Chandra Ferrari, California Water Policy Director
Rene Henery, California Science Director

Sent via email

October 27, 2014

Ms. Melissa Harris
Project Manager Bureau of Reclamation
Planning Division
2800 Cottage Way, MP-700
Sacramento, CA 95825
sha-mpr-usjrbsi@usbr.gov

Re: Upper San Joaquin River Basin Storage Investigation Draft Environmental Impact Statement

Dear Ms. Harris:

Trout Unlimited (TU) appreciates the opportunity to provide comments on the Bureau of Reclamation's (Reclamation) Draft Environmental Impact Statement (DEIS) for the Upper San Joaquin River Basin Storage Investigation for the proposed Temperance Flat Dam. TU is a non-profit organization with a mission to conserve, protect and restore North America's coldwater fisheries and their watersheds. With 140,000 members nationwide and more than 10,000 in California, TU works to restore wild trout, salmon, and steelhead and their watersheds throughout California. TU's members regularly fish and recreate in the San Joaquin River watershed. Additionally as an active San Joaquin River Restoration Program settling party, TU has long considered it a priority to ensure that self-sustaining populations of anadromous fish are restored to the entire reach of the San Joaquin River below Friant Dam.

The DEIS alternatives propose to construct Temperance Flat Reservoir 6.8 miles upstream of Friant Dam for the primary purposes of improving water supply reliability and temperature and flow conditions for anadromous fish in the lower San Joaquin River below Friant Dam. TUs over-arching concerns with the DEIS are a) that it fails to accurately identify and evaluate potentially significant effects on key sensitive fish species, b) improperly uses tools such that it overlooks or inadequately assesses impacts, and c) misinterprets the findings from the analyses that were performed. These key errors significantly weaken the value of the DEIS to decision-makers as they lead to both unsupported conclusions regarding the potential benefit of the alternatives to fish and other aquatic resources as well as underestimation of the impacts of the alternatives on those same resources. With a proposed project as controversial and costly as Temperance Flat Dam, the DEIS cannot afford to be beset by such errors. The DEIS is legally required to be comprehensive enough to facilitate a meaningful dialogue about the costs and benefits of the proposal moving forward. TU recommends the modification and recirculation of the DEIS consistent with our comments below.

I. The DEIS Fails to Accurately Assess Environmental Impacts to Sensitive Fish Species

1. The DEIS Does Not Adequately Analyze Potential Adverse Environmental Impacts to Fall-Run Chinook Salmon

The DEIS fails to adequately analyze the environmental impacts of the alternatives on fall-run Chinook salmon in the reach between Friant Dam and the Merced River. In addition to being a species of concern under the Endangered Species Act, fall run Chinook salmon are the only recognized Chinook salmon run in the basin and are of immense commercial importance to California. Additionally, their recovery is a requirement of the San Joaquin River Restoration Settlement Agreement (Settlement) and Settlement Act. Pursuant to the terms of the Settlement, reintroduction of fall-run Chinook has begun with the intent to establish self-sustaining populations that are supported by the entire reach of the San Joaquin River below Friant Dam. As acknowledged by the DEIS, fall-run Chinook salmon can already be found in Reach 1 immediately below Friant Dam and are expected to be present in other areas as reintroduced juveniles return to the system as adults.

The DEIS must conclude that a significant environmental impact exists should an alternative cause a substantial adverse effect to a special status species such as fall-run Chinook salmon. Despite this requirement, the DEIS fails to meaningfully analyze the impact of the project alternatives on fall-run Chinook salmon. When it does attempt an analysis, the DEIS does not differentiate fall-run Chinook from spring-run Chinook when assessing impact despite their differing needs. Fall-run and spring-run Chinook salmon exhibit different life history strategies and the timing of spawning, adult migration, and juvenile rearing are very different between the two runs. *See* DEIS, Table 5-2. As a result of these differences, the impacts of changes in flow, temperature, and habitat will have very different effects on these two distinct Chinook salmon runs. Despite this, the DEIS largely fails to assess impacts on fall-run Chinook salmon, particularly when those impacts would be substantially different from impacts to spring-run Chinook salmon. Additionally, the DEIS not analyze the potential effects of the alternatives on fall-run Chinook salmon habitat potential despite including such an analysis for spring run Chinook salmon (FSH-10).

As discussed more fully below, the DEIS alternatives will likely cause increased spring water temperatures, reduced flows and reduced floodplain inundation. The DEIS must consider whether such conditions will cause significant adverse impacts to fall-run Chinook even if the DEIS claims (erroneously) that similar conditions will benefit spring-run Chinook. If the DEIS finds that the alternatives will substantially and adversely affect fall-run Chinook salmon it must conclude that a significant adverse effect is present given the special species status of fall-run under NEPA and CEQA.

2. The DEIS Fails to Sufficiently Analyze the Potential Adverse Effect to Fall-Run and Spring-Run Chinook Salmon from Increased Temperatures

The warm spring temperatures caused by the alternatives will likely affect the ability of fall-run and spring-run Chinook salmon to migrate and may even completely eliminate migration for fall-run. The DEIS, however, includes no analysis of this effect. It does, however, acknowledge that the alternatives are likely to substantially increase spring water temperatures stating that:

> Each of the action alternatives would reduce the number of weeks between January 1 and June 1 with 7-day average water temperatures below the 55°F temperature threshold in at least one reach in all water temperature year types, at all exceedence levels, with the largest effects occurring between reaches 1B and 2B2. DEIS at 5-96.

Temperatures between March and the end of June are particularly important for allowing outmigration of salmon from the river and constitute the primary outmigration window for fall-run juveniles.[1] Maintaining suitable temperatures is particularly important for juvenile salmon and other early life stages that generally tolerate narrower temperature ranges and are more sensitive to temperature fluctuations.[2] The best available scientific information suggests that suitable smoltification temperatures are less than 55°F and smoltification is impaired from 55°F to 59°F.[3] Temperatures reaching or above 55°F can halt or reverse smoltification in Chinook and steelhead salmon.[4] Yearling spring-run Chinook prefer temperatures below 52°F.[5]

The increased temperatures that are likely to result from the alternatives may be encountered earlier in the year or for a longer duration as compared to the no-action alternative. For instance, Alternative Plan 1 increases winter and spring water temperatures over baseline conditions. As a consequence, the 55°F 7-day average temperature threshold is exceeded 6 to 7 weeks earlier than

---

[1] *Id*. at Appendix H.
[2] California Department of Fish and Wildlife 2014, Final Environmental Impact Report, San Joaquin River Restoration Program: Salmon Conservation and Research Facility and Related Fisheries Management Actions Project, at 6-42.
[3] U.S. Environmental Protection Agency. 2003. EPA Region 10 Guidance for Pacific Northwest State and Tribal Temperature Water Quality Standards.EPA 910-B-03-002.
[4] *See* Richter and Kolmes 2005. Maximum Temperature Limits for Chinook, Coho, and Chum Salmon, and Steelhead Trout in the Pacific Northwest., Rev in Fish Sci, 13:1,23-49. DOI: 10.1080/10641260590885861.
[5] *See* Sauter, S. T., J. McMillan, and J. Dunham. 2001. Issue Paper 1. Salmonid behavior and water temperature. Prepared as part of U.S. EPA Region 10 Temperature Water Quality Criteria Guidance Development Project.

the no-action alternative at the typical 50th and warmer 90th percentile temperatures (see summary table of results in the Modeling Appendix). DEIS at 5-96. This has the effect of altering the timing and distribution of water temperatures suitable for juvenile salmon and steelhead migration and smolting throughout a large component of the migratory corridor, increasing both the distance and duration of exposure to water temperatures that inhibit parr-smolt transformation. The DEIS, however, does not adequately assess this effect and the reality that temperature barriers from the proposed alternatives likely will be widespread because of higher spring temperatures, creating barriers for downstream migration.

In addition, the DEIS states that daily maximum temperatures are 1-2°F above the average daily water temperature in winter, however the temperature model used has been shown to vary from actual temperature by as much as 10°F higher. *See* Reclamation 2013, HEC-5Q Water Temperature Model in Post-Settlement Conditions (March 21, 2013), available online at: http://restoresjr.net/group_activities/TFMB-RestGoals/2013/3.0_20130321_RGTFG_RiverTemp.pdf; Federal Energy Regulatory Commission 2012, Study Plan W&AR16, lower Tuolumne River Temperature Model, Status Report, September 2012, available online at: http://www.donpedro-relicensing.com/Lists/Announcements/Attachments/84/LowerTuolumneRiverTempModelStatus_Sep2012_20121018.pdf.

Spring temperatures could exceed threshold tolerance for spring and fall run Chinook in June in Reach 1 and in April, May, and June in Reach 2. Modeling in the SJR5Q appendix to the DEIS shows that the alternatives generally increase winter spring water temperatures in Reaches 1-2 by 2-5°F, and increase water temperatures in reaches 3-5 by 2-3°F. DEIS, SJR5Q Modeling Attachment, at 3-27. Since Reclamation does not provide the raw temperature data, we include an additional 1-2°F as a conservative estimate of the range. Given this, Reach 1 temperatures for the Alternatives could reach between 47-52°F in April, 49-53°F in May, and 50-55°F in June. Reach 2 is expected to reach temperatures well above this, 54-70°F in April, 56-76°F in May, and 60—80°F in June. Already it can be seen that Reach 2 may act as a major barrier to outmigration as early as April. In all, the proposed operations could create a nearly 90 mile long barrier to downstream migration, effectively eliminating proposed ecosystem benefits.

3. The DEIS Fails to Sufficiently Analyze the Potential Adverse Effect to Fall-Run and Spring-Run Chinook Salmon from Decreased Floodplain Rearing Habitat

Based on modeled results presented in the DEIS, changes to flow regime as a result of implementation of the alternatives are likely to have a significant negative effect on spring-run and fall-run Chinook salmon and other floodplain adapted native species. Floodplain restoration is specifically stipulated in the San Joaquin River Restoration Settlement agreement and extensive investment in floodplain restoration is planned as a component of the SJRRP. In addition to direct impacts on temperature in-channel, the alternatives would significantly decrease the beneficial effects of floodplain rearing habitat by reducing both the frequency and the duration of floodplain inundation. Long inundation floodplains provide multiple benefits for Chinook salmon including a) increased productivity and decreased activity level that serve as a primary mechanism for buffering juvenile fall-run Chinook salmon from elevated temperatures b) increased temperatures during early outmigration in Spring-run Chinook salmon, fostering improved growth, and c) increasing and diversifying the size at outmigration and diversifying outmigration timing, improving downstream and ocean survival in certain years, and contributing to population level resilience. Pursuant to the alternatives, flood releases would be decreased, vis a vis non-project conditions. As a result, juvenile fall and spring-run Chinook salmon would in many years outmigrate at a smaller size, earlier, and with more uniform timing, potentially lowering size based survival, timing of ocean entry, and population resilience resulting from diversification of outmigration strategy.

The DEIS must consider whether the increased spring water temperatures, reduced flows, and reduced floodplain inundation expected from several of the alternatives will cause significant adverse impacts to fall-run Chinook salmon even if the DEIS claims (erroneously) that similar conditions will benefit spring-run Chinook. Additionally, the DEIS should reconsider its conclusions regarding the effects of such conditions on spring-run Chinook salmon consistent with the comments in section 5(b) below.

4. The DEIS Fails to Adequately Analyze Potential Adverse Environmental Impacts to Steelhead and Sturgeon

One of the primary objectives for the alternatives identified in the DEIS is to“[e]nhance water temperature and flow conditions in the San Joaquin River downstream from Friant for salmon and *other native fish.*” DEIS at ES-9 (emphasis added). Additionally, the Restoration Goal for the San Joaquin River Restoration Program (SJRRP) is “to restore and maintain fish populations in ‘good condition’ in the main stem San Joaquin River below Friant Dam to the confluence with the Merced River, including naturally reproducing and self-sustaining populations of salmon and *other fish”*.[6] However, the effects of the alternatives on “other native fish” including steelhead and sturgeon are not thoroughly analyzed in the DEIS.

The DEIS does not analyze the potential effects of the alternatives on steelhead. It is reasonably foreseeable that steelhead, a federally threatened species under the Endangered Species Act, will be present in the project reach of the San Joaquin River below Friant Dam prior to dam construction. Steelhead successfully undergo parr-smolt transformation at temperatures between 6.5 and 11.3°C, a smaller cooler range than Chinook salmon, and show little seawater adaptation

[6] Natural Resources Defense Council (NRDC) vs. Rodgers et al., 2006

at temperatures above 15°C. Cooler temperatures (< 10°C) tend to increase their seawater adaptation. Cooler temperatures also reduce their risk of predation and disease, both of which are enhanced at higher temperatures (Myrick and Cech 2004, 2005).[7] Given these temperature tolerances, it can be inferred that project related temperature impacts (detailed in the previous section) could have similar or greater adverse effects on steelhead. The San Joaquin River below Friant Dam has been targeted by the National Marine Fisheries Service as one of the few primary target areas for steelhead reintroduction.[8] Therefore, the potential effects of the alternatives on steelhead habitat should be analyzed including the impacts of changing flows, increased temperatures and modifications to floodplain habitat.

Additionally, the DEIS should analyze the effects of the alternatives on sturgeon habitat. Currently, the DEIS does not address the potential effects of the alternatives on green and white sturgeon or include them in the list of species documented in Reach 5 despite ample evidence of their presence in the system. For instance, California Department of Fish and Wildlife Sturgeon Report Card data indicate six green sturgeon and 169 white sturgeon were reported by anglers in the last five years within the San Joaquin River upstream of Stockton.[9] Additionally, Reclamation fish biologists have detected sturgeon above the Merced River confluence within the last three years (Don Portz Personal communication).

Modeling of historic sturgeon habitat in Central Valley rivers suggests that the San Joaquin between the Merced River confluence and the current location of Friant Dam historically provided high quality habitat for sturgeon (Mora et al. 2009) and late April and early May spring pulses appear to trigger spawning events as was seen during a 2012 flow event from the Merced and Tuolomne Rivers.[10] Accordingly, the DEIS should analyze how reductions in spring pulses, reductions in scour and temperature modifications affect sturgeon habitat.

5. The DEIS Fails to Analyze the Potential Effects of Increased Spring Temperatures on Chinook Salmon

---

[7] Myrick, C.A. and J.J. Cech. 2004. Temperature effects on juvenile anadromous salmonids in California's central valley: what don't we know? Reviews in Fish Biology and Fisheries 14:113–123.
Myrick, C.A. and J.J. Cech. 2005. Effects of temperature on the growth, food consumption, and thermal tolerance of age-0 Nimbus-strain steelhead. North American Journal of Aquaculture 67:324–330.
[8] NMFS. 2014. Recovery plan for the evolutionarily significant units of Sacramento River winter-run Chinook salmon, Central Valley spring-run Chinook salmon, and the distinct population segment of California Central Valley steelhead.Appendix B: Threats Assessment
[9] DuBois, J., T. MacColl, and E. Haydt. 2012. 2011 sturgeon fishing report card: preliminary data report. California Department of Fish and Game, Stockton, California.
[10] Jackson, Z.J. and J.P. Van Eenennaam. 2013. 2012 San Joaquin River Sturgeon Spawning Survey Final Annual Report. Mora, E. A., Lindley, S. T., Erickson, D. L., & Klimley, A. P. (2009). Do impassable dams and flow regulation constrain the distribution of green sturgeon in the Sacramento River, California?. Journal of Applied Ichthyology, 25(s2), 39-47.

As noted above, the DEIS acknowledges that the alternatives will likely increase spring water temperatures however it does not adequately analyze the impact of increased water temperatures on salmon populations between Friant Dam and the Merced River. Specifically, it fails to consider the impact of increased water temperatures on adult salmon migrating upstream or spring run salmon holding and rearing habitat. Adult spring run Chinook salmon typically migrate upstream in February to May and therefore the increased water temperatures under the alternatives could become a barrier not only to downstream juvenile migration but also upstream adult spring run Chinook salmon migration.[11]

Reclamation determined the increase in water temperatures caused by the alternatives to be "a cumulatively considerable incremental contribution to the overall significant cumulative impact to water temperature conditions supporting juvenile salmon and steelhead migration." DEIS at 27-67. This assessment does not take into account any other changes that might be brought about by other projects or climate change. Again, even though this increase in temperature could significantly impact salmon outmigration and adult spring-run Chinook salmon upmigration, Reclamation wholly fails to identify any mitigation measures for this impact. Because the DEIS determines that the alternatives will cause significant environmental impacts, Reclamation must consider mitigation measures in the DEIS to reduce or eliminate these significant environmental impacts from higher water temperatures.

6. The DEIS Analysis of Potential Effects to Spring-Run Chinook Salmon is Flawed and Understates Impacts

a. The DEIS Uses the EDT Model Inappropriately

Reclamation inappropriately uses output from the EDT model as a prediction of future outcomes under the alternatives. The EDT model is a habitat based model with some limited population modeling capacity. It assesses productivity differences based principally on flow, channel width, and temperature. It is meant to provide insight into the potential for existing and future habitat conditions to support salmon populations, but it is explicitly not intended to be used as a predictive model. To be clear, Reclamation should not use the EDT tool as a way to predict the actual numbers of salmon returning to the system or otherwise determine likely ecosystem benefit for NEPA or economic benefits calculations.

The developers of the EDT model have been clear about its recommended uses and limitations noting that, "[t]he model is a tool to facilitate both -planning and learning; it is not a predictive model." *See* Lestelle, L. C.; Lichatowich, J. A.; Mobrand, L. E., and Cullinan, V. I. 1994 Ecosystem diagnosis and treatment planning model as applied to supplementation; Model description, user guide, and theoretical documentation for the model introduced in the summary report series on supplementation in the Columbia Basin. Portland, Oregon: Bonneville Power Administration. Similarly, the developers have also stated that, "this performance measure is an

[11] USBR 2014, Revised Final Technical Report: Analysis of Fish Benefits for Reach 2B Alternatives of the San Joaquin River, March 2014 at 2-10, 5-3.

indicator of how favorable the environment is or might become for salmon to persist and abound, *not a predictor* of how many will return and when." *See* Mobrand, L. E., J. A. Lichatowich, L. C. Lestelle, and T. S. Vogel. 1997. An approach to describing ecosystem performance "through the eyes of salmon." Can. J. Fish. Aquat. Sci. 54:2964–2973. (emphasis added)

NOAA fisheries scientists agree that using the EDT as a predictive model is problematic "because the underlying data and functional relationships are largely untested, the accuracy of any EDT outcome is unknown." *See* Beechie, T.J., E.A. Steel, P. Roni, and E. Quimby (editors). 2003. Ecosystem recovery planning for listed salmon: an integrated assessment approach for salmon habitat. U.S. Dept. Commerce, NOAA Tech. Memo. NMFS-NWFSC-58 (emphasis added). NOAA scientists have also stated that using the EDT model to predict the effects of flow alterations can be misleading, that the model is most sensitive to parameters focused on adult populations, and that error values for abundance, productivity, and capacity are large. Id. They also state that using the EDT model to assess potential fish performance is "risky" and that the model should not be used for making decisions without sensitivity analysis. See Steel et al 2009. Making the Best Use of Modeled Data: Multiple Approaches to Sensitivity Analysis of a Fish-Habitat Model. Fisheries 34: 330-339. Similarly, U.S. FWS, U.S. Geological Survey, and NOAA Fisheries have stated that, "Uncertainties inherent in EDT, a complex ecosystem model, made it important that confidence bounds around the results of this effort be taken into account" when using the EDT model for a similar purpose. See NMFS and USFWS 2011. Fall Chinook Salmon Life Cycle Production Model. Report to Expert Panel, available online at: http://www.fws.gov/arcata/fisheries/reports/technical/Fall%20Chinook%20Report%20of%20FPM%20Team%20to%20Expert%20Panel%20DRAFT%201%202011.pdf.

Additionally, the EDT model, in general, poorly accounts for floodplain inundation and productivity. The EDT model does not have the potential to quantify many of the primary benefits of floodplain rearing habitat for fall and spring-run Chinook salmon including: improved growth on long inundation (greater than 10 day) floodplains as a function of higher prey base, lower activity and warm temperatures; diversification of size/ timing of outmigration relationships as a function of altered growth and rearing timing in floodplain reared juveniles; increased cohort/ population resilience as a function of diversification of life history strategy, and improved ocean survival as a function of floodplain rearing derived increased size and altered timing of ocean entry. (ICF Personal communication) As a result, the model understates the adverse environmental impacts of reduced floodplain inundation and increased water temperatures on floodplains.

This effect is exacerbated because the EDT model assumes the most limited floodplain restoration, and largely ignores required floodplain restoration in Reaches 2 and 4. *See* Draft Feasibility Report, Modeling Appendix, Attachment A, at 2-7 (stating that the EDT modeling utilized the "Minimum Restoration Scenario," which includes no "gravel augmentation, levee setbacks, floodplain habitat restoration, or other proposed restoration actions"); see DEIS at 5-104 (describing reaches 1 and 5 as having the greatest accessible floodplain area, which seems to ignore planned floodplain restoration in reaches 2 and 4).

b. The DEIS inappropriately interprets modeled results to indicate that the alternatives will not significantly impact Spring-Run Chinook Salmon.

The DEIS erroneously concludes that some impacts are less than significant or even beneficial when in reality the modeled results suggest that changes to flow regime are likely to have a significant negative impact on spring-run Chinook salmon. The modeling that is included in the DEIS improperly uses the EDT model, fails to account for the effects of climate change, fails to accurately account for the importance of floodplain inundation, downplays the effects of increased water temperatures in the spring on both juvenile and adult migration, and largely ignores the reductions in flows in the restoration area and downstream. For instance, increases in water temperatures caused by the alternatives are likely to cause significant migration barriers yet the EDT model fails to accurately assess the impacts of increased water temperatures on upstream and downstream migrations. If salmon cannot successfully migrate upstream or downstream in the spring, they obviously cannot benefit from improved summer temperatures. Additionally, the EDT model poorly represents the benefits of floodplain inundation, thus failing to accurately assess these adverse impacts which are likely to eliminate and more than offset any potential benefits of decreased summer temperatures on spring run Chinook salmon, resulting in a significant adverse impact on spring run Chinook salmon.

7. The DEIS Analysis of the Potential Effects of Reductions in Pulse Flows and Floodplain Inundation on Native Fish Species is Flawed

The DEIS fails to adequately or accurately consider the potential negative effects to native fish species that will result from changes in the duration and timing of floodplain inundation or the effect of increased spring water temperatures on floodplain inundation. The DEIS acknowledges that, "the action alternatives would alter the duration of peak flows above 4,000 cfs," DEIS at 5-106, and that the alternatives would, "[r]educe the frequency, magnitude, and duration of floodplain habitat inundation, affecting rearing habitat," DEIS at 5-51 yet it concludes that the reduction in floodplain inundation will result in a less than significant impact. *See* DEIS at 5-107. Given that the DEIS completely omits any analysis of the negative effects of changes in the timing, duration, and water temperatures associated with floodplain inundation, the conclusion that no significant effect is present cannot be supported.

There is strong scientific evidence that floodplain inundation produces significant biological benefit to salmon and other native fish. For instance, salmon that rear on floodplains grow substantially larger than those that rear in the main channel. *See, e.g.*, Opperman 2012; Sommer 2001. The timing, duration, and magnitude of floodplain inundation, as well as the water temperatures during floodplain inundation, determine the productivity of floodplains and their use by salmon and other native species. *Id.*; *see also* Bureau of Reclamation, Revised Final Technical Report: Analysis of Fish Benefits for Reach 2B Alternatives of the San Joaquin River, March 2014. Longer duration of floodplain inundation is important to produce biological benefits for salmon, with a minimum of two weeks inundation often necessary to achieve biological benefits. *See* Opperman 2012.

In contrast to the strong scientific evidence that longer duration of floodplain inundation is necessary for biological benefits to salmon and other fisheries, the DEIS questionably asserts that:

> As shown, sustained pulse flows between 4,000 and 8,000 cfs would occur more frequently under the No Action Alternative. This suggests that the duration of peak flows between 4,000 and 8,000 cfs would be reduced under Alternative Plan 1, but the ecological significance of changes in flood pulse frequency exceeding this threshold is unclear. The effects of the remaining action alternatives on flood pulse volumes and, by extension, the duration of flood pulses larger than 4,000 cfs, are similar to those described for Alternative Plan 1. DEIS at 5-106 to 5-107.

Elsewhere, the DEIS admits that the action alternatives would, "Reduce frequency, magnitude, duration of floodplain habitat inundation." DEIS at 6-72. Yet the DEIS fails to quantify these reductions and it completely disregards the environmental impacts of these reductions in reaching its erroneous conclusion that the reduction in floodplain inundation would not cause a significant environmental impact.

Table 12-6 in the DEIS shows that under the no action alternative, flood releases would occur in 39 of the 82 years in the 1922-2003 CALSIM simulation, although in the majority of these years flood releases were less than 100 TAF (20 years). DEIS at 12-39 to 12-40. In contrast, under most of the action alternatives, flood releases would only occur in 7 years. *Id*. Similarly, the Modeling Appendix shows significant reductions in flows would occur during the winter and spring months, at flow levels substantially below 8,000 cfs. *See* DEIS, CALSIM Modeling Appendix, at 659. Yet the DEIS fails to consider the environmental impact of this dramatic reduction in the frequency of flood releases and resulting floodplain inundation.

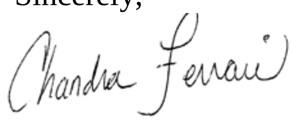
The DEIS also ignores the environmental impacts of reduced flood flows on salmon survival through the San Joaquin River between Friant dam and the junction with the Merced River. Studies conducted for the SJRRP in 2011 showed substantial survival rates for juvenile salmon migrating downstream and through the flood bypass system during flood releases. *See* SJRRP, Juvenile Salmonid Survival and Migration in the San Joaquin River Restoration Area Spring 2011 and 2012, presentation to the Fisheries Management Technical Feedback Group, November 2, 2012. While the DEIS considers the impacts of reduced flows downstream (FSH-16), it fails to consider the impact of reduced flows on salmon survival from Friant Dam to the junction with the Merced River. The DEIS shows substantial decreases in flows in these reaches, see DEIS at 14-64 (citing Table 14-27), yet the DEIS wholly fails to analyze the effects of such flow reductions in these reaches on salmon survival.

Other, more robust modeling approaches examining the relationship between Chinook salmon productivity, habitat, and flow regime have specifically incorporated floodplain habitat based effects on behavior (e.g. timing of fry dispersal) that in turn may impact survival, life history diversification, and population abundance and resilience over time (Hendrix et al 2014). We recommend that Reclamation consider utilizing such an approach.

II. Recommendation

As evident by the comments above, TU is concerned that the DEIS fails to accurately identify and evaluate potentially significant effects on key sensitive fish species and improperly uses tools such that the impacts it has identified are inadequately assessed. To ensure that the DEIS can meaningfully inform the public and decision-makers of the costs and benefits of the alternatives, TU recommends that it be revised consistent with the above recommendations and recirculate it for public comment. If you have any questions, please contact us at 916-214-9731.

Sincerely,



Chandra Ferrari
California Water Policy Director

Rene Henery
California Science Director
rhenery@tu.org
(510) 528-4164