharge of a pollutant or pollutants’”)).

Furthermore, a § 401 certification for this project is mandated by California statute. The California Code of Regulations contains in Title 23, § 3855(b)(1) the following language: “[a]n application for water quality certification shall be filed . . . whenever a potential discharge from a proposed activity . . . is involved or associated with . . . a hydroelectric facility, and the proposed activity requires a FERC license or amendment to a FERC license.” The Districts fail to address the existence of this statutory requirement, much less explain how it could possibly not apply to the Don Pedro Project. Instead of attending to the statutory language, the Districts choose to discuss language from a letter the State Board sent to the EPA in March of 1994.²⁰¹ However, the 1994 letter is not controlling legal authority. In addition to being almost 25 years old, this outdated State Board opinion contradicts both the intervening Supreme Court opinion in *PUD No. 1* and current California law. The language from the State Board’s 1994 letter is therefore completely irrelevant.

In summary, the language from the Supreme Court and California’s statute is unambiguous. The State Board therefore has the authority to establish Section 401 certification requirements and limitations as it deems appropriate to protect the Tuolumne River’s water quality.

A. The SED’s Unimpaired Flow and Carryover Storage Requirements Can Be Applied to the Districts Because Section 401 Applies to Streamflow and Operations.

The thrust of the Districts’ arguments about streamflow and operations is that the CWA does not consider impacts from changes in water flow to be associated with “water quality” as properly regulated by the CWA. This line of argument contradicts precedent, explicit EPA policy, and the relevant statutory language. As such, the Districts’ assertion that the § 401 process should not apply to the Don Pedro Project because the water-related concerns relate to stream flow should be summarily rejected. The State Board should proceed with the § 401 certification process as is clearly authorized by law, and establish conditions and limitations for licensing and operation as it deems necessary to adequately maintain and protect the existing uses of the Tuolumne River.

1. A minimum stream flow requirement is a permissible condition of a Section 401 certification.

The argument the Districts make regarding the impermissibility of streamflow and operations requirements in a § 401 certification is essentially the same as an argument already explicitly rejected by the Supreme Court. “[W]hether the minimum stream flow requirement that the State imposed on the Elkhorn Project [was] a permissible condition of a § 401 certification under the Clean Water Act” was “[t]he principal dispute” in *PUD No. 1*.²⁰² The Court concluded unambiguously that the minimum stream flow requirement was a permissible condition of a § 401 certification. Petitioners in that case argued, as the Districts do, that the

²⁰¹ Letter from Greg Salyer, General Manager, Modesto Irrigation District, and Casey Hashimoto, General Manager, Turlock Irrigation District, to State Water Resources Control Board, at 11 (Mar. 17, 2017) (hereinafter “Letter to SWRCB”).

²⁰² 511 U.S. at 711.

CWA is concerned only with water quality, not water quantity.²⁰³ The Supreme Court responded that “[t]his is an artificial distinction,” and went on to explain the intimate link between water quality and water quantity:

[T]here is recognition in the Clean Water Act itself that reduced stream flow . . . can constitute water pollution. First, the Act’s definition of pollution as “the man-made or man induced alteration of the chemical, physical, biological, and radiological integrity of the water” encompasses the effects of reduced water quantity. This broad conception of pollution -- one which expressly evinces Congress’ concern with the physical and biological integrity of water -- refutes petitioners’ assertion that the Act draws a sharp distinction between the regulation of water “quantity” and water “quality.” Moreover, § 304 of the Act expressly recognizes that water “pollution” may result from “changes in the movement, flow, or circulation of any navigable waters . . ., including changes caused by the construction of dams.” This concern with the flowage effects of dams and other diversions is also embodied in the EPA regulations, which expressly require dams to be operated to attain designated uses.²⁰⁴

In light of this decision, the Districts’ assertion that § 401(d) is limited in scope and cannot be applied to “matters of streamflow, water rights, and operations of dams and diversions” because these are “not related to water quality” is plainly erroneous.²⁰⁵ This argument was comprehensively and explicitly rejected in the *PUD No. 1* decision.²⁰⁶

The petitioners in *PUD No. 1* also attempted to argue that “the minimum stream flow requirement imposed by the State was unrelated to [the] specific discharges, and that as a consequence, the State lacked the authority under § 401 to condition its certification on maintenance of stream flows sufficient to protect the Dosewallips fishery.”²⁰⁷ The Court rejected this argument too because it conflicts with the explicit language of the CWA. “The text refers to the compliance of the applicant, not the discharge. Section 401(d) thus allows the State to impose ‘other limitations’ on the project in general to assure compliance with various provisions of the Clean Water Act and with ‘any other appropriate requirement of State law.’”²⁰⁸

This view is consistent with EPA’s regulations implementing § 401. The regulations expressly interpret § 401 as requiring the State to find that “there is a reasonable assurance that the *activity* will be conducted in a manner which will not violate applicable water quality standards.” EPA’s conclusion that *activities* -- not merely discharges -- must comply with state water quality standards is a reasonable interpretation of § 401, and is entitled to deference.²⁰⁹

The Court found, in no uncertain terms, “that ensuring compliance with § 303 is a proper function of the § 401 certification. . . . As a consequence, state water quality standards

²⁰³ *Id.* at 719.

²⁰⁴ *Id.* (citations omitted).

²⁰⁵ Letter to SWRCB, at 12.

²⁰⁶ 511 U.S. at 723 (“In summary, we hold that the State may include minimum stream flow requirements in a certification issued pursuant to § 401 of the Clean Water Act”)

²⁰⁷ *Id.* at 719.

²⁰⁸ *Id.*

²⁰⁹ *Id.* at 712 (citations omitted) (emphasis in original).

adopted pursuant to § 303 are among the ‘other limitations’ with which a state may ensure compliance through the § 401 certification process.”²¹⁰

In light of the well-established law on § 401, it is incoherent to argue that establishing streamflow requirements as part of the § 401 certification is inappropriate. Such an argument also contradicts a variety of statements in the EPA’s handbook on § 401. In the section labeled “401 Certification Considerations: Consistency With Other Appropriate Requirements of State and Tribal Law,” the EPA expressly acknowledges the relevancy of “wildlife laws addressing *habitat characteristics* necessary for species identified in a waterbody’s designated use.”²¹¹ The words “habitat characteristics” clearly contemplate more than toxins and pollutants. Indeed, when the handbook discusses the potential for adaptive management, it explicitly discusses the creation and modification of “a minimum flow” requirement “[i]n the context of hydropower licensing adaptive management.”²¹²

The Districts also attempt to argue that “FERC retains sole and exclusive jurisdiction to establish minimum streamflow and other conditions of the license in the absence of the 401 conditions,” and thus that “[e]ven if adopted, the UIF and carryover storage requirements cannot unilaterally be applied against MID and TID because they are preempted by FERC’s determination on appropriate streamflows.”²¹³ Their defense of this argument hinges entirely on the language and holding from *California v. FERC*.²¹⁴ Like almost everything else the Districts cite, however, this case predates the *PUD No. 1* opinion. Thus, *PUD No. 1* is the controlling law, not *California v. FERC*. As explained in detail above, the holding in *PUD No. 1* clearly authorizes the SWRCB to incorporate streamflow requirements in their § 401 certification.

B. The Need to Apply for Section 401 Certification for the Don Pedro Dam is Unavoidable.

There are no exceptions that will permit the Districts to circumnavigate the need to obtain § 401 certification for Don Pedro Project. The Districts make two failed arguments concerning the lack of a need for § 401 certification for the Project. The first argument is that, because they may apply for a new license that reduces the discharge quantity, the need for a § 401 certification is nullified. The second argument is that, even if the new license resulted in equal or slightly higher discharge than currently flows through the dam, the § 401 certification may still not be necessary because “[n]ot all increases in flows from hydroelectric projects will trigger the need for Section 401 certification.”²¹⁵ Neither of these arguments has merit.

To address the Districts’ first argument, what they “may” do is irrelevant. A § 401 certification is required whenever there exists the *potential* for a discharge. Certainty or likelihood of a discharge is not required.²¹⁶

²¹⁰ *Id.*

²¹¹ EPA Handbook, at 21.

²¹² *Id.* at 27.

²¹³ Letter to SWRCB, at 14.

²¹⁴ 495 U.S. 490 (1990).

²¹⁵ Letter to SWRCB, at 15.

²¹⁶ EPA Handbook, at 4 (“It is important to note that §401 certification is triggered by the *potential* for a discharge; an actual discharge is not required”) (emphasis in original).

The Districts' second argument contains numerous flaws. First, the assertion that not all increases in flow require a § 401 certification is true but irrelevant. Section 401 is implicated by the Don Pedro Project because it involves an "applicant for a Federal license or permit to conduct [an] activity . . . which may result in [a] discharge,"²¹⁷ not because it is predicted to cause an increase in flow. Additionally, as was discussed above, 23 C.C.R. § 3855(b)(1) mandates that an application for water quality certification be filed for any hydroelectric facility activity requiring a FERC license or an amendment to a FERC license.

Furthermore, the example the Districts offer in support of their second argument is off-point. In the example, the licensee merely sought permission to make a change in its discharge rate.²¹⁸ This licensee asked only for a *modification* to the conditions of its *existing* FERC license, and FERC, being the licensing authority, granted the modification to its own license. In contrast, the Don Pedro Dam involves a relicensing procedure; a new license must be issued permitting continued and modified operations. As discussed above, state and federal law clearly provide for § 401 certification as part of the process of obtaining this new license.

Additionally, the Districts' example scenario occurred in Alabama. In California, there is a statute explicitly mandating the filing of an application for water quality certification for projects such as this. The decision FERC made in Alabama inherently did not involve application of this statutory mandate. The legal framework within which the Alabama decision was made is not analogous to the legal framework under which decisions must be made regarding the Don Pedro Project.

Finally, it is unclear what relevance the Districts believe their confidence "that the nature of the discharge will not materially change" is supposed to have.²¹⁹ Even assuming their confidence is well placed, the static nature of the discharge does not shield them from the requirement for a § 401 certification as part of the relicensing process. Federal law and Supreme Court precedent authorize the SWRCB to undertake a § 401 certification process if there is even the potential for a discharge, which clearly exists here. Furthermore, state law mandates that the project go through said process. Beyond that, the Districts' *beliefs* about what the studies and environmental analysis *will* say about the nature of the discharge are neither dispositive nor relevant to an analysis of the applicability of § 401.

NEPA RECOMMENDATIONS

As noted in the section *supra*, the Commission has obligations under NEPA and FPA to assess the Project's direct and cumulative effects on the environment, develop and adopt appropriate protection, mitigation or enhancement measures to mitigate the adverse effects of the Project, and develop and analyze reasonable alternatives to the proposed Project.

²¹⁷ 33 U.S.C. § 1341(a)(1).

²¹⁸ Letter to SWRCB, at 15.

²¹⁹ Letter to SWRCB, at 15.

VI. Alternatives

The Commission should analyze the following alternatives in its NEPA document: 1) the Conservation Groups' Flow, Habitat and River Management Alternative; and 2) a Low Exports Alternative that may be required pursuant to Phase II of the Bay-Delta Plan update;

A. Conservation Groups' Tuolumne River Flow, Habitat and River Management Alternative

The EIS should evaluate the Conservation Groups' Flow, Habitat and River Management Proposal for the Tuolumne River. This alternative should include: 1) Conservation Groups' recommended flow measures, including the proposal for a groundwater water bank; 2) Conservation Groups recommended habitat improvement measures including proposals for additional floodplain habitat, large woody debris, and gravel augmentation; 3) Conservation Groups' recommended river management improvement measures including a proposal to install a segregation weir in Critically Dry years in the Lower Tuolumne River; 4) Conservation Groups' measures related to management actions upstream of Don Pedro Reservoir including access improvement at Ward's Ferry Bridge.

In developing a flow proposal for the lower Tuolumne River, the Conservation Groups attempted to work within the general framework that the State Water Resources Control Board (State Board) 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.²²⁰ The State Board framework is built around the scientifically-supported principle that higher and more variable inflows during the February through June time frame are needed to support existing salmon and steelhead populations in the major San Joaquin River tributaries, including the Tuolumne.²²¹ Accordingly, the State Board recommended flow objectives for the Tuolumne River (as well as the Merced and Stanislaus rivers) require release of 30-50% of the February-June unimpaired flow in each river, with a beginning value of 40%.

The Conservation Groups agree with the principles underpinning the State Board's recommended flow objectives. However, the State Board's recommended flow objectives lack critical detail and rely instead on an amorphous adaptive management regime. Consequently, it has been difficult for stakeholders to thoroughly understand the benefits and impacts associated with the State Board's proposal. The Conservation Groups' flow proposal picks up where the State Board's proposal falls short: it better defines the flow regime, models it more accurately, and addresses Critically Dry years and dry-year sequences. To do so, the Conservation Groups used the water-balance model developed by the Districts and CCSF for the relicensing to incrementally evaluate different percentages of unimpaired flow requirements for the lower Tuolumne River in all or just some of the February-June months. The Conservation Groups'

²²⁰ SWRCB, "Bay Delta Plan Update: Draft San Joaquin River Flow and Southern Delta Salinity Requirements Released for Public Comment," *available at* http://www.waterboards.ca.gov/waterrights/water_issues/programs/bay_delta/bay_delta_plan/water_quality_control_planning/2012_sed/docs/sjr_factsheet2012.pdf.

²²¹ See Technical Report on the Scientific Basis for Alternative San Joaquin River Flow and Southern Delta Salinity Objectives. State Water Resources Control Board. February 2012; updated June, 2016.

flow proposal, in concert with its recommended non-flow measures, will likely achieve the stated goals of the State Board proposal while addressing many of the concerns articulated by the Licensees.

Given that the State Board issued its draft revised water quality objectives and a recirculated SED for Phase 1 on September 15, 2016, it is reasonably foreseeable that the State Board will adopt new flow objectives that will affect the Tuolumne River during the term of the new license.²²² Indeed, since the State Board may use its Clean Water Act §401 Water Quality Certification authority as a legal basis for portions of the Bay-Delta Plan update, it is foreseeable that portions of the update may be directly incorporated into the Certification and thus the new FERC license for the Don Pedro Hydroelectric Project.²²³ The Conservation Groups plan to submit their flow alternative to the State Board for consideration as an alternative to the State Board's recommended flow objectives.

As described *supra*, the Conservation Groups also analyzed the nature and amount of physical habitat improvements needed in the lower Tuolumne River. Conservation Groups performed these analyses both in the context of FERC licensing and in other collaborative settings. The Conservation Groups developed a series of biological and environmental goals and objectives to use as metrics for these analyses. The Conservation Groups used two sets of modeling tools to evaluate the interaction between instream flow and floodplain inundation, and developed a recommendation that requires varying amounts of needed floodplain improvements according to a quantification of habitat availability that will become available as a result of flow improvements. Recognizing that not all inundated floodplain is suitable habitat for salmonids, Conservation Groups specifically require suitable habitat in their recommendation for floodplain habitat improvements. Conservation Groups also recognize the specific degradation of the Tuolumne River's channel habitat caused by dredging and the resulting "special run pools" that provide poor habitat for salmonids and excellent habitat for piscivorous fish. Conservation Groups recommend solving the underlying habitat problem that promotes the abundance of piscivorous fish, combined with use of a weir in Critically Dry years to prevent migration of striped bass into the upper 26 miles of salmonid habitat in the lower Tuolumne River. Conservation Groups also developed a proposal to place and maintain large woody debris in the lower Tuolumne River.

The State Board's SED for the Water Quality Control Plan acknowledges the need for physical habitat improvements in the lower Tuolumne River, and other San Joaquin River tributaries and the mainstem lower San Joaquin. However, the State Board makes no specific recommendations on the nature or amount of habitat that may be required in conjunction with necessary flow improvements.

²²² Available at:

https://www.waterboards.ca.gov/waterrights/water_issues/programs/bay_delta/bay_delta_plan/water_quality_control_planning/2016_sed/index.shtml

²²³ See Revised Notice of Preparation for "Update to the Water Quality Control Plan for the San Francisco Bay/Sacramento-San Joaquin Delta Estuary: Water Quality Objectives for the Protection of Southern Delta Agricultural Beneficial Uses; San Joaquin River Flow Objectives for the Protection of Fish and Wildlife Beneficial Uses; and the Program of Implementation for Those Objectives, Attachment 2, p. 4. Available at http://www.swrcb.ca.gov/waterrights/water_issues/programs/bay_delta/bay_delta_plan/water_quality_control_planning/docs/notice_sjr_flow_southern_delta_scoping_mtg_with_attachments.pdf

Conservation Groups propose to protect, mitigate and enhance Project effect on riverine recreation. Conservation Groups' recommendations for recreation differ in emphasis and extent from those of the Licensees.

Accordingly, the Commission should evaluate Conservation Groups' alternative as a reasonable means to address forthcoming regulatory requirements while meeting the purpose and need of the Projects.

B. Limited Exports Alternative

The EIS should evaluate an alternative that evaluates Licensee's proposal and Conservation Groups' Flow, Habitat and River Management Alternative in combination with reduced exports at the SWP and CVP south Delta pumps. Phase II of the update of the Water Quality Control Plan will consider changes to export restrictions and requirements on the south Delta pumps of the State Water Project and the Central Valley Project.

The geographic scope of this analysis, at a minimum, should extend to the confluence of the San Joaquin and Sacramento Rivers, consistent with Commission direction on listed species in Scoping Document 2 for the Don Pedro Project:

For water resources, aquatic resources, and socioeconomics we define the geographic scope as extending upstream on the Tuolumne River to Hetch Hetchy and extending downstream to San Francisco Bay.

At this time, we have tentatively determined a cumulative geographic scope for anadromous fish and EFH that includes the Tuolumne River basin downstream to the confluence with the San Joaquin River, and through the Sacramento-San Joaquin Delta to San Francisco Bay.²²⁴

In the 2009 FERC Proceeding on Interim Conditions, consultants for Turlock and Modesto irrigation districts and for the City and County of San Francisco pointed strongly to the importance of coordination of San Joaquin tributary flows and of Delta export operations. For instance, biologist Noah Hume testified on behalf of the Districts:

Perhaps the largest improvements in conditions affecting Chinook salmon could take place in the San Joaquin River and Delta. ... Other than drastic reductions in exports from the state and federal pumping facilities, major flow factors affecting Chinook salmon downstream of the Don Pedro Project include management of San Joaquin River basin outflows during winter and spring from all three tributaries (Stanislaus, Tuolumne and Merced) and implementation of seasonal barriers in the Delta that shift migration routes and improve survival. ... Absent major reductions in export levels, however, it is unlikely that predator habitat suitability and predation levels in the Delta will markedly improve.²²⁵

²²⁴ Scoping Document 2 for the Don Pedro relicensing, July 25, 2011, eLibrary no. 20110725-3020, pp.33-34.

²²⁵ Testimony of Noah Hume, eLibrary no. 20090914-5160, pp. 16-17.

The Vernalis Adaptive Management Program (VAMP), which was discontinued after 2010, combined a mid-April to mid-May pulse flow with export reductions during the period of the pulse flow. While many observers agreed that the approach was conceptually sound, positive results were limited; much of this limitation was attributed to the small magnitudes of the pulses. As the VAMP review panel put it:

VAMP flows generally have been too restricted in range and have included more low flows than high flow. From an experimental or adaptive management perspective, it is impossible to learn much about effects of higher flows without having a chance to observe survival (and carry out acoustic tagging experiments) at such higher flows.²²⁶

In testimony before the State Water Board in February, 2010, Dr. Christina Swanson of the Bay Institute recommended specific export limitations during biologically critical spring periods. Dr. Swanson concluded:

... [C]urrent Delta hydrodynamic conditions resulting from the combined effects of low San Joaquin River inflows and high export rates are almost always inadequate to provide conditions necessary to support or sustain San Joaquin Basin salmon population abundances or meet these objectives. We also concluded that only Delta hydrodynamic conditions with a VF:E [Vernalis Flow to Exports] ratios that were greater than 4.0 consistently corresponded to salmon abundance levels that approached the population abundance objectives for this species.²²⁷

Dr. Swanson recommended the following measures:

1. "Hydrodynamic conditions in the Delta should be managed to maintain OMR flows that are greater than -2000 cfs during the period from October-June in all years."²²⁸
2. "Hydrodynamic conditions in the Delta should be managed to maintain a March-June VF:E ratio that is greater than 4.0 in 40% of years, greater than 3.0 in 60% of years, greater than 2.0 in 80% of years and greater than 1.0 in 100% of years."²²⁹

In its summary comments to the State Board in the 2010 Delta Flow Criteria workshops, the USFWS stated:

We believe the source of flows is very important to determine Delta outflows. ... This includes contributions from the Sacramento and San Joaquin Rivers and their tributaries. As stated in previous Board workshops, managing the San Joaquin system for flows only

²²⁶ *The Vernalis Adaptive Management Program (VAMP): Report Of The 2010 Review Panel*, p. 9. Available at: <http://www.sjrg.org/technicalreport/2009/2010-VAMP-Peer-Review-Panel-Report.pdf>

²²⁷ Testimony of Christina Swanson Regarding Flow Criteria for the Delta Necessary to Protect Public Trust Resources: Delta Hydrodynamics, February 16, 2010, p. 11. Available at:

http://www.waterboards.ca.gov/waterrights/water_issues/programs/bay_delta/deltaflow/docs/exhibits/bay_inst/tbi_e_xh4.pdf

²²⁸ *Id.*

²²⁹ *Id.*, p. 12.

at Vernalis has not been effective in improving fish populations on the San Joaquin and its tributaries.²³⁰

The USFWS continued: “To address the biological objective of increased survival of emigrating salmonid smolts, the AFRP identified the importance of maintaining positive QWEST flows (AFRP Working Paper, 1995).”²³¹ It elaborated further:

It’s important to note, that in 1992, the Board also acknowledged the importance of maintaining positive QWEST flows, in order to protect and stop the decline of the public trust resources in the Delta, and included a new standard (requirement) that “there shall be no reverse flow for all year types on a 14-day running average in the western Delta... between February 1 and June 30.

Commission staff should select from principles agreed on in the State Board’s Decision 1630 in 1992, in the San Joaquin River Agreement that led to the implementation of VAMP, in the testimony of the Districts in 2009, and in the submittals of Bay Institute and the USFWS in the 2010 Delta Flow Criteria workshops. Commission staff should use these principles and other relevant information to develop a series of rules for SWP and CVP exports as the basis for a Limited Exports Alternative. The Limited Exports Alternative should be designed to allow the Commission to evaluate the Districts’ and Conservation Groups’ flow alternatives in conjunction with Delta export reductions that substantially improve opportunities for the survival of salmonids outmigrating from the Tuolumne River in particular and the San Joaquin River in general. With this geographic extent, the Limited Exports Alternative should also evaluate impacts to Delta species such as Delta smelt and longfin smelt. These pelagic species are dependent not only on export operations, but also on inflow from Delta tributaries such as the Tuolumne.

Since at least 2009, the Districts and CCSF have argued that flow increases in the Tuolumne River are relatively futile because the benefits in the river will be overwhelmed by conditions in the Delta downstream. A Limited Delta Exports alternative will break through this blame-the-other-guy paradigm and answer the question: what if downstream conditions were not a limiting factor?

VII. Comments Regarding Cumulative Effects of the Proposed Action

As noted in the “Legal Basis for Conservation Groups’ Recommendations,” *supra*, the Commission’s NEPA document must address cumulative effects. The Commission’s policy is to “address and consider cumulative impact issues at original licensing and relicensing *to the fullest extent possible* consistent with the Commission’s statutory responsibility to avoid undue delay in

²³⁰ U.S. Department of the Interior, *Comments Regarding the California State Water Resources Control Board’s Notice of Public Informational Proceeding To Develop Delta Flow Criteria for the Delta Ecosystem Necessary to Protect Public Trust Resources*, February 12, 2010, p. 12, Available at: https://www.waterboards.ca.gov/waterrights/water_issues/programs/bay_delta/deltaflow/docs/exhibits/usdoi/doi_entire_exhibit.pdf

²³¹ *Id.*, p. 8. Qwest means the aggregate daily average flow at Prisoners Point on the San Joaquin River upstream of Antioch.

the relicensing process and to avoid undue delay in the amelioration of individual project impacts at relicensing.” 18 C.F.R. § 2.23 (emphasis added).

The new licenses, in conjunction with present water supply operations, will cumulatively affect fish and wildlife and recreation resources. The AFLA does not include sufficient information regarding other present and/or reasonably foreseeable future actions to facilitate the Commission’s evaluation of the Project’s cumulative effects. For instance, the AFLA does not anticipate actions to restore anadromous fish upstream of La Grange and Don Pedro dams during the term of the new license. It does not contain sufficient analysis regarding the update to the State Water Resources Control Board’s Water Quality Control Plan, the San Joaquin River Restoration Program, or foreseeable changed operations at dams on the Merced River. However, information regarding these actions is publicly available. We request that the Commission utilize all available sources to inform its cumulative effects analysis in the DEIS consistent with the comments below.

A. Fish Passage

The DEIS should analyze the Projects’ cumulative effects likely to result from reasonably foreseeable actions to reintroduce spring-run Chinook salmon and/or Central Valley steelhead past La Grange and Don Pedro dams to the upper Tuolumne River during the term of the new licenses. The analysis should include potential effects to biological resources, recreation use and access and the water supply of the City and County of San Francisco. NMFS has authority to issue a prescription for fish passage past La Grange Dam and Don Pedro Dam under § 18 of the FPA. However, under the terms of § 10011 of the San Joaquin River Restoration Settlement Act, NMFS is precluded from issuing an FPA § 18 fish passage prescription in the San Joaquin River watershed for spring-run Chinook until December 31, 2025.

The Commission should consider the totality of information suggesting that reintroduction of spring Chinook salmon and/or steelhead above La Grange and Don Pedro Dams is a strong possibility after 2025 and during the term of the new licenses. Such a prescription would be consistent with NMFS’ comprehensive Final Central Valley Recovery Plan filed in the Don Pedro and La Grange dockets as a comprehensive plan in October, 2014.²³²

Additionally, as detailed in Conservation Groups’ Fish Passage recommendation in Section II *supra*, significant studies have been commissioned by NMFS and others related to a potential reintroduction of anadromous fish to the Tuolumne River upstream of Don Pedro Reservoir.²³³ Generally, these studies demonstrate that there is suitable habitat for steelhead and

²³² National Marine Fisheries Services. 2014. *Final Recovery Plan for Sacramento River Winter-run Chinook Salmon, Central Valley Spring-run Chinook Salmon, and Central Valley Steelhead*. NMFS, West Coast Region, Sacramento, California. July 22, 2014. Entered into the records for the Don Pedro and La Grange licensings as a comprehensive plan, October 6, 2014, eLibrary no. 20141006-5095.

²³³ In 2017, NMFS produced a technical report on the genetics of *O. mykiss* found in the upper Tuolumne River and upper Merced River watersheds. *Conceptual Analysis of Oncorhynchus Mykiss in the Upper Tuolumne and Merced Rivers to Evaluate Ancestry and Adaptive Genetic Variation*, November, 2017, eLibrary no. 20171117-5127. In 2018, NMFS also produced a technical report on the habitat capacity of the upper Tuolumne River and upper Merced River for steelhead and spring-run Chinook salmon. *On the Capacity of upper Tuolumne and Merced Rivers for Reintroduction of Steelhead and Spring-run Chinook Salmon*, January, 2018, eLibrary no. 20180124-

genetically unique populations of steelhead in sections of the upper Tuolumne watershed. Over the next seven years, additional information-gathering and other fish passage efforts are expected to generate more information on fish passage feasibility including logistical, technical and biological issues that would inform any effort on the Tuolumne.²³⁴

B. San Joaquin River Restoration Settlement Act

The San Joaquin River Restoration Program (SJRRP) is on track to reintroduce Central Valley spring-run Chinook salmon to the San Joaquin River by 2025. The continued reintroduction of Central Valley spring-run Chinook salmon to the San Joaquin River above Merced River confluence in the 2018 to 2025 timeframe will likely cause this species to stray into the Tuolumne River.

The EIS should highlight and discuss the Project's cumulative effects on spring-run Chinook salmon and steelhead in the San Joaquin River that are likely to result from reasonably foreseeable San Joaquin River restoration actions, such as reoperation of Friant Dam. For instance, increased releases from Friant Dam in February and March will provide additional cold water to the San Joaquin River, including the reach downstream of the confluence with the Tuolumne River. This may improve success of rearing and outmigration of juvenile salmon and steelhead from the Tuolumne River. During April, increased releases will likely transition in water temperature, and depending on magnitude and ambient meteorology may have more mixed results, improving flow but having variable effect on water temperatures. In May and especially in June, increased releases from Friant may have reduced benefits or even adverse impacts to out-migrating Tuolumne River salmon and steelhead because of thermal increases. In addition, the Licensee and Commission should consider potential measures that would create benefits for Tuolumne River salmon and steelhead from increased Friant releases. Increased releases from Friant Dam may result in fall water temperatures in the San Joaquin River downstream of Tuolumne River confluence that inhibit upstream migration of Tuolumne River salmon; however, depending on temperature, this increased mainstem San Joaquin flow may encourage or enhance upstream fall-run salmon migration, particularly as temperatures cool.

Documents that could inform this analysis include the San Joaquin River Restoration Program Programmatic EIS/EIR prepared by the Bureau of Reclamation and California Department of Water Resources, the Salmon Conservation and Research Facility and Related Management Actions Project EIR prepared by California Department of Fish and Wildlife, and the Final 10(j) Rule establishing a Nonessential Experimental Population of Central Valley spring-run Chinook salmon prepared by NMFS.²³⁵

5038. In 2017, NMFS produced a technical report on conceptual engineering plans for fish passage facilities to support a program to reintroduce salmonids to the upper Tuolumne River. *Conceptual Engineering Designs for Fish Passage at La Grange and Don Pedro Dams on the Tuolumne River*, October 2017, eLibrary no. 20171133-5347
²³⁴ For instance, the Bureau of Reclamation's ongoing pilot reintroduction program to reintroduce winter-run Chinook salmon upstream of Shasta Reservoir will likely tackle practical logistical issues of trap and haul ranging from permitting to on-the-ground operations. One or more pilot trap and haul programs elsewhere in the Central Valley may also be in planning or early implementation stages by 2025. As each program develops, cost estimates and program efficiencies are likely to evolve.

²³⁵ Bureau of Reclamation, Department of Water Resources. July 2012. Final Program Environmental Impact Statement/Report for the San Joaquin River Restoration Program. Available at www.usbr.gov/mp/nepa/nepa_projdetails.cfm?Project_ID=2940;

C. Update of Bay-Delta Water Quality Control Plan

The State Board's Bay-Delta Plan qualifies as a comprehensive plan for the Tuolumne River pursuant to FPA section 10(a)(2) and the Commission must consider it in determining "[t]he extent to which the project is consistent with ... comprehensive plan[s] for improving, developing or conserving a waterway or waterways affected by the project". 16 U.S.C. § 803(a)(2). See "Legal Basis for Conservation Groups' Recommendations," *supra*. It is reasonably foreseeable that the State Board will adopt new flow objectives as part of its Bay-Delta Plan update process that will affect the Tuolumne River during the term of the new license.²³⁶ Therefore, it is also reasonably foreseeable that the State Board will take action, through its water rights or water quality certification authority, to ensure the implementation of objectives adopted in the Bay-Delta Plan. The cumulative effects analysis in the DEIS should consider how Project operations would be modified in response to implementation of the preferred alternative set forth in the State Board's final Substitute Environmental Document (SED) for the Bay-Delta Plan.

D. Water Management in the Merced River

The Merced and the Tuolumne Rivers each contain FERC-jurisdictional rim dams that essentially control all instream flows downstream of the storage reservoirs (the Don Pedro Project on the Tuolumne River is on a relicensing timeline approximately four years behind the Merced River Project). FERC's EIS's for both the Merced and Tuolumne licensings must consider the effects of each proposed action on the other, and how the combined actions can best address flow requirements in the lower San Joaquin River and the San Francisco Bay/Sacramento-San Joaquin Delta Estuary.

COMPREHENSIVE PLANNING

The Commission must ensure that the new license is best adapted to a comprehensive plan of the development for the beneficial uses of the Tuolumne River. The AFLA does not contain sufficient information to support a finding that the Districts' proposed alternative is consistent with relevant comprehensive plans including the planned update of the State Board's Bay-Delta Plan. In particular, the AFLA neglects to provide relevant information or analysis regarding actions to restore fish access above La Grange or Don Pedro Dam, the update to the Bay-Delta Plan, the San Joaquin River Restoration Program, and foreseeable changed operations at Merced River Dam. Conservation Groups' recommend that the Commission consider these actions in the DEIS as separate alternatives and/or as part of the cumulative

California Department of Fish and Wildlife (CDFW). June 2014. Salmon Conservation and Research Facility and Related Management Actions Project Final EIR. Available at www.dfg.ca.gov/regions/4/sanjoaquinriver/#docs; National Marine Fisheries Service (NMFS). 2013. 50 CFR Part 223 (Final Rule). 10(j) Rule establishing a Nonessential Experimental Population of Central Valley spring-run Chinook salmon below Friant Dam in the San Joaquin River, Available at www.westcoast.fisheries.noaa.gov/publications/frn/2013/78fr79622.pdf.

²³⁶ See SWRCB, "Bay Delta Plan Update: Draft San Joaquin River Flow and Southern Delta Salinity Requirements Released for Public Comment," *available at* http://www.waterboards.ca.gov/waterrights/water_issues/programs/bay_delta/bay_delta_plan/water_quality_control_planning/2012_sed/docs/sjr_factsheet2012.pdf.

effects analysis, consistent with our comments above. Such analysis must be completed to provide a sufficient basis for a Commission finding that the new license is in the public interest and best suited to a comprehensive plan of development for the river. 16 U.S.C. § 803(a)(1).

CONCLUSION

Thank you for the opportunity to provide comments and recommendations in response to the Notice of Ready for Environmental Analysis for the relicensing of the Don Pedro Hydroelectric Project and the licensing of the LaGrange Hydroelectric Project.

Dated January 29, 2018



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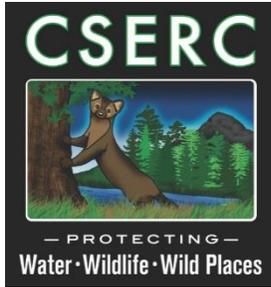
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A handwritten signature in black ink that reads 'John Buckley'. The signature is written in a cursive style with a large, looping 'J' and 'B'.

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/s/ Allison Boucher
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**BEFORE THE
UNITED STATES OF AMERICA
FEDERAL ENERGY REGULATORY COMMISSION**

)	
Turlock Irrigation District, Modesto Irrigation District)	
)	
)	
Don Pedro Hydroelectric Project)	P-229-082
La Grange Hydroelectric Project)	P-14581-002
)	

Certificate of Service

I hereby certify that the foregoing Comments and Recommendations on the Ready for Environmental Analysis of California Sportfishing Protection Alliance, Tuolumne River Trust, Trout Unlimited, American Rivers, American Whitewater, Merced River Conservation Committee, Friends of the River, Golden West Women Flyfishers, Central Sierra Environmental Resource Center and Tuolumne River Conservancy in the above-captioned proceeding has this day been filed online with the Federal Energy Regulatory Commission and served via email or surface mail upon each person designated on the Service List compiled by the Commission Secretary for this Project.

Dated at Salem, Oregon on the 29th day of January 2018.

Chandra Ferrari
Chandra Ferrari
Senior Policy Advisor
Trout Unlimited