



June 4, 2019

Barry Thom, Regional Administrator  
National Marine Fisheries Service  
1201 Northeast Lloyd Boulevard, Suite 1100  
Portland, OR 97232

**RE: Reinitiation of Consultation on Long Term Operations of the State Water Project and Central Valley Project**

Dear Regional Administrator Thom,

I am writing to provide comments on the Bureau of Reclamation's biological assessment for the reinitiation of consultation on long-term operations of the State Water Project and Central Valley Project. As you know, the initial biological assessment failed to include any biological modeling of the likely effects of the action (except for model results of temperature-dependent mortality of winter-run Chinook salmon), including any results from numerous biological models NMFS has relied on in past consultations, including the Southwest Fishery Science Center's Winter Run Life Cycle Model, the OBAN life cycle model, Perry/USGS Flow Survival Model, or the Delta Passage Model.<sup>1</sup> Despite the omission of biological modeling in the biological assessment, NMFS initiated formal consultation without all of the necessary information for this consultation, contrary to its own regulations. *See* 50 C.F.R. § 402.14(c). We understand that biological modeling has been or is being prepared, and we therefore request that NMFS share these model results with the peer review panel and members of the public, including NRDC.

We also understand that the National Marine Fisheries Service (NMFS) and Bureau of Reclamation have agreed to a two-week delay of the independent scientific peer review of the draft biological opinion and of the final biological opinion. Such a delay raises concerns regarding potential political interference in the final biological opinion, particularly in light of the Inspector General's 2005 Final Audit Report No. STL-17242-5-0001/July 2005. We therefore request that any and all draft biological opinions, including any draft opinions that were transmitted to the Bureau of Reclamation, and any comments on a draft biological opinion from the Bureau of Reclamation, be shared with the peer review panel and members of the public, including NRDC.

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<sup>1</sup> We recognize and have previously commented on the known flaws with several of these models (e.g., the Delta Passage Model fails to account for the flow-survival relationship in some reaches of the Delta and is based on acoustic tag results from larger smolts during a very narrow set of dry hydrologic conditions).

Based on our review of the materials provided to date by the Bureau of Reclamation, the biological assessment fails to comply with the Endangered Species Act because it fails to use the best available science, fails to evaluate the long-term effects of the proposed project, and fails to evaluate the effects of the proposed project. In addition, the proposed project appears likely to jeopardize the continued existence of listed species and adversely modify designated critical habitat, contrary to the requirements of the ESA. On the pages that follow, we provide more detail regarding these concerns, and we have enclosed supporting documents and materials with this letter.

**1. The Proposed Project is Likely to Jeopardize ESA-Listed Species and Adversely Modify Designated Critical Habitat**

The Endangered Species Act requires NMFS to ensure that the long-term operations of the Central Valley Project and State Water Project do not jeopardize the continued existence and recovery of winter-run Chinook salmon, spring-run Chinook salmon, green sturgeon, central valley steelhead, and orcas, nor adversely modify designated critical habitat. It is unlawful for NMFS' jeopardy analysis to simply compare the proposed project to current operations, particularly given the degraded baseline conditions that are jeopardizing the continued existence and recovery of ESA-listed species under current operations of the CVP and SWP. Rather, the Act requires that NMFS evaluate whether the effects of the proposed project, when added to the underlying baseline conditions, would jeopardize listed species or adversely modify designated critical habitat. *Nat'l Wildlife Federation v. Nat'l Marine Fisheries Service*, 524 F.3d 917, 930 (9th Cir. 2008); *Turtle Island Restoration Network v. Dep't of Commerce*, 878 F.3d 725, 737-39 (9th Cir. 2017).

On August 17, 2016, NMFS concluded that reinitiation of consultation was required under the ESA regulations and the 2009 biological opinion, due to "new information related to the effects of multiple years of drought, recent data demonstrating extremely low abundance levels for Sacramento River endangered winter-run Chinook salmon and threatened spring-run Chinook salmon, and new information." That same day, NMFS concluded that modifications to the Shasta RPA in the 2009 biological opinion were warranted using the adaptive management provisions of that biological opinion, because "Various RPA actions within Action Suite I.2 are not performing as designed to achieve their objective to avoid jeopardy of winter-run Chinook salmon during extended drought conditions." NMFS also admitted in late 2016 that the performance standards of RPA Action I.2.1 have not been met and that "the level of incidental take in 2014 and 2015 was greater than analyzed or authorized in 2009 when the RPA was developed." On August 30, 2016 the Secretary of the Interior concluded that the "[t]he reinitiation process will likely lead to new or amended biological opinions that will increase protections" for Delta Smelt and winter-run Chinook salmon, and which will likely reduce water supply for CVP and SWP contractors South of the Delta.<sup>2</sup>

It is clear that current operations of the CVP and SWP are contributing to the decline of ESA-listed species, which is consistent with the need to improve protections for the species.

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<sup>2</sup> A copy of this memorandum and other documents and studies referenced in these comments are included as enclosures hereto.

According to NMFS, under baseline conditions, in 9 of the past 12 years (2008-2017) the cohort replacement rate for winter-run Chinook salmon has been less than 1, meaning that the population is not replacing itself. Similarly, in the 2017 WaterFix biological opinion NMFS found that there is concern that spring-run Chinook salmon “will deteriorate into high extinction risk in the coming years based on the population size or rate of decline criteria.” NMFS has also found that Orcas are facing greatly increasing risk of extinction.

However, rather than increasing protections for winter-run Chinook salmon and other ESA-listed species, the Proposed Project would significantly weaken existing protections in the 2009 biological opinion and does not provide sufficient conservation measures to prevent extinction. The biological assessment proposes to eliminate RPA action IV.2.1 in the 2009 biological opinion, would provide virtually unlimited exceptions from RPA Action IV.2.3 in the 2009 biological opinion, and would result in levels of temperature-dependent mortality of winter-run Chinook salmon that greatly exceed the maximum thresholds identified by NMFS.

As discussed further below, NMFS’ prior findings and the best available science demonstrate that the proposed project likely would jeopardize the continued existence of ESA-listed species and adversely modify designated critical habitat.

## **2. The Proposed Project in the Biological Assessment would Result in Unsustainable Temperature-Dependent Mortality of Winter-Run Chinook salmon**

The proposed project would result in unsustainable temperature-dependent mortality of winter-run Chinook salmon and spring-run Chinook salmon in critically dry years and droughts that exceed the thresholds that NMFS has previously identified are necessary to avoid jeopardy. In its 2017 draft RPA amendment, NMFS concluded that temperature dependent mortality of winter-run Chinook salmon should never exceed 30 percent, while noting that, “These temperature dependent mortality numbers are preliminary and subject to further analysis to understand whether the population can withstand this level of mortality and still be viable.” In contrast, the modeling in the biological assessment shows that the proposed project would result in more than double that level of mortality in critically dry years using the Martin model, and that temperature-dependent mortality would exceed NMFS’ targets in all water year types.<sup>3</sup>

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<sup>3</sup> Substantially greater temperature-dependent mortality would occur under full contract deliveries to Sacramento River Settlement Contractors. For instance, Appendix A to the Bureau of Reclamation’s December 2018 Environmental Assessment for the Addendum to the Coordinated Operating Agreement found that temperature-dependent mortality of winter-run Chinook salmon would exceed 25% in 50% of years, whereas this biological assessment finds that temperature-dependent mortality would be 6% in 50% of years under the COS baseline. The reduction in water deliveries to Sacramento River Settlement Contractors in this biological assessment, as discussed *infra*, appears to be the largest difference between these modeling efforts by the Bureau of Reclamation.

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WY Type	Temp Dependent Mortality – 2017 Shasta RPA target	Temp Dependent Mortality – 2019 BA modeling of COS
Wet	Less than 3%	5%
Above normal	Less than 3%	4%
Below Normal	Less than 3%	11%
Dry	Less than 8%	10%
Critical	Less than 30%	61%

Similarly, the Bureau of Reclamation’s estimates of temperature-dependent mortality under the proposed action are greater than NMFS’ estimate of temperature-dependent mortality from 1996-2016 for most water year types, and they are relatively similar in critically-dry water year types. NMFS has already determined that recent levels of temperature-dependent mortality exceeded the incidental take limits in the 2009 biological opinion and required reinitiation of consultation and revision of the Shasta RPA.

WY Type	Temp Dependent Mortality – 1996-2016	Temp Dependent Mortality – 2019 BA modeling of Proposed Action
Wet	4%	5%
Above normal	3%	4%
Below Normal	10%	11%
Dry	9%	10%
Critical	68%	61%

Equally important, the biological assessment significantly underestimates temperature-dependent mortality of winter-run Chinook salmon caused by CVP operations for at least five reasons, each of which are discussed below.

First, the biological assessment underestimates temperature-dependent mortality because CalSim modeling assumes perfect foresight in managing the cold-water pool in Shasta Reservoir throughout each year. However, NMFS has repeatedly concluded in recent years that the Bureau of Reclamation’s temperature model “assumes operations can achieve temperature targets that are either not realistic or not supported by the historic record,” that “Reclamation has historically overestimated their ability to achieve the temperature compliance point,” that Reclamation repeatedly refuses to use accurate or even conservative assumptions in the model, and that Reclamation’s temperature model generally performs very poorly. Reclamation has repeatedly overestimated its ability to meet temperature control, with disastrous results in 2015. Because of the lack of adequate models and assumptions to manage temperature within the year, actual operations will likely exceed estimated temperature-dependent mortality.

Second, the biological assessment proposes to eliminate the Shasta Dam carryover storage requirements and related requirements of Action I.2 of the 2009 biological opinion and the operational requirements in the 2017 draft RPA amendment. In the 2019 draft Shasta RPA amendment, NMFS concluded that carryover storage requirements in April and September and

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reservoir release limits were necessary to ensure temperature compliance. For instance, NMFS concluded that, “it has become clear from Shasta operations in the drought years that an end of April storage requirement is also a critical metric towards meeting temperature compliance throughout the temperature management season.” However, the biological assessment proposes to eliminate any and all carryover storage requirements, reservoir release limits, or other limitations on Reclamation’s operations. Without any carryover storage and reservoir requirements, it is not reasonably certain that adequate cold water pool resources will be available in future critically dry years and droughts.

Third, the biological assessment proposes to eliminate all of the consultation and real time operations processes that involve NMFS, including the requirement for consultation prior to the initial CVP allocation. As NMFS has explained, the RPA requires that:

NMFS shall review the February forecast to determine whether the predicted delivery schedule is likely to leave sufficient water for temperature management to meet Endangered Species Act (ESA) requirements, and provide a written evaluation to Reclamation prior to Reclamation making the first allocation announcements. The objective of this RPA action is to use a conservative forecast as early as possible to protect the cold water pool in Shasta Reservoir so that suitable habitat can be maintained downstream during the summer and fall for federally listed endangered Sacramento River winter-run Chinook salmon (*Oncorhynchus tshawytscha*), and threatened Central Valley spring-run Chinook salmon (*O. tshawytscha*).

Letter from NMFS to Bureau of Reclamation dated February 19, 2019 regarding Transmittal of February Reservoir Operations Forecast per RPA Action I.2.3.

Instead, the biological assessment proposes to eliminate this essential consultation process and give the Bureau of Reclamation virtually unfettered discretion in how to manage Shasta Reservoir under the tiered temperature management strategy, including “sole discretion for: water operations of the CVP and SWP, including allocations.” The biological assessment proposes no limit on Reclamation’s discretion to switch between tiers, e.g., from Tier 3 to Tier 4 temperature management operations, within a year. As a result, temperature management under Tiers 1-3 is not reasonably certain to occur, and NMFS cannot rely on the more protective operations in Tiers 1-3 being implemented to protect ESA-listed species.

Fourth, the biological assessment proposes that Reclamation would not perform the first temperature modeling run until April, after initial CVP water supply allocations (including allocations to Sacramento River Settlement Contractors) have been made, despite the fact that Shasta reservoir releases in April and May for the Sacramento River Settlement Contractors significantly contributed to Reclamation’s failure to meet temperature control in 2014 and 2015. Indeed, NMFS concluded in July 2015 that, “It is now very clear through evaluating operations in both 2014 and 2015 that the volume of cold water available for real-time management in June through October is highly dependent on Keswick releases in April through early June.” Relatedly, the water storage criteria for the different tiers in the tiered temperature management strategy are generally based on the size of the cold water pool at the beginning of May, but it

appears that data generally will not be available until after the Bureau of Reclamation announces initial water supply allocations and begins making reservoir releases to meet Sacramento River Settlement Contractor demands, which will significantly impair the ability to meet temperature compliance. By failing to prepare temperature modeling runs or temperature management plans before making initial allocations, Reclamation will lack data to determine whether initial allocations are consistent with ensuring that sufficient cold water will be available to protect winter-run Chinook salmon and other ESA-listed species.

Fifth, as discussed *infra*, the effects of climate change are likely to result in even higher levels of temperature dependent mortality after 2025. However, the biological assessment fails to model or analyze long term effects of the project with climate change.

Because of these flaws, the biological assessment significantly underestimates temperature-dependent mortality of winter-run Chinook salmon that is likely to occur under the proposed project, and temperature-dependent mortality will likely significantly exceed the estimates in the biological assessment.

In addition, NMFS has previously concluded that use of a 56°F daily average temperature (DAT) at the location of salmon redds is not scientifically supported and is not adequate to protect the earliest life stages of winter-run Chinook salmon because daily maximum temperatures can exceed 60°F and cause lethal and sub-lethal adverse effects while meeting a daily average of 56°F. Instead, NMFS has concluded that the best available science supports use of a 55°F 7 Day Average of the Daily Maxima (7DADM) temperature threshold at the location of the most downstream salmon redd. Despite these prior findings, the biological assessment proposes to manage to meet 56°F daily average temperatures at Clear Creek Gauge under Tier 3, and to plan to exceed 56°F under Tier 4. Such an approach fails to use the best available science.

### **3. The Biological Assessment Fail to Accurately Assess the Adverse Effects of Increased Delta Pumping Under the Proposed Project**

The proposed project would significantly increase South of Delta exports and increase the magnitude, frequency, and duration of reverse flows in Old and Middle River, adversely affecting migrating salmon and steelhead and designated critical habitat. However, the biological assessment fails to accurately evaluate the impacts of increased pumping on salmon and steelhead.

First, the biological assessment fails to accurately model the effects of the WIIN Act OMR waivers included in the proposed project. While the modeling in the BA assumes a single, short duration waiver in January and February to allow OMR flows of -6,000 cfs, the proposed project imposes no limit on the magnitude, frequency or duration of these waivers; for instance, it asserts that “some precipitation in the Central Valley” triggers such waivers. *See* Biological Assessment at 4-4-51 to 4-55. As a result, the OMR conditions modeled in the BA are not reasonably certain to occur, and it is unlawful for NMFS to rely on these more protective OMR model results in assessing the impacts of the proposal. *See Nat’l Wildlife Fed’n*, 524 F.3d at 935-36 & n.17. Second, the proposed project would significantly increase pumping and OMR reverse flows

during April and May because it proposes to eliminate Action IV.2.1 in the 2009 NMFS biological opinion (San Joaquin River inflow: export action).

Taken together, the proposed project is likely to result in increased entrainment mortality and reduced survival for salmonids and Central Valley steelhead migrating through the Delta. For instance, in its recent biological opinion for the California WaterFix project, NMFS concluded that reduced exports from the South Delta pumping plants and more positive Old and Middle River flows would increase survival through the Delta for salmon and steelhead migrating from both the San Joaquin River and Sacramento River. Consistent with that analysis, increased pumping and more negative Old and Middle River flows (as proposed in the biological assessment) would reduce migratory survival through the Delta. In addition, NMFS found that a 1-2% reduction in through Delta survival would have significantly greater population level impacts and would be “a notable reduction for an endangered species, especially if it occurs on a consistent (e.g., annual) basis.”

Moreover, in its recovery plan NMFS identified specific through-Delta survival rates for each ESA-listed salmon species that are necessary for the species’ recovery. Those through-Delta survival rates are significantly higher than current estimates of survival through the Delta, yet the proposed action would reduce survival through the Delta. The biological assessment fails to consider whether this would jeopardize the recovery of ESA-listed species.

In addition, we note that reliance on real time operations to minimize entrainment mortality as proposed in the biological assessment is inadequate and not reasonably certain to occur because the biological assessment proposes that Reclamation and DWR shall make final decisions on OMR and other protective actions. NMFS’ 2009 biological opinion required that the Service make the final determination of OMR flows, because of the repeated examples of Reclamation and DWR rejecting recommendations of biologists from state and federal agencies to reduce pumping to protect ESA-listed species under the 2004/2005 biological opinions. In contrast, the biological assessment proposes that Reclamation and DWR will have sole discretion over water project operations and allows for multiple waivers of OMR criteria.

Because the biological assessment fails to accurately model the effects of the proposed project, because reductions in entrainment due to real time operations are not reasonably certain to be implemented, and because the proposed project would significantly increase pumping and reduce survival through the Delta, the biological assessment fails to demonstrate that operations of the CVP and SWP will not jeopardize ESA-listed species nor adversely modify designated critical habitat.

#### **4. The Biological Assessment Fails to Assess the Effects of Reduced Flows on the Survival and Abundance of ESA-Listed Species**

Recent scientific studies demonstrate that the migratory survival and subsequent abundance of winter-run Chinook salmon, spring-run Chinook salmon, and fall-run Chinook salmon (which are an important prey species for ESA-listed Orcas) is significantly impaired by lower flows in the Sacramento River and tributaries during key migration periods, due in part to operations of the CVP and SWP. For instance, Michel 2018 found that freshwater survival for migrating

salmon had a strong, statistically significant positive relationship with smolt to adult ratios (SAR) ( $r^2=0.62$ ), indicating that freshwater survival was an important factor in determining adult abundance. Henderson et al 2018 found that flows in the Sacramento River are the primary driver of migratory survival, with lower survival at lower flows. Work by Jeremy Notch, Flora Cordoleani, and other scientists with NMFS and the California Department of Fish and Wildlife have demonstrated that instream flows have a significant, positive effect on the migratory survival of spring-run Chinook salmon such that survival is higher at higher flows. *See, e.g.,* Cordoleani et al 2018.<sup>4</sup>

Similarly, studies by Russ Perry and other USGS scientists (which were used by NMFS in the WaterFix biological opinion) found that there is a strong flow-survival relationship between Sacramento River flow and survival through the Delta to Chipps Island, which results in increased survival through the Delta as a result of higher inflows to the Delta. Other analyses have concluded that increased Delta outflow during the winter and spring months results in greater abundance and/or recruitment of sturgeon. However, the biological assessment fails to incorporate these scientific studies and fails to accurately assess the impacts of reduced flow from CVP/SWP operations on survival.

In addition, the biological assessment proposes to reduce flows in the Stanislaus River, despite scientific evidence that survival of migrating salmonids in the Stanislaus River is strongly and positively correlated with the volume of flow during the winter and spring months. *See, e.g.,* Zeug et al 2014; *see also* Buchanan et al 2018 (steelhead). NMFS has previously concluded that the minimum flows in the 2009 biological opinion are necessary to avoid jeopardy, and the Recovery Plan finds that the minimum flows in Appendix 2-E to the 2009 biological opinion are a priority 1 recovery action. This element of the proposed project (reduced flows in the Stanislaus River) also is inconsistent with the State of California's Bay-Delta Water Quality Control Plan as amended in 2018, and Stanislaus River operations under both the COS baseline and the proposed project would result in flows and water project operations that violate Reclamation's legal duty under its water rights to meet D-1641 Vernalis pulse flows in all years.

Finally, the proposed project conflicts with and prevents attainment of numerous priority 1 recovery actions identified in the Recovery Plan, such as new Delta flow objectives that mimic natural flow characteristics, pulse flows of 17,000 cfs or higher at Freeport during the December-April outmigration period, and minimizing the frequency, magnitude and duration of reverse flows in Old and Middle River. This consultation must ensure that proposed project does not jeopardize the recovery of listed species, as required by the ESA.

##### **5. The Biological Assessment Fails to Accurately Model and Analyze the Scope of the Proposed Project**

The biological assessment fails to accurately model and assess the impacts of the following elements of the proposed project: (a) Implementation of the Water Supply Contract with

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<sup>4</sup> To the extent that these flow-survival relationships are not already incorporated into the Winter Run Life Cycle Model, NMFS needs to otherwise account for these flow-survival effects to ensure that the agency uses the best available science.



Sacramento River Settlement Contractors; (b) Expansion of Shasta Dam; (c) long term operations of the Central Valley Project and State Water Project in light of the anticipated effects of climate change. Each of these flaws is discussed in more detail below.

a. The Biological Assessment Fails to Analyze the Effects of Full Implementation the Water Supply Contract with Sacramento River Settlement Contractors:

The Endangered Species Act requires that the Service’s biological opinion be co-extensive with the proposed action, to ensure that the proposed action will not jeopardize listed species or adversely modify designated critical habitat. *Connor v. Burford*, 848 F.2d 1441, 1453 (9th Cir. 1988); *Wild Fish Conservancy v. Salazar*, 628 F.3d 513, 525 (9th Cir. 2010). This must include the effects of water diversions at full contract amounts for the Sacramento River Settlement Contractors, as well as the effects over the full duration of the contracts. However, the Biological Assessment fails to adequately consider the full effects of implementation of the Bureau of Reclamation’s contract with the Sacramento River Settlement Contractors, because the BA fails to model or analyze: (1) the effects of full contract deliveries, instead only analyzing recent historic deliveries, which are significantly lower than full contract amounts; and, (2) the effects of full contract deliveries on salmon and other endangered species over the duration of the contract, instead only analyzing effects under near term climatic conditions in 2025 rather than effects over the full duration of the contracts (through 2045). Because the BA fails to analyze the full effects of implementing these contracts, the consultation does not ensure that implementation of the contracts will not jeopardize listed species.

i. *The Biological Assessment Fails to Analyze the Effects of Sacramento River Settlement Contractor Diversions at Full Contract Amounts*

Unlike prior consultations and environmental reviews, this biological assessment only models the effects of recent historic levels of water diversions by Sacramento River Settlement Contractors instead of full contract amounts. The modeling assumptions in the BA explicitly states that the CalSim modeling only analyzes historic diversions by the Sacramento River Settlement Contractors, not the full contract amounts. *Id.*, Appendix D at 46 (“Land-use based, full buildout of contract amounts, except for Settlement Contractors represented with historical diversions.”); *id.* at 47.<sup>5</sup>

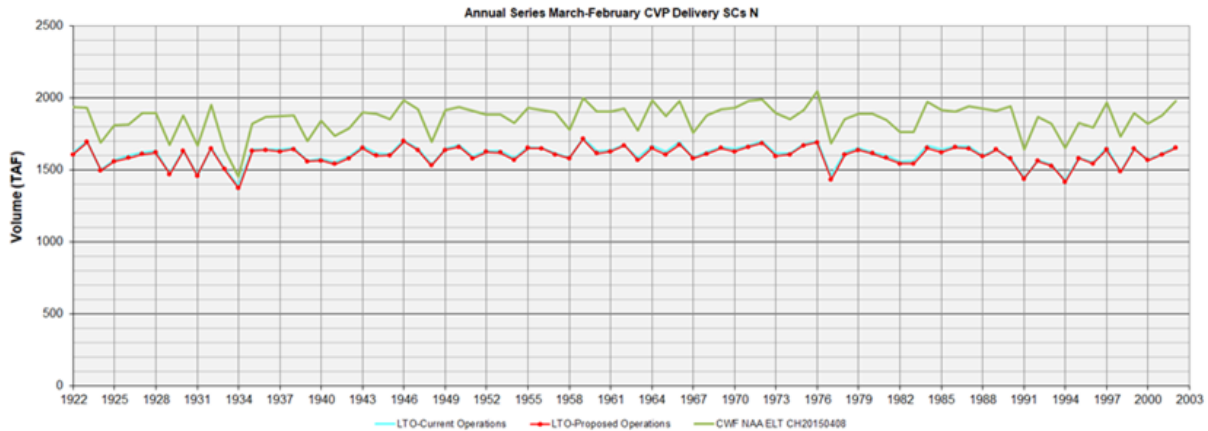
CalSim results from the BA also demonstrate that the Bureau of Reclamation changed the assumptions regarding the amount of water diversions by Sacramento River Settlement Contractors in both the Continued Operations Scenario and the Proposed Project. In recent previous ESA consultations and NEPA analyses the Bureau of Reclamation analyzed the effects of full contract amounts by the Sacramento River Settlement Contractors, including the California WaterFix biological opinions, California WaterFix Final EIS/EIR, and the 2015 Final EIS on Long Term Operations of the CVP and SWP. In contrast, here the Bureau of Reclamation has significantly reduced water diversions by Sacramento River Settlement Contractors in the model, limiting those diversions to historic levels rather than full contract

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<sup>5</sup> The text of the BA inaccurately asserts that the document analyzes full contract deliveries to the Sacramento River Settlement Contractors. *See* BA at 4-9 to 4-11. However, the CalSim modeling results and text demonstrate this statement is inaccurate.

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amounts. Staff from the U.S. Fish and Wildlife Service confirmed that the CalSim model results show a significant reduction in water diversions by Sacramento River Settlement Contractors as compared to the California WaterFix modeling, providing the graphic below, and that this was a result of changes in the assumptions. See Email from Derek Hilts to Doug Obegi dated March 28, 2019.



The Sacramento River Settlement Contractors have never diverted their full contract amounts, and in most years total diversions are only 75% or less of full contract amounts. As a result, this change in modeling assumption significantly altered the modeling results, including causing a significant increase in carryover storage in Shasta Reservoir as compared to those earlier modelling efforts.

**Comparison of Baseline Modeling Results**

	<b>ROC BA (Current Operations)</b>	<b>WaterFix BA (NAA)</b>	<b>2015 ROC EIS (No Action Alternative)</b>
<b>Shasta EOS Storage</b>			
<i>Wet</i>	2989	2985	2985
<i>Above Normal</i>	2833	2835	2834
<i>Below Normal</i>	2729	2615	2608
<i>Dry</i>	2611	2459	2462
<i>Critically Dry</i>	1225	914	937
<b>Shasta EOA Storage</b>			
<i>Wet</i>	4360	4298	4298
<i>Above Normal</i>	4501	4403	4404
<i>Below Normal</i>	4213	4027	4026
<i>Dry</i>	3889	3735	3737
<i>Critically Dry</i>	2474	2181	2202

FWS staff confirm that the change in assumptions for Sacramento River Settlement Contractor water diversions played a role in the change in water storage in Shasta Dam and other reservoirs, as did the changes to the Coordinated Operations Agreement. *Id.*

However, if the Sacramento River Settlement Contractors increased water diversions beyond historic levels up to full contract amounts, that would necessarily result in significant reductions in carryover storage in Shasta Dam and other reservoirs, reduced flows below the diversion points in the lower Sacramento River and Delta, and other adverse effects. These changes would significantly harm endangered winter-run Chinook salmon, spring-run Chinook salmon, Delta smelt, Green Sturgeon, and other species. For instance, NMFS has previously concluded that Shasta carryover storage levels as modeled in the WaterFix biological opinion and Final EIS/EIR would cause significant harm to winter-run Chinook salmon, jeopardizing the continued existence and recovery of the species and leading to the January 2017 draft revised Shasta RPA.

Because the BA does not analyze the effects of the Sacramento River Settlement Contractors diverting their full contract amounts, and because increased diversions up to full contract amounts would cause significant adverse effects on listed species that are not analyzed in the consultation, the consultation cannot provide incidental take coverage or ensure that the implementation of these contracts does not jeopardize endangered species.

ii. The Biological Assessment Fails to Analyze the Effects of Water Diversions by Sacramento River Settlement Contractors over the Full Duration of the Contracts

In addition to failing to consider the full amounts of water under the Sacramento River Settlement Contracts, the BA and consultation also fail to consider the effects of water deliveries over the full duration of the contract (through the year 2045). The BA only analyzes effects, including both the effects of climate change and Sacramento River Settlement Contractor water diversions, through the year 2025. *See, e.g.*, BA, App. D at 96.<sup>6</sup> As a result, the effects of 20 years of water diversions under the Sacramento River Settlement Contracts, in combination with the increased effects of climate change, are not analyzed in this consultation.

Numerous scientists and agencies including NMFS, USBR, and CDFW have acknowledged that climate change is likely to increase air and water temperatures, modify the amounts and forms of precipitation, and significantly change hydrology in the Bay-Delta watershed. These effects of climate change are widely accepted to increase over the longer term, with more significant effects anticipated after 2025, and these effects are likely to significantly exacerbate the effects of water project operations on endangered winter-run Chinook salmon, Delta Smelt, and other listed species in the Bay-Delta.

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<sup>6</sup> Although the text of the BA modeling appendix elsewhere claims that the BA modeling incorporates the effects of climate change through the year 2030, *see* BA, App. D at 18, the specific model results on hundreds of pages in Appendix D state that “All scenarios are simulated at ELT (Early Long-Term) Q5 with 2025 climate change and 15 cm sea level rise.”

Modeling in the California WaterFix Final EIS/EIR shows that the combination of climate change effects at the Late Long Term (2060) and water project operations would cause significant adverse impacts that are not reflected in the modeling that only considers the effects of climate change at the Early Long Term (2025). For instance, that modeling shows that at the Late Long Term, there is a dramatic increase in the magnitude, duration, and frequency of water temperatures below Shasta Dam that exceed lethal levels for endangered winter-run Chinook salmon. Climate change is likely to cause significant changes in flows and temperatures in the Delta in the LLT that could adversely affect Delta Smelt and other species and which are not observed in the ELT.

Because the consultation fails to analyze the effects of climate change and Sacramento River Settlement Contractor water diversions over the duration of these contracts, the consultation fails to ensure that implementation of the Sacramento River Settlement Contracts would not jeopardize the continued existence of Delta Smelt and other species listed under the ESA.

b. The Biological Assessment Fails to Model and Analyze the Effects of Enlarging Shasta Dam

Although the Biological Assessment purports to assess the impacts of enlarging Shasta Dam, because it fails to model the effects of enlarging Shasta Dam it fails to ensure that the project would not jeopardize ESA-listed species. The text of the BA states that an 18.5-foot raise of Shasta Dam is included in the proposed project, with less than one third of the increased storage capacity purportedly for dedicated cold-water storage (191 TAF). BA at 4-33. However, the CALSIM modeling in the BA does not include an expanded Shasta Dam and instead only models the existing storage capacity of Shasta Dam. BA Appendix D at 48. Other models used in this consultation rely on the CALSIM modeling in the BA, and thus they also fail to consider the effects of an enlarged Shasta Dam. As a result, the modeling in the BA fails to analyze or consider the effects of enlarging Shasta Dam on endangered species.

For instance, increasing water storage in Shasta Dam will reduce flows in the Sacramento River and into the Delta by a commensurate amount, but by failing to model the increased storage capacity the BA fails to analyze the timing, frequency, or magnitude of reduced flows below Shasta Dam. State and Federal agencies have raised significant concerns in the past that the reduction in flows below Shasta Dam caused by this project would adversely affect listed salmonids. Reduced flows in the Sacramento River during the winter and spring months will reduce the survival of salmon in the Sacramento River and survival in the Delta in most years, and reduced inflows into the Delta resulting from increased storage and capture at an enlarged Shasta Dam will likely harm Delta Smelt and other species in most years by reducing Delta inflows and outflows. The BA wholly fails to model and consider these adverse effects on ESA-listed species.

In addition, because the BA fails to model and analyze the effects of an enlarged Shasta Dam, it fails to demonstrate to what extent, if any, the dam raise would change temperature management for salmonids below the dam. The BA does not describe any rule that would reasonably ensure that increased water storage for fishery purposes resulting from an enlarged Shasta Dam would be available during drought conditions, or what that volume of water would be in addition to.

Because there is no operational rule requiring this storage to be maintained into drought conditions, there is no basis for NMFS and FWS to conclude that any additional cold-water pool storage would be reasonably certain to occur in drought years.

Because the biological assessment fails to model or analyze the effects of enlarging Shasta Dam on Delta Smelt, the consultation fails to ensure that enlarging Shasta Dam would not jeopardize the continued existence of the species or adversely modify its critical habitat.

c. The Biological Assessment Fails to Model and Analyze the Effects of Long-Term Operations of the Central Valley Project and State Water Project in Combination with Climate Change

Although the biological assessment is entitled “Reinitiation of Consultation on the Coordinated Long-Term Operation of the Central Valley Project and State Water Project,” the document only analyzes the effects of operations through the year 2025, and it fails to consider the long-term effects of water project operations despite the fact that operations are anticipated to occur long after 2025. State and federal agencies have concluded that the adverse effects of climate change on ESA-listed species (e.g., increased air and water temperatures, more frequent droughts, changes in the timing and amounts of precipitation) are likely to worsen after 2025, exacerbating the adverse effects of operations of the CVP and SWP. For instance, in the WaterFix Final EIS/EIR, lethal water temperatures below Shasta Dam in the year 2060 are significantly increased in magnitude and frequency compared to conditions in 2025. Similarly, a recent study by the California Department of Water Resources and University of Massachusetts found that by the year 2050, the effects of increased temperatures as a result of climate change is likely to significantly reduce water storage in Oroville Reservoir (April and September) and reduce Delta outflow as compared to today. In addition, the study notes that increased climatic variability, such as more frequent and/or extended duration of droughts, was not analyzed but could lead to additional adverse impacts beyond those identified in the study.

The fact that CVP and SWP operations will undergo reinitiation in the future does not justify the failure to analyze the longer-term effects of the projects in this consultation. *Wild Fish Conservancy*, 628 F.3d at 525. Because the biological assessment and consultation fails to analyze the long-term operations of the CVP and SWP after the year 2025, the consultation fails to comply with the ESA.

6. The Biological Assessment Models Infeasible Water Project Operations, Particularly During Critically Dry Years, and Fails to Assess the Impacts of Future Waivers of Environmental Protections During Drought Conditions

The operations proposed in the biological assessment are infeasible during critically dry years, which is likely to lead to operational changes that will worsen conditions for Delta Smelt, winter-run and spring-run Chinook salmon, and other ESA-listed species. In addition, the Service approved waivers of operational protections for Delta Smelt during the recent drought, which adversely affected Delta Smelt, and state and federal agencies have concluded similar waivers of Delta outflow and OMR requirements are reasonably foreseeable in future droughts. However,

the biological assessment and draft effects analysis fail to discuss or analyze the effects of foreseeable changes in operations during future droughts.

First, according to U.S. Fish and Wildlife Service staff, CalSim modeling of baseline<sup>7</sup> operations (Current Operations) in the biological assessment would drain Oroville Reservoir end of September storage far below minimum power pool levels in 8 of the 12 critically dry years that are modeled in CalSim. *See* email from Derek Hilts to Doug Obegi dated March 29, 2019. For instance, Oroville EOS storage is reduced below 800 TAF in 1924, 1929, 1931, 1933, 1934, 1977 (to 138.7TAF), 1988, and 1992. *Id.* These storage levels likely would cause significant adverse environmental impacts, and releases from the reservoir would be greatly limited or impossible because the storage would be below the powerhouse and the River Valve Outlet System has limited or no capability to release flows currently. Average critical year EOS storage in Oroville under the Current Operations baseline is 750TAF, *see* BA Appendix D at 116, yet the Proposed Action would reduce average critical year EOS storage in Oroville to 739TAF, *see id.* at 117. Oroville storage under baseline conditions is significantly lower in this consultation than in recent consultations and environmental reviews, which appears to result from the execution of the Addendum to the Coordinated Operating Agreement in combination with climate change. *See* email from Derek Hilts to Doug Obegi dated March 29, 2019.

Second, the proposed operations in the BA would reduce Delta outflows during the summer and fall months to 3,000 cfs. Yet the Public Policy Institute of California and others have noted that Delta outflows at those levels would not meet salinity standards in the Delta; for instance, the recent PPIC report<sup>8</sup> found that outflows of approximately 3,700 cfs are needed to maintain D-1485 and D-1641 salinity standards at Tracy.

The operations proposed in the Biological Assessment therefore appear infeasible and are likely to result in changes in operations during critically dry years. That is consistent with Reclamation and DWR's finding in the final EIS/EIR for WaterFix that changes to Delta outflow and Old and Middle River flow requirements are "reasonably foreseeable" to recur in future droughts. NMFS concluded that the effects of the drought were one of the reasons why reinitiation of consultation was required, and there is no question that winter-run Chinook salmon, spring-run Chinook salmon, and other species suffered devastating declines in abundance as a result of drought and water project operations. However, the biological assessment and draft effects analysis fail to analyze the likely effects of future waivers of Delta outflow and OMR requirements in future droughts. As a result, the biological assessment fails to demonstrate that the proposed project will not jeopardize the species or adversely modify its critical habitat.

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<sup>7</sup> The draft effects analysis in the biological opinion appears to ignore the "Without Action" environmental baseline in the biological assessment. We note that the Without Action environmental baseline would be unlawful, as it would violate the terms and conditions of Reclamation's water rights. *See, e.g.,* SWRCB Water Rights Order 90-5 (requiring the Central Valley Project to operate Shasta Dam to meet downstream water temperature requirements).

<sup>8</sup> Public Policy Institute of California, A New Approach to Accounting for Environmental Water, Appendix B at 29-30 (2017), available online at: [https://www.ppic.org/wp-content/uploads/1117ggr\\_appendix.pdf](https://www.ppic.org/wp-content/uploads/1117ggr_appendix.pdf). This report is hereby incorporated by reference.

**7. Conclusion**

Despite the decline of winter-run Chinook salmon, spring-run Chinook salmon, and other ESA-listed species that migrate through the Bay-Delta, Reclamation has proposed to weaken protections for these once-abundant species in order to increase water deliveries to Westlands and other CVP contractors. The biological assessment fails to use the best available science, fails to adequately consider the effects of the proposed project, and appears likely to jeopardize the continued existence and recovery of winter-run Chinook salmon, spring-run Chinook salmon, and other ESA-listed species, and adversely modify critical habitat.

Thank you for consideration of our views.

Sincerely,

A handwritten signature in cursive script that reads "Doug Obegi".

Doug Obegi

**Enclosures**