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Subject: Comments on Sites RDEIR/SDEIS
Date: Friday, January 28, 2022 8:21:29 AM
Attachments: NRDC et al Comments on Sites RDEIR-SDEIS 1.28.22.pdf
Exh. 1 to NRDC et al Comments on Sites RDEIR-SDEIS.pdf
Exh. 2 to NRDC et al Comments on Sites RDEIR-SDEIS.pdf
Exh. 3 to NRDC et al Comments on Sites RDEIR-SDEIS.pdf

Good morning. Attached, please find comments on the November 2021 Sites Reservoir Revised Draft Environmental Impact Report/Supplemental Draft Environmental Impact Statement and three exhibits. The comments are submitted on behalf of the Natural Resources Defense Council, Defenders of Wildlife, San Francisco Baykeeper, The Bay Institute, Planning and Conservation League, Restore the Delta, Northern California Council of Fly Fishers International, California Sportfishing Protection Alliance, Friends of the River, Golden West Women Flyfishers, Institute for Fisheries Resources, Pacific Coast Federation of Fishermen's Associations, Sierra Club California, Save California Salmon, and Golden State Salmon Association.

I would appreciate confirmation that you have received the comments and exhibits.

Many thanks,
Rachel

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January 28, 2022

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Sent via email to: EIR-EIS-Comments@SitesProject.org

RE: Comments on Sites Reservoir Revised Draft Environmental Impact Report/ Supplemental Draft Environmental Impact Statement (RDEIR/SDEIS)

Dear Sites Project Authority and Bureau of Reclamation:

On behalf of the Natural Resources Defense Council, Defenders of Wildlife, San Francisco Baykeeper, The Bay Institute, Planning and Conservation League, Restore the Delta, Northern California Council of Fly Fishers International, California Sportfishing Protection Alliance, Friends of the River, Golden West Women Flyfishers, Institute for Fisheries Resources, Pacific Coast Federation of Fishermen's Associations, Sierra Club California, Save California Salmon, and Golden State Salmon Association, we are writing to submit comments on the November 2021 Sites Reservoir Revised Draft Environmental Impact Report/Supplemental Draft Environmental Impact Statement ("RDEIR/SDEIS"). Unfortunately, our review of the RDEIR/SDEIS demonstrates that the document fails to comply with the requirements of the California Environmental Quality Act ("CEQA") and National Environmental Policy Act ("NEPA"). In particular, the RDEIR/SDEIS fails to consider a reasonable range of alternatives, fails to use a stable and accurate project description, uses an inaccurate environmental baseline, and fails to adequately account for and assess impacts of the project in light of climate change. Equally important, the RDEIR/SDEIS also fails to adequately analyze impacts to aquatic species like Chinook salmon, Delta Smelt, and Longfin Smelt, and to terrestrial wildlife including giant garter snake and migratory birds, fails to disclose significant environmental impacts of the project to these and other species, inappropriately defers the formulation of mitigation measures, and proposes inadequate mitigation measures. Despite the fact that state agencies and other commenters raised many of these issues in comments on the August 2017 Draft Environmental Impact Report/Environmental Impact Statement ("DEIR/DEIS"), the RDEIR/SDEIS fails to correct these errors. Because the RDEIR/SDEIS is riddled with significant errors, inadequacies, and omissions, the lead agencies must make substantial revisions to the document and recirculate the revised document for public review and comment.

I. <u>The RDEIR/SDEIS Fails to Consider a Reasonable Range of Alternatives</u>

CEQA and NEPA require that the RDEIR/SDEIS consider a reasonable range of alternatives. Cal. Pub. Res. Code §§ 21002, 21061, 21100; tit. 14, Cal. Code Regs. ("CEQA Guidelines") § 15126.6; 42 U.S.C. § 4332; 40 C.F.R. §§ 1502.1, 1502.14, 1508.25(b). However, the RDEIR/SDEIS fails to consider a reasonable range of alternatives because it only considers a single operational alternative, whereas other operational alternatives could reduce or avoid adverse environmental impacts. The failure to include any operational alternatives that could reduce or avoid adverse environmental impacts violates NEPA and CEQA. *See, e.g., Citizens of Goleta Valley v. Board of Supervisors*, 52 Cal.3d 553, 566 (1990) (EIR must consider a reasonable range of alternatives that offer substantial environmental benefits and may feasibly be accomplished); *Muckleshoot Indian Tribe v. U.S. Forest Serv*., 177 F.3d 800, 813 (9th Cir. 1999) (NEPA analysis failed to consider reasonable range of alternatives where it "considered only a no action alternative along with two virtually identical alternatives"); *Natural Res. Def. Council v. U.S. Forest Serv*., 421 F.3d 797, 813 (9th Cir. 2005).

State agencies and members of the public, including many signatories to this letter, have repeatedly emphasized the need to analyze more than one operational alternative, first in scoping comments prior to release of the DEIR/DEIS, and subsequently in comments that the DEIR/DEIS failed to consider a reasonable range of alternatives because it only included a single operational alternative. For instance, the California Department of Fish and Wildlife ("CDFW") previously wrote that,

> . . . the DEIR/DEIS does not include potentially feasible alternatives that would avoid or substantially lessen the Project's significant environmental impacts. CDFW continues to recommend that the DEIR/DEIS should include a more robust range of operational alternatives, as discussed in its comments to the NOP, provided on March 21, 2017. Of the five alternatives in the DEIR/DEIS, many of them are similar with respect to water operations (e.g. diversions, bypass criteria, deliveries are the same across alternatives.) CDFW recommends that alternatives

> should be split into two or more alternatives that encompass the entire range of possible water operations scenarios, including an alternative that minimizes operational impacts through more restrictive bypass flows and diversion criteria.

Letter from CDFW to the Sites Project Authority dated January 12, 2018 ("CDFW Comment Letter").

Despite the prior comments on the need to analyze multiple operational alternatives, the RDEIR/SDEIS analyzes only a single set of operational criteria that is common to all the alternatives. *See, e.g.*, RDEIR/SDEIS at ES-10, 2-6, 2-8, 2-28 to 2-33. Yet as discussed in more detail below, the proposed bypass flows and other operational criteria result in significant environmental impacts that are not disclosed in the RDEIR/SDEIS.

State agencies and public commentors previously highlighted the need to analyze more than one operational alternative because the DEIR/DEIS failed to disclose significant environmental impacts, which could be mitigated through alternative operational criteria such as increased bypass flows. *See, e.g.*, CDFW Comment Letter at 2 (noting that the DEIR/DEIS failed to adequately analyze and disclose environmental impacts and stating that "CDFW does not consider proposed bypass flows identified in the DEIR/DEIS to sufficiently minimize or offset these impacts."). The RDEIR/SDEIS now admits that the operational criteria that were included in the DEIR/DEIS, and that are modeled in the RDEIR/SDEIS, would result in significant environmental impacts requiring mitigation. *See* RDEIR/SDEIS at ES-26, 11-131. As discussed *infra*, even with the proposed mitigation measure (Wilkins Slough Flow Protection Criteria), all of the alternatives result in significant environmental impacts to several fish species. The RDEIR/SDEIS does not include the full range of bypass flows and other operational criteria proposed by CDFW or other commentators to mitigate these significant impacts as alternatives in the RDEIR/SDEIS.

Similarly, as discussed *infra*, the State Water Resources Control Board ("SWRCB") began the regulatory process to update the Bay-Delta Water Quality Control Plan in 2008, issued a Framework in 2018 for completing the update of the Water Quality Control Plan,[1] and has announced that it anticipates adopting new water quality standards for the Sacramento River and Delta as part of the updated Water Quality Control Plan in 2023.[2] The RDEIR/SDEIS fails to provide a reasoned explanation why it does not consider alternative operational criteria that

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[1] *See* State Water Resources Control Board, July 2018 Framework for the Sacramento/Delta Update to the Bay-Delta Plan, available online at: https://www.waterboards.ca.gov/waterrights/water_issues/programs/bay_delta/docs/sed/sac_delta_framework_070618%20.pdf. This document is incorporated by reference.

[2] *See* State Water Resources Control Board, Upcoming Actions to Update and Implement the Bay-Delta Plan, December 8, 2021, available online at: https://www.waterboards.ca.gov/waterrights/water_issues/programs/bay_delta/docs/20211207-slides-for-12-08-bay-delta-plan-inform-item_accessible.pdf. This document is incorporated by reference.

would be consistent with the 2018 Framework for completing the update of the Bay-Delta Water Quality Control Plan, particularly since the final CEQA/NEPA document is intended to be used by the SWRCB in consideration of water rights permits.

The RDEIR/SDEIS violates CEQA and NEPA because it fails to consider more than one operational alternative that could reduce or avoid significant environmental impacts of the proposed project and alternatives.

II. The RDEIR/SDEIS Fails to Use an Accurate and Stable Project Description

(A) The RDEIR/SDEIS Fails to Use an Accurate and Stable Project Description Because the Project that the RDEIS/SDEIR Analyzes is Inconsistent with the Project Description

The RDEIR/SDEIS violates CEQA because the document fails to use an accurate and stable project description. In particular, the modeling of operations in the RDEIR/SDEIS, which is the basis for the analysis of potential environmental impacts throughout the document, does not include the proposed mitigation measure FISH-2 (Wilkins Slough Flow Protection Criteria). As a result, the quantitative analysis and modeling in the RDEIR/SDEIS does not analyze the project that is proposed in the RDEIR/SDEIS.

It is black letter law that "[a]n accurate, stable and finite project description is the sine qua non of an informative and legally sufficient EIR." *County of Inyo v. City of Los Angeles*, 71 Cal. App. 3d 185, 193 (1977). CEQA requires a clear explanation of the nature and scope of the proposed project, otherwise it "is fundamentally inadequate and misleading." *See Communities for a Better Environment v. City of Richmond*, 184 Cal.App.4th 70, 84-85 (2010).

In this case, the RDEIR/SDEIS includes inconsistent bypass flow criteria that limit diversions from the Sacramento River in the operational criteria common to all the alternatives. *Compare* RDEIR/SDEIS at 2-31 to 2-33 (identifying bypass flow criteria of 8,000 cfs at Wilkins Slough in April and May, and 5,000 cfs in other months) with *id*. at 11-131 (describing the proposed Wilkins Slough Fish Protection Criteria mitigation measure, which requires a 10,700 cfs bypass flow at Wilkins Slough during the months of March through May). Buried deep in the appendices, the RDEIR/SDEIS indicates that the proposed mitigation measure FISH-2 (Wilkins Slough Flow Protection Criteria) is not included in the modeling of the proposed project and alternatives. *See, e.g.*, RDEIR/SDEIS Appendices at 5A1-29, 5A2-28 to 5A2-33.

As a result, all of the modeling of proposed operations in the RDEIR/SDEIS common to all of the alternatives – including modeling and analysis of environmental impacts on surface water supplies, on fish and wildlife, and on water quality – does not actually model or analyze the effects of the proposed project or alternatives, and instead the analyses and modeling in the RDEIR/SDEIS are inconsistent with the actual proposed project (which includes this proposed mitigation measure). The document fails to analyze the likely environmental impacts of the proposed project and alternatives because, in light of the document's failure to articulate a stable project description, it fails to analyze the proposed project at all.

The inconsistent descriptions of the proposed project are grossly misleading to the public and decisionmakers in violation of CEQA. *See, e.g.*, *San Joaquin Raptor Rescue Center v. County of Merced*, 149 Cal.App.4th 645, 655-56 (2007) (holding that the project description was inconsistent as to whether the project would increase mining production and violated CEQA, in part based on statements in public hearings on the CEQA document that demonstrated such inconsistencies); *Communities for a Better Environment*, 184 Cal.App.4th at 83-84 (holding project description violated CEQA because of inconsistent statements regarding the objectives of the project).

The RDEIR/SDEIS uses different modeling assumptions for project operations and alternatives in other chapters, which also do not reflect the proposed project or alternatives. For instance, in the analysis of the effects of diversions on salmon survival in the Sacramento River (Appendix 11P), the RDEIR/SDEIS states that it uses different modeling assumptions that are not reflected in the proposed project, including a requirement that Delta outflow is greater than 44,500 cfs in the months of April to May and that there are 7 days of surplus conditions in the Delta in order for the project to divert water. RDEIR/SDEIS at 11P-2 to 11P-3. These operational criteria are not currently part of the proposed project, *see id*. at 2-31, nor are they part of the CalSim modeling used in body of the RDEIR/SDEIS, *see id*. at 5A2-23. As a result, the modeling in Appendix 11P and the analysis of the effects of reduced flows on salmon survival in the Sacramento River fails to analyze the proposed project and alternatives.

In addition, the RDEIR/SDEIS assumes that there will be water exchanges with Shasta and Oroville reservoirs in certain years, which affects operations of those reservoirs and temperature-dependent mortality of salmon. RDEIR/SDEIS at ES-12, 2-35 to 2-37, 5A-2-30 to 5A-2-33.[3] However, there are no proposed agreements for such exchanges between the CVP or SWP and Sites, and this element of the project is speculative. *See id*. at ES-10 ("exchanges of water *may* occur with the CVP and SWP") (emphasis added); *id.* at 2-35 (acknowledging that the Sites Reservoir Authority is in discussions with the U.S. Bureau of Reclamation ("Reclamation") and the California Department of Water Resources ("DWR") regarding potential exchanges). Equally important, the RDEIR/SDEIS does not analyze the potential adverse effects that would result from such exchanges, including potential changes in river flows, redd dewatering, or reductions in juvenile salmon survival, and completely ignores the effects of exchanges with Folsom Reservoir. *See* RDEIR/SDEIS at 5-27; *id*. at 11-103 (admitting that the RDEIR/SDEIS needs to "better reflect the exchanges in the model," that these exchanges are difficult to model,

[3] Because these exchanges would be intended to "assist the CVP and SWP in meeting their regulatory obligations," RDEIR/SDEIS at 2-35, these exchanges do not provide public benefits that justify public taxpayer expenditures for this project. These exchanges are effectively water supply benefits to the contractors of the CVP and SWP who are obligated to pay for meeting regulatory requirements of the CVP and SWP.

and that the RDEIR/SDEIS underestimates the extent of potential exchanges that could occur under the proposed project).[4]

Because the RDEIR/SDEIS fails to provide an accurate and stable project description, the document fails to model and analyze the environmental impacts of the proposed project and alternatives, in violation of CEQA and NEPA.

(B) The RDEIR/SDEIS Fails to Use an Accurate and Stable Project Description Because the Overall Project Design is Not Final and Major Project Components Have Not Been Designed at All

The RDEIR/SDEIS also fails to provide an accurate and stable project description because the overall project design is not yet final and major project components that will have significant environmental impacts have not been designed at all. The RDEIR/SDEIS states that, "[a]s with any large infrastructure project, the Project must and will continue toward final design. Project components will be refined as the Project moves toward final design and as parcels become accessible to survey." RDEIR/SDEIS at 3-7; *see also id.* at 9-20 (explaining that estimates of acreage of impacts to plant habitats and wetlands is based on "preliminary engineering design"). While the RDEIR/SDEIS acknowledges that the overall project design is not yet final, it does not clearly describe what project components could change and how. It is impossible for the public to understand the environmental impacts of the project and to meaningfully comment when it is not yet clear what the project is.

In addition to vague statements about the lack of finality of the project's design, the RDEIR/SDEIS highlights particular project components that have not been designed at all. For example, it appears that the locations for major sections of the project's 46 miles of new paved and unpaved roads have not yet been determined. *See, e.g.*, RDEIR/SDEIS at 9-15 ("The exact locations of the realigned Huffmaster Road, new Comm Road South, and new South Road are not yet finalized."); 9-44 ("exact locations of construction-related activities are not known for the new roads"). As the RDEIR/SDEIS acknowledges, these roadways could cause significant impacts to waterways, wetlands, and wildlife:

> New roadways would create physical barriers or impediments for some wildlife, including amphibians and reptiles, which may have a difficult time crossing the roadways. There are numerous waterways and wetlands in the study area, and new or larger roadways could disrupt existing connections between aquatic and upland habitats, and result in increased habitat fragmentation, which could affect

[4] The RDEIR/SDEIS also admits that Sites Reservoir cannot release water to GCID and other participants located between the Hamilton City Pump Station and Knights Landing, and that deliveries of water to those participants would be made by GCID and Reclamation. RDEIR/SDEIS at 2-34. The RDEIR/SDEIS does not appear to analyze the effects of additional Shasta Dam releases by Reclamation to fulfill such exchanges, which could be particularly impactful to the environment in drier years.

> seasonal movements of amphibians and reptiles. Roadways may deter some larger animals from moving through those areas, even if they are able to physically cross the roadways. In addition, some of the roadways may be fenced, which would create a greater impediment to large animals attempting to cross the road. New roadways would also increase the potential for wildlife to be struck by vehicles of workers traveling to operations facilities or visitors traveling to recreation areas, and the presence of fences could trap animals in the roadway and make them more prone to being struck by vehicles.

RDEIR/SDEIS at 10-139. Yet there is no meaningful discussion of the impacts of specific roads to specific resources and no exploration of alternative routes that could minimize impacts because specific road locations have not been proposed.

The RDEIR/SDEIS suggests that the lack of information about roadway locations is not a problem because the lead agencies have estimated the maximum extent of impacts by assuming that resources within the broader “road alignment corridor” will be impacted and because “roads . . . will be designed, to the extent practicable, to avoid direct and indirect impacts . . . .” RDEIR/SDEIS at 9-45 to 9-46. This approach undermines core purposes of CEQA and NEPA. First, it fails to provide the public with an accurate assessment of the project’s impacts, and instead provides only an unrealistic overestimate of impacts that is not reflective of the actual project. Second, it deprives the public of an opportunity to comment on alternative alignments or approaches that could reduce the roadways’ environmental impacts, deferring the process of selecting roadway locations to an unspecified future date when there will be no opportunity for public input and review pursuant to the procedures set forth in NEPA and CEQA.

Basic details about other key project components that could significantly impact the environment are also unknown. Large recreation areas are not yet designed, depriving the public of an opportunity to understand a realistic picture of their impacts and comment on alternative designs that could reduce those impacts. RDEIR/SDEIS at 9-24 (“The permanent footprint of these recreation areas is currently at a conceptual design stage, and the actual location of facilities is not yet known.”). For electrical transmission lines, the RDEIR/SDEIS indicates that “[o]nly one of the two north-south transmission line alignments described in Chapter 2 would be constructed, and specific locations for the transmission line towers are currently unknown.” RDEIR/SDEIS at 9-14. Transmission line can have serious impacts to birds and the towers can destroy vernal pool wetlands and other important landscape features. Yet the RDEIR/SDEIS does not provide the public with an opportunity to understand the project’s impacts or suggest alternatives because it lacks basic information like the locations of transmission line towers. Similarly, the RDEIR/SDEIS discusses the need for upgrades to the GCID canal but indicates that the details will be worked out in the future. RDEIR/SDEIS at 2-9 (“The GCID system may require several upgrades to support the operation of Sites Reservoir. The specific details of these upgrades would be confirmed during future hydraulic modeling and assessment of system conditions.”). There are likely threatened giant garter snakes in the GCID system, and the location, timing, and method of construction matters greatly for avoiding and minimizing impacts to this sensitive species. Once again, the RDEIR/SDEIS fails to provide the public with a meaningful opportunity to understand those impacts and suggest alternative approaches because the document omits the most basic planning details.

The RDEIR/SDEIS makes clear that the project's design is not yet complete, and that major, impactful decisions related to roads, recreation areas, transmission lines, canal modifications, and other project components will occur in the future. Shielding these decisions from public review deprives the public of a meaningful opportunity to understand the project's impacts and comment in violation of CEQA and NEPA. Accordingly, a revised draft EIS/EIR must once again be recirculated for public comment when project design is complete.

III. The RDEIR/SDEIS Fails to Accurately Analyze the Environmental Impacts of the Project in Light of the Effects of Climate Change that have Already Occurred and the Effects of Climate Change Over the Life of the Project

CEQA and NEPA require that the analysis of potential environmental impacts address the full duration of the project, not just the environmental impacts at the very beginning of the project. The CEQA Guidelines explicitly require the consideration of "both the short-term and long-term effects." 14 Cal. Code Regs. § 15126.2(a). In *Neighbors for Smart Rail*, the California Supreme Court reiterated that an EIR must evaluate both the near-term and long-term environmental impacts of a proposed project. 57 Cal. 4th at 455. The RDEIR/SDEIS violates CEQA and NEPA because it fails to accurately assess the environmental impacts of the proposed project in the short term in light of the already observed effects of climate change, and because it wholly fails to consider the environmental impacts in the long term in light of the increasing effects of climate change.

First, the RDEIR/SDEIS fails to accurately assess the short-term effects of the project because the analysis of environmental impacts uses observed hydrology from 1922 to 2003 without considering the effects of climate change. *See, e.g.*, RDEIR/SDEIS at 3-5, 5A1-2. However, that historic hydrologic data do not account for the effects of climate change that have significantly altered hydrology from the historic baseline as observed over the past several decades. Inexplicably, the RDEIR/SDEIS fails to use hydrologic modeling data that have already been developed by DWR and Reclamation for CalSim II (and for CalSim III) which incorporate the near-term effects of climate change on hydrology and water temperatures.[5] As a result, the analysis of environmental impacts in the RDEIR/SDEIS uses outdated information that significantly underestimates the environmental impacts of the proposed project in combination with the effects of climate change.

For example, because the Sites Reservoir RDEIR/SDEIS excludes the observed effects of climate change in recent years, the environmental analysis estimates that temperature-dependent

[5] This modeling data is used in the Climate Change appendix, but it is not used in the body of the RDEIR/SDEIS, making the analysis of environmental impacts in the RDEIR/SDEIS plainly inaccurate.

mortality of winter-run Chinook salmon in the Sacramento River under the No Action Alternative is 24.4 percent in critically dry years. RDEIR/SDEIS at 11O-6. In contrast, the Trump Administration's final 2020 EIR on the long-term operations of the Central Valley Project and State Water Project concludes that temperature-dependent mortality of winter-run Chinook salmon in the Sacramento River under the biological opinions (the No Action Alternative in the Sites Reservoir RDEIR/SDEIS) is 61 percent.[6]

Similarly, Chapter 28 of the RDEIR/SDEIS shows that the effects of climate change with the proposed project and alternatives would cause greater reductions in Sacramento River flow at Wilkins Slough in critically dry years than when climate change is excluded. RDEIR/SDEIS at 28-16 (reductions in December flow at Wilkins Slough from the alternatives increase from 5-6 percent without climate change to 6-7 percent with climate change). And when the effects of climate change are included, the proposed project and alternatives result in much larger reductions in December Delta outflow. *See id*. at 28-24 to 28-25 (reductions in December Delta outflow in critically dry years are 4-5 percent excluding climate change and 7-8 percent when climate change is considered). Yet the impacts of the proposed project's reduction in flow on fish and other resources in the lower river and the Bay-Delta, in light of the effects of climate change, are not analyzed—the cursory discussion about aquatic biological resources in section 28.5.5 focuses on benefits in spawning areas from "temperature exchanges" (which are entirely speculative and solely a mitigation measure); describes a benefit to fish from increased Delta outflow in October (while ignoring flow reductions in other months); and suggests that reduced groundwater pumping due to the additional surface storage would benefit fish by protecting riparian trees (without acknowledging that the project changes the hydrograph in ways that may harm native riparian trees). None of these supposed benefits are adequately documented, analyzed, or likely to materialize and no mitigations are offered for the likely negative effects (e.g., of reduced flows and harm to native riparian trees) that the RDEIR/SDEIS glosses over. *See id*. at 28-31.

The exclusion of the effects of climate change from the RDEIR/SDEIS also results in inaccurate modeling of the temperature of water released from the proposed project, given the current effects of climate change, as well as the effects anticipated in the coming decades. *See id*. at 28-4 (estimating that air temperatures in California could increase by 5.8°F by 2050 and up to 8.8°F by 2100, and that air temperatures in the Sacramento Valley in the months of July through September are likely to increase by 2.7°F to 10.8°F, as a result of climate change); *id*. at 28-27 (admitting that climate change is likely to increase occurrence of harmful algal blooms in the proposed reservoir).

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[6] *See* Final EIS, Appendix F, Attachment 3-8, Table 1-1, available online at: https://www.usbr.gov/mp/nepa/includes/documentShow.php?Doc_ID=41744. As the table notes, "[a]ll scenarios are simulated at ELT (Early Long-Term) Q5 with 2025 climate change and 15 cm sea level rise." *Id*. This document is incorporated by reference.

Second, the RDEIR/SDEIS entirely fails to evaluate the long-term environmental impacts of the proposed project because it only analyzes environmental impacts based on anticipated conditions in the year 2020, 2021 or 2030, depending upon which part of the document is reviewed. *Compare* RDEIR/SDEIS at ES-7 (describing conditions in 2030) and *id*. at 3-5 ("Operations is assumed to begin in 2030 and would continue for the life of the Project.") *with id*. at 5A-2-2 ("Planning Horizon" defined as the year 2021) *with id*. at 3-2 ("the existing conditions baseline under CEQA has been updated to capture conditions through 2020."). Despite the clear mandate of CEQA to evaluate long-term impacts of the project, the RDEIR/SDEIS does not do so.

Excluding the effects of climate change in assessing environmental impacts[7] is particularly egregious and unlawful because: (1) analysis of the impacts of climate change was required in the quantification of public benefits of water storage projects under Proposition 1, as well as to comply with Executive Order B-30-15 (2015) and Assembly Bill 1482 (2015), which require state agencies to account for climate change in project planning and investment decisions; and (2) the longer-term effects of climate change are likely to have more severe impacts in terms of hydrological modification and increased air and water temperatures. Moreover, the RDEIR/SDEIS erroneously describes the 1922-2003 CalSim modeling as "current climate conditions," *see* RDEIR/SDEIS at 5A-2, but state and federal agencies have repeatedly concluded that the 1922-2003 historical hydrologic information does not adequately represent current climate conditions given the change in the climate that has been observed in recent decades.

Because the RDEIR/SDEIS fails to consider the effects of climate change in the near term in determining the potential environmental impacts of the proposed project and alternatives, and because the RDEIR/SDEIS wholly fails to consider the long-term environmental impacts in a future with climate change, the document violates NEPA and CEQA.

IV. **<u>The RDEIR/SDEIS Fails to Use an Accurate Environmental Baseline and Fails to Accurately Describe the Environmental Setting</u>**

(A) <u>The RDEIR/SDEIS Fails to Use an Accurate Environmental Baseline</u>

The RDEIR/SDEIS also violates CEQA and NEPA because it fails to use an accurate environmental baseline. The environmental baseline is typically the conditions that exist when the Notice of Preparation is issued. Cal. Code Regs., tit. 14, § 15125(a). Here, however, the RDEIR/SDEIS improperly uses the following baseline that differ from conditions that existed when the Notice of Preparation was issued, including: (1) it uses the Trump Administration's

[7] While the RDEIR/SDEIS includes a separate chapter that includes some modeling of the proposed project and alternatives with climate change, the document excludes the effects of climate change in determining what constitutes an environmental impact under NEPA and CEQA, and thus fails to consider the near-term and long-term effects of the project under a lawful baseline.

2019 Biological Opinions for operations of the Central Valley Project and State Water Project as part of the baseline; (2) it omits the SWRCB's 2018 Update of the Bay-Delta Water Quality Control Plan; and (3) it ignores the pending revision of water quality standards for the Sacramento River and flows into, through and from the Delta to San Francisco Bay as the final part of the SWRCB's forthcoming update of the Bay-Delta Water Quality Control Plan. Instead the RDEIR/SDEIS assumes that other regulatory requirements would be identical in the future even as species spiral towards extinction because of unsustainable water diversions.

First, the RDEIR/SDEIS proposes to use the 2019 biological opinions for operations of the CVP and SWP as part of the environmental baseline, claiming that because these biological opinions were issued after the Notice of Preparation, they are anticipated to be implemented "into the future," and thus "an updated baseline is necessary to provide the most accurate picture of the Project's impacts." RDEIR/SDEIS at 3-2 to 3-3. However, even before the RDEIR/SDEIS was released to the public on November 12, 2021, the federal government formally reinitiated consultation on the long-term operations of the CVP and SWP on October 1, 2021, beginning the process to develop new biological opinions. In addition, the Biden Administration has agreed to not defend these biological opinions in court, and the state and federal administrations have proposed interim operations that would modify and not fully implement the biological opinions in 2022. As a result, at the time the RDEIR/SDEIS was released to the public, the federal government had agreed that the 2019 Biological Opinions were "not an accurate picture" of how the CVP and SWP would be operated in the near term, let alone "into the future," and it is arbitrary and capricious to conclude otherwise. Including these blatantly unlawful biological opinions in the environmental baseline of the RDEIR/SDEIS violates CEQA and NEPA because this environmental baseline is not an accurate reflection of environmental conditions that would be affected by the proposed project and alternatives, and the document must be revised to analyze operations with a lawful environmental baseline that accurately reflects how the CVP and SWP could lawfully be operated.

Second, the environmental baseline used in the RDEIR/SDEIS violates CEQA and NEPA because it does not include existing water quality standards adopted by the SWRCB in 2018. While the RDEIR/SDEIS's environmental baseline selectively updated some regulatory requirements to include the 2019 biological opinions, the document excludes the regulatory requirements adopted by the SWRCB in 2018 regarding water quality standards for Delta salinity and freshwater inflow from the Stanislaus, Tuolumne, Merced, and lower San Joaquin Rivers. *See* RDEIR/SDEIS at 5A2-20 to 5A2-22. The RDEIR/SDEIS fails to provide any reasoned explanation for excluding these regulatory requirements from the environmental baseline.

Finally, the environmental baseline is also unlawful because it assumes that regulatory obligations that affect diversions from the Bay-Delta will not change in the future, even as fish species continue to spiral towards extinction and regulatory processes to update standards are underway. The RDEIR/SDEIS asserts that "[t]he reasonably foreseeable future conditions under the No Project Alternative would not be materially different from the conditions under the

CEQA existing conditions baseline" because existing regulatory requirements, including the 2019 Biological Opinions, "would reasonably be anticipated to continue to be implemented into the future." RDEIR/SDEIS at 3-2 to 3-3. The SWRCB began its process of updating the Bay-Delta Water Quality Control Plan in 2008, adopted new regulatory requirements for Phase 1 of the updated Water Quality Control Plan in 2018, issued a framework in 2018 for completing the update of the Water Quality Control Plan,[8] and has announced that it anticipates adopting new water quality standards for the Sacramento River and the Bay-Delta estuary as part of the updated Water Quality Control Plan in 2023.[9] There is no justification for entirely excluding consideration of the forthcoming updates to the Bay-Delta Water Quality Control Plan in the RDEIR/SDEIS, particularly since the document will purportedly be used by the SWRCB.

(B) <u>The RDEIR/SDEIS Fails to Accurately Describe the Environmental Setting</u>

In addition to the above-described inaccuracies in the environmental baseline, the RDEIR/SDEIS fails to provide basic information regarding the environmental setting, which makes it impossible for the public to understand and meaningfully comment on the project's impacts. This is particularly true for the RDEIR/SDEIS's discussion of vegetation, wetland, and wildlife resources. For these resources, the RDEIR/SDEIS relied on outdated, unreliable, and inaccurate habitat and species distribution information even though it was feasible to provide more accurate information, in violation of CEQA. *See Save Agoura Cornell Knoll v. City of Agoura Hills*, 46 Cal.App.5th 665, 692-94 (2020).

No new on-the-ground surveys regarding vegetation, wetland, or wildlife resources were conducted for preparation of the RDEIR/SDEIS. Rather, the RDEIR/SDEIS relies primarily on desktop modeling of land-cover types based on areal imagery to describe the location of plant communities and wetlands. RDEIR/SDEIS at 9-8. For wildlife resources,

> [a]vailable literature was reviewed to identify known habitat associations and habitat requirements for each species. Habitat requirements were then compared with the existing land cover types mapped in the study area, and a series of assumptions were made regarding which land cover types could provide potentially suitable habitat for each species based on its habitat requirements.

RDEIR/SDEIS at 10-8. The RDEIR/SDEIS emphasizes multiple times that "[a]ll land cover type acreages are preliminary and subject to revision based on pedestrian surveys once access has been granted to the study area." RDEIR/SDEIS at 10-8; *see also* DEIS.DEIR at 9-8 (same), 9-9 ("The acreages of wetlands and non-wetland waters presented are preliminary, as the aquatic resources delineation has not been completed with onsite surveys or jurisdictional review by the

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[8] *See supra* note 1.
[9] *See* State Water Resources Control Board, Upcoming Actions to Update and Implement the Bay-Delta Plan, December 8, 2021, available online at: https://www.waterboards.ca.gov/waterrights/water_issues/programs/bay_delta/docs/20211207-slides-for-12-08-bay-delta-plan-inform-item_accessible.pdf. This document is incorporated by reference.

USACE and State Water Board."); 9-18 ("All land cover type acreages are preliminary and subject to revision based on pedestrian surveys once access has been granted to the study area, particularly for the wetland and non-wetland water types, which are subject to change pending field review and verification by the USACE and State Water Board.").

Not only are the land cover type estimates that form the basis for the RDEIR/SDEIS's analysis of impacts to vegetation, wetlands, and wildlife "preliminary" and seemingly subject to radical revisions based on future field survey, the RDEIR/SDEIS admits they are unreliable. Appendix 10-B provides information about the models and methods used for defining wildlife habitats in the project area. It describes "habitat model limitations" for each species or species group analyzed and explains that "[t]he model is limited primarily by the accuracy of aerial imagery interpretation and the inability to ground truth the land cover mapping." RDEIR/SDEIS at 10B-3. For each species group, it then provides further details about the model's limitations. For example, for vernal pool branchiopods, it explains:

> Vernal pool habitat must be inundated sufficiently by rainfall at the appropriate time of year to allow vernal pool branchiopods to reach maturity and reproduce; if the availability of aerial imagery is limited or the resolution is poor, it may not be possible to accurately determine the sufficiency of ponding. Additionally, very small seasonal wetlands that could provide suitable habitat may not be visible on aerial imagery. Other parameters that affect the habitat suitability for vernal pool branchiopods that are not measurable using aerial imagery review include water quality, ponding depth, and water temperature (U.S. Fish and Wildlife Service 2005:xiii, xiv).

RDEIR/SDEIS at 10B-3. In combination, the descriptions of the modeling limitations make clear that the RDEIR/SDEIS's modeling of vegetation, wetlands, and wildlife is extremely coarse, inaccurate, unreliable, and not verified with any on-the-ground survey information. Yet this modeling is the basis for the RDEIR/SDEIS's description of the environmental setting and the basis for its analysis of impacts for these resource areas.

The coarse nature of the models used in the RDEIR/SDEIS obscures the existence, extent, and location of particularly sensitive habitats, denying the public the opportunity to understand and comment on the project's true impacts. For example, the RDEIR/SDEIS groups vernal pools and alkali wetlands along with several other wetland types under a category called "seasonal wetlands" in the description of the environmental setting and associated maps. Vernal pools and alkali wetlands are special types of seasonal wetlands that are a high priority for conservation because so few remain. But the RDEIR/SDEIS only provides location information for the broader category of "seasonal wetlands" and does not show the specific locations of vernal pools or alkali wetlands. Instead, it notes that "[a]dditional refinement of the mapping, including the resource boundaries and types (e.g., seasonal wetlands that are vernal pools or alkali wetlands) will be developed in coordination with agencies and with onsite surveys during the permitting process." RDEIR/SDEIS at 9B-10. Deferring mapping of habitat types that are of critical conservation concern until after the NEPA and CEQA process makes it impossible for the public to understand and meaningfully comment on the project's impacts.

The RDEIR/SDEIS indicates that, in addition to the modeling based on areal imagery, information on the extent and location of vegetation, wetland, and wildlife resources is also based on surveys conducted in 1998 and 2003. *See, e.g.,* RDEIR/SDEIS at 9-3. However, we are unable to discern how the old survey data are integrated into the description of the environmental setting or the impacts analysis, and it is not clear that they are integrated at all. *See, e.g.,* RDEIR/SDEIS at 10-7 (suggesting that the previous surveys were too old and therefore not used). To the extent the old survey data were used, reliance on them is problematic for all of the reasons discussed in our comments on the 2017 DEIR/DEIS, including because climate change is altering temperature and hydrologic patterns in the Sacramento Valley in a manner that impacts wildlife habitat suitability. *See also* CDFW Comments on 2017 DEIR/DEIS at 19 ("Botanical surveys were conducted in 1998 and 1999 within the reservoir footprint, and in 2000 through 2003 for potential conveyance routes, recreation areas, and road relocations. These surveys are out of date. CDFW recommends resurveying all areas associated within the Project area that would be impacted.").

The RDEIR/SDEIS's reliance on coarse and inaccurate habitat modeling (and potentially also on old survey data) is particularly problematic because more accurate approaches were available. For example, the lead agencies could have conducted on-the-ground surveys. The RDEIR/SDEIS explains that the lead agencies had to rely on coarse modeling based on areal imagery because "[p]roperty access restrictions to most of the Project area precluded field investigations of vegetation and wetland resources in the study area." RDEIR/SDEIS at 9-8. However, project proponents were able to gain access to survey 75 percent of the study area between 1998 and 2003, and the RDEIR/SDEIS indicates that they did so by seeking court orders to access properties. RDEIR/SDEIS at 9-8, 3-4. The lead agencies also "pursued targeted access in recent years to support environmental clearance for geotechnical investigations." RDEIR/SDEIS at 3-4 to 3-5. It seems that the lead agencies could have found a way to access the project area to conduct meaningful surveys for vegetation, wetlands, and wildlife—as they have in the past and did recently for geotechnical investigations—but chose not to prioritize access to the project area for these surveys. *See City of Agoura Hills*, 46 Cal.App.5th at 692-93 (use of outdated plant surveys violated CEQA, where document discussed future surveys but there was no showing that it was infeasible to perform these surveys prior to project approval so that the document could provide an accurate assessment of impacts).

The proponents also failed to consider other approaches that could have yielded more accurate information about the environmental setting, in order to accurately assess the environmental impacts of the proposed project and alternatives. For example, the RDEIR/SDEIS discusses conducting helicopter surveys to assess nest occupancy for golden eagles in the future. RDEIR/SDEIS at 10-97 to 10-98. The lead agencies could have, but did not, conduct helicopter surveys to inform the analysis in the RDEIR/SDEIS for golden eagles and perhaps other species as well. There are also detailed habitat suitability maps for some species that overlap with the project area and that do not appear to have been considered in the RDEIR/SDEIS. For example, Attachment A to the *2015 Programmatic Formal Consultation for Bureau of Reclamation's Proposed Central Valley Project Long Term Water Transfers (2015-2024) with Potential Effects on the Giant Garter Snake within Sacramento Valley, California* includes a habitat suitability map and maps of priority habitat areas for giant garter snakes. Inclusion of relevant information from these maps—and similar information for other species—in the description of the environmental setting would have helped to provide a more meaningful understanding of the project's likely impacts to giant garter snakes and other sensitive wildlife.

The coarse and inaccurate discussion of the presence and location of vegetation, wetlands, and wildlife in the project area render the discussion of the project's environmental setting unreliable. As discussed further below, this undermines the analysis of impacts for these resource areas in a manner that makes it impossible for the public to understand the nature and extent of the project's impacts and deprives the public of an opportunity to meaningfully comment on alternatives. For these reasons, the RDEIR/SDEIS violates CEQA and NEPA, and the lead agencies must recirculate a revised draft EIS/EIR for public comment after conducting accurate surveys of vegetation, wetlands, and wildlife in the project area.

V. The CALSIM Modeling Used in the RDEIR/SDEIS to Analyze Potential Environmental Impacts Appears to be Significantly Flawed, Making all of the Analyses Questionable

It appears that the CALSIM modeling that is used in the RDEIR/SDEIS is significantly corrupted and flawed, raising serious questions about the accuracy of the analyses in the RDEIR/SDEIS. For instance, the modeling shows that, as compared to the No Action Alternative, Alternative 1A results in diversions of Sacramento River flows greater than 1,000 cfs on average in January (in Wet and Above Normal water years), February (in Wet, Above Normal, and Below Normal water years), and March (in Wet, Above Normal, Below Normal, and Dry water years). RDEIR/SDEIS at Table 5B1-3-1c. Similarly, the modeling shows that these diversions for Sites Reservoir under Alternative 1A would reduce flows in the Sacramento River at Hamilton City by more than 1,000 cfs in January (in Wet and Above Normal water years), February (in Wet, Above Normal, and Below Normal water years) and March (in Wet, Above Normal, Below Normal, and Dry water years). RDEIR/SDEIS at Table 5B2-13-1c. Yet inexplicably, the modeling in the RDEIR/SDEIS shows that diversions to Sites under Alternative 1A would cause substantially less reduction in flows in the Sacramento River at Wilkins Slough, with reductions in flow greater than 1,000 cfs only in March (Above Normal and Below Normal water years). *Id*. at Table 5B2-14-1c. Similarly, there is much less of a reduction in flow in the Sacramento River at Freeport under Alternative 1A. *Id*. at Table 5B3-1-1c (showing flow reduction is greater than 1,000 cfs only in March (in Above Normal, Below Normal, and Dry water years). But Alternative 1A results in reductions in Delta outflow that are greater than 1,000 cfs in January (in Wet and Above Normal water years), February (in Wet, Above Normal, and Below Normal water years), and March (in Wet, Above Normal, Below Normal, and Dry water years). *Id*. at Table 5B3-5-1c.

	January (Wet year)	February (Wet year)	March (Wet year)
Total Sites Diversions	1,287	1,426	1,114

Hamilton City	-1,264	-1,418	-1,128
Wilkins Slough	-310	-254	-483
Freeport	-492	-454	-582
Delta outflow	-1,298	-1,332	-1,131

Sources: Table 5B1-3-1c (Total Sites Diversions), Table 5B2-13-1c (Hamilton City), Table 5B2-14-1c (Wilkins Slough), Table 5B3-1-1c (Freeport), and Table 5B3-5-1c (Delta outflow)

The modeling indicates that Alternative 1 reduces flows in the Sacramento River at Hamilton City and Delta outflow by similar amounts, but causes far lesser reductions in flow between these points. The modeling also shows that flows through the Yolo Bypass are reduced as a result of the proposed project and do not account for the change in flow between Freeport and Delta outflow. RDEIR/SDEIS at Table 5B3-3-1c. These results do not appear to be credible, and the RDEIR/SDEIS does not provide any explanation why the reduction in flow upstream caused by diversions under the proposed project and alternatives would not result in similar reductions in flow at other locations downstream.[10]

In addition, the RDEIR/SDEIS provides entirely inconsistent results of the effects of diversions to Sites under Alternative 1A on flows in the Sacramento River at Wilkins Slough. *Compare RDEIR/SDEIS at Table 5B2-14-1c with id*. at Table 5C-9-1c. These two tables should show identical results because they are comparing the same alternatives, but they do not.

Table 5C-9-1c. Sacramento River Flow at Wilkins Slough, Alternative 1A 011221 minus No Action Alternative 011221, Monthly Flow (cfs)

Statistic	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
Probability of Exceedance												
10%	0	-50	-273	-299	-236	-379	-1,461	-113	-252	79	98	-112
20%	-12	-350	-268	-1,180	-355	-290	-1,032	-36	116	359	39	84
30%	81	42	-393	-1,087	-1,256	-1,020	-46	-41	-231	349	161	79
40%	132	-80	-563	-571	-815	-2,128	-87	-190	-239	267	91	37
50%	223	-109	-279	-454	-593	-1,520	-65	-58	-51	213	311	422
60%	351	-299	-390	-456	-517	-1,325	-29	-107	-10	511	132	371
70%	245	-200	-91	-35	6	-980	-119	-79	-62	53	114	182
80%	332	-31	-167	-99	-306	-826	-100	-74	16	164	80	224
90%	139	-65	-118	-254	-175	70	9	-158	-90	269	127	196
Long Term												
Full Simulation Period[a]	121	-106	-234	-403	-469	-774	-236	-201	-139	249	138	129
Water Year Types[b,c]												
Wet (32%)	-165	-200	-176	-437	-391	-541	-490	-253	-201	-29	-119	-41
Above Normal (15%)	56	-162	-267	-726	-771	-1,286	-216	-98	-176	51	-33	24
Below Normal (17%)	155	-8	-112	-460	-710	-1,119	-175	-26	-163	133	60	117
Dry (22%)	220	-25	-219	-258	-407	-835	-69	-148	-71	689	634	370
Critical (15%)	617	-83	-494	-157	-148	-274	-24	-475	-38	524	217	251

[10] The RDEIR/SDEIS shows that this is not the result of releases from Sites, as there is on average only 1 cfs of releases from Sites in January, 0 cfs in February, and 2 cfs in March. *See* RDEIR/SDEIS at Table 5B1-6-1c.

Table 5B2-14-1c. Sacramento River at Wilkins Slough Flow, Alternative 1A 011221 minus No Action Alternative 011221, Monthly Flow (cfs)

Statistic	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
Probability of Exceedance												
10%	-62	39	-137	-432	-121	-1	-614	-564	-626	10	84	-15
20%	14	-638	6	-326	-482	-489	-185	123	-264	413	62	104
30%	54	-298	7	-1,282	-622	-892	1	32	0	326	201	87
40%	372	-144	141	-497	-815	-1,271	-48	-186	-2	256	168	-5
50%	300	21	-554	-503	-502	-1,812	122	-171	81	274	416	435
60%	221	-46	-4	-434	-551	-1,537	-27	-190	-277	578	190	376
70%	171	-187	-330	-198	-161	-631	143	-304	-207	37	90	180
80%	184	196	-37	-103	-243	-491	-187	-299	162	286	-11	349
90%	193	184	141	2	-75	-542	-59	-381	-217	326	28	125
Long Term												
Full Simulation Period[a]	108	-72	-124	-318	-351	-757	-193	-216	-121	278	142	146
Water Year Types[b,c]												
Wet (32%)	-164	-334	-56	-310	-254	-483	-511	-200	-231	-11	-88	-30
Above Normal (15%)	69	-18	-134	-515	-367	-1,108	-90	-160	-213	57	-34	32
Below Normal (17%)	149	142	-86	-398	-618	-1,212	-105	-171	-173	163	52	129
Dry (22%)	193	53	7	-239	-387	-885	-5	-141	10	753	623	376
Critical (15%)	558	3	-505	-163	-182	-279	10	-472	75	545	201	315

Finally, the Daily Divertible and Storable Flow Tool fails to include any Above Normal years, which results in a failure to adequately analyze potential impacts to salmon. RDEIR/SDEIS Attachment 11P-1 (describing Daily Divertible Flow Tool). This tool uses 2009-2018 hydrology, a period which contains no Above Normal years. There are only two Wet years during this period, and the tool identified significant impacts to salmon in both of these years. RDEIR/SDEIS at 11P-4. While the RDEIR/SDEIS suggests that mitigation Measure FISH-2.1 could reduce impacts to salmon from the project diversions, it shows that the project's impacts are not fully mitigated in one of those two years (2011) and would still result in reduced salmon survival through the Delta. *Id*. at 11P-8. In addition, because hydrologic conditions in 2011 are similar to that of Above Normal years, it indicates that unmitigated impacts are likely to occur in Above Normal years and other years similar to 2011. The decision to exclude Above Normal years from the analysis means that possible significant impacts in Above Normal years are unknown, and the RDEIR/SDEIS fails to analyze the effectiveness of Project Mitigation Measure FISH-2.1 in Above Normal years. Therefore, the RDEIR/SDEIS must be revised to include analysis of Above Normal years, such as 2000, 2003, and 2005.

The CALSIM modeling in the RDEIR/SDEIS is internally inconsistent and limited, and appears to be flawed and corrupted. All analyses in the RDEIR/SDEIS that use CALSIM to assess the effects of the project are unreliable.

VI. <u>The RDEIR/SDEIS Fails to Accurately Analyze Environmental Impacts and Fails to Disclose Significant Adverse Environmental Impacts of the Proposed Project and Alternatives</u>

(A) The RDEIR/SDEIS Fails to Accurately Assess Environmental Impacts Because it Ignores Changes in Flow or Storage Less Than 5 or 10 Percent

The RDEIR/SDEIS' analysis of significant environmental impacts violates NEPA and CEQA because it assumes that changes in flow or storage less than 5 percent and/or 10 percent are insignificant. However, changes in flow and/or storage less than 5 percent or 10 percent frequently results in these levels dropping below key thresholds relating to the survival of native fish species, including species listed under the California Endangered Species Act ("CESA") and the federal Endangered Species Act ("ESA"). As a result, even changes in flow or storage levels that are a less than 5 percent change from the baseline clearly can and do cause significant adverse impacts to native fish species. Moreover, for salmon and other species, reductions in flow less than 5 percent have synergistic impacts that can be devastating for these species, as reduced flows reduce survival in multiple reaches of the Sacramento River and through the Delta, resulting in cumulatively significant reductions in survival. As a result, the RDEIR/SDEIS fails to disclose significant impacts of the proposed project and alternatives to species listed under CESA and the ESA, for which mandatory findings of significance are warranted. The RDEIR/SDEIS must be revised to eliminate the assumption that changes in flow or storage less than 5 percent and less than 10 percent are insignificant.

The RDEIR/SDEIS claims that the CALSIM model is not accurate enough to assess changes in flow or storage less than 5 percent, stating that,

> Incremental flow and storage changes of 5% or less in modeled results are generally considered within the standard range of uncertainty associated with model processing. Therefore, for the purposes of the impact analysis, flow changes of 5% or less were considered to be similar to the NAA for comparative purposes. Changes in flow exceeding 10% were considered to represent a potentially meaningful difference.

RDEIR/SDEIS at 11-57. These 5 percent and 10 percent thresholds of significance are arbitrary, inconsistent with other NEPA/CEQA documents prepared by Reclamation, and not supported by substantial evidence. Moreover, to the extent that CALSIM 2 fails to accurately assess impacts, the RDEIR/SDEIS fails to explain why it does not use the CALSIM 3 model, which has been publicly released by DWR and incorporates more recent hydrological data.

First, the RDEIR/SDEIS provides no justification for why changes in flow less than the 10 percent threshold would not be considered a potentially meaningful difference. The lack of any explanation for this assumption regarding the 10 percent threshold makes it plainly arbitrary and capricious.

Second, the justification for the 5 percent threshold is also irrational and not supported by substantial evidence. Because CALSIM modeling is used in a comparative manner (meaning that it is used to model conditions under both the environmental baseline and action alternatives), there is no need for the 5 percent or 10 percent thresholds. Importantly, there is no basis to conclude that Sacramento River flow reductions due to diversions to storage under the proposed project are an illusory modeling artifact; instead, reduced flow in the Sacramento River is an inevitable and necessary consequence of diverting water from the Sacramento River to fill Sites Reservoir. While the CALSIM model does have significant flaws, failing to disclose changes in flow that are 5 percent (or 10 percent) or less as a significant impact misleads the public and decisionmakers. In fact, other CEQA/NEPA documents that use CALSIM modeling do not use a 5 percent or 10 percent thresholds for determining whether changes in flow or storage constitute a significant impact. For instance, the final CEQA/NEPA documents for the California WaterFix project did not use these thresholds, and the RDEIR/SDEIS provides no reasoned explanation why these assumptions are necessary since they have been omitted from other CEQA/NEPA analyses where CALSIM is used.

Third, the RDEIR/SDEIS does not consistently employ these thresholds. If a 5 percent change is significant, then to avoid impacts the project could simply limit diversions to levels that produce a less than 5 percent change in flow, yet it fails to do this. In addition, changes in Delta outflow from the proposed project are generally less than 5 percent, *see* RDEIR/SDEIS at Table 5B3-5-1a, yet as the RDEIR/SDEIS admits, the reduction in abundance of Longfin Smelt that results from reduced Delta outflow would be a significant impact requiring mitigation, *see id*. at 11-271.

Fourth, using these 5 percent and 10 percent thresholds results in the RDEIR/SDEIS failing to disclose significant environmental impacts for which mitigation is required. For instance, the RDEIR/SDEIS claims that the project and alternatives would cause a significant impact to winter-run Chinook salmon if diversions by the proposed project or alternatives caused flows in the Sacramento River to drop below 10,700 cfs. RDEIR/SDEIS at 11-130 to 11-131. However, because the RDEIR/SDEIS assumes that a 5 percent reduction in flows in the Sacramento River is simply a modeling artifact and not a real change, the RDEIR/SDEIS would not identify operations that reduce flows by 4 percent, but drop below 10,700 cfs, as a significant effect. Similarly, although the IOS life cycle model used in the RDEIR/SDEIS finds that on average, winter-run Chinook salmon escapement is 3 percent lower under Alternative 1A and 4 percent lower under Alternative 1B, with greater reductions in escapement in wetter water year types, *see* RDEIR/SDEIS at 11-128, the RDEIR/SDEIS wrongly concludes this is a less than significant effect.[11]

Similarly, the use of arbitrary thresholds for identifying significant impacts is inconsistent with the CEQA guidelines, which require a mandatory finding of significance if a project would "cause a fish or wildlife population to drop below self-sustaining levels" or "substantially reduce the number or restrict the range of an endangered, rare or threatened species." Cal. Code Regs., tit. 14, § 15065(a)(1). Where, as here, populations of winter-run Chinook salmon, Longfin Smelt, Delta Smelt, and other species are below self-sustaining levels, any further impacts that causes those populations to further drop below self-sustaining levels is a per se significant impact

[11] As the RDEIR/SDEIS admits, the OBAN model does not account for the flow:survival relationship in the Sacramento River, RDEIR/SDEIS at 11-129 to 11-130, and therefore the OBAN model does not provide an accurate assessment of the effects of the proposed project and alternatives on salmon. Similarly, the SALMOD model does not accurately assess the effects of the proposed project and alternatives, including because it does not account for the flow:survival relationships in the Sacramento River and through the Delta; SALMOD is an outdated and discredited model should not be relied upon.

under CEQA requiring mitigation.[12] As one example, the RDEIR/SDEIS finds, using the IOS life cycle model, that Alternative 1A would reduce the long-term abundance of winter-run Chinook salmon by 3 percent on average, as a result of reducing survival through the Sacramento River by 1 percent and through the Delta by 1-2 percent. RDEIR/SDEIS at 11-128 to 11-129. The population of winter-run Chinook salmon is not self-sustaining under baseline conditions, and the impact of Alternative 1A is therefore per se a significant impact requiring mitigation. Cal. Code Regs., tit. 14, § 15065(a)(1).

The RDEIR/SDEIS fails to accurately analyze environmental effects and disclose significant environmental impacts because of the use of these arbitrary 5 percent and 10 percent thresholds. The RDEIR/SDEIS must be revised to exclude these improper assumptions regarding the effects of the proposed project and alternatives.

(B) <u>The RDEIR/SDEIS Fails to Accurately Analyze Environmental Impacts to Winter-Run Chinook salmon and Fails to Disclose Significant Impacts of the Proposed Project</u>

The RDEIR/SDEIS erroneously claims that the proposed project and alternatives will not cause significant environmental impacts to winter-run Chinook salmon; however, this conclusion is based on flawed and internally inconsistent analyses that fail to accurately assess the likely impacts of the proposed project and alternatives. The proposed mitigation measure FISH-2 fails to mitigate impacts to winter-run Chinook salmon, and the proposed project and alternatives will cause reduced survival and abundance of winter-run Chinook salmon, which is a significant impact in light of the fact that the species is declining and is not self-sustaining under baseline conditions. Cal. Code Regs., tit. 14, § 15065(a)(1). The RDEIR/SDEIS must be revised to accurately characterize impacts to winter-run Chinook salmon and to identify adequate mitigation measures that eliminate significant impacts to winter-run Chinook salmon.

(i) The RDEIR/SDEIS Fails to Disclose Significant Environmental Impacts to Winter-Run Chinook Salmon Caused by Reduced Flows in the Sacramento River Due to Incorrect Assumptions Regarding Migration Timing

Although the RDEIR/SDEIS acknowledges the scientific evidence demonstrating that reduced flows in the Sacramento River as a result of diversions to fill Sites Reservoir will reduce the survival of migrating juvenile salmon, the RDEIR/SDEIS concludes that mitigation measure FISH-2 will reduce these impacts to a less than significant level. *See* RDEIR/SDEIS at 11-130 to 11-131. This conclusion is arbitrary and capricious because mitigation measure FISH-2 applies only in the months of March to May, whereas winter-run Chinook salmon juveniles migrate past the diversion points for Sites Reservoir from October to May.

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[12] In addition, we note that CESA requires that the impacts of the project on listed species be fully mitigated and not jeopardize the continued existence of the species, *see* Cal. Fish and Game Code § 2081, regardless of whether those impacts are designated as significant under CEQA.

The RDEIR/SDEIS admits that diversions to Sites Reservoir that reduce flows in the Sacramento River at Wilkins Slough below 10,700 cfs would reduce the survival of winter-run Chinook salmon and constitute a significant environmental impact. *Id*. at 11-130 to 11-131. Numerous peer reviewed scientific studies have demonstrated a strong flow:survival relationship for juvenile salmon migrating down the Sacramento River, such that reduced flows as a result of diversions by Sites Reservoir would reduce the survival of juvenile salmon. *See, e.g.*, Michel et al. 2015; Cordoleni et al. 2017; Notch 2017; Henderson et al. 2018; Michel 2018; Michel et al. 2021).

The RDEIR/SDEIS claims that mitigation measure FISH-2, which prohibits diversions for Sites Reservoir when Sacramento River flows are less than 10,700 cfs at Wilkins Slough between March to April, would reduce these impacts to a less than significant impact while salmon are rearing or migrating downstream toward the Delta. RDEIR/SDEIS at 11-130 to 11-131 ("Mitigation Measure FISH-2.1 will limit the potential for negative flow-survival effects to winter-run Chinook salmon during their dispersal to rearing habitat and/or migration downstream toward the Delta"). However, as the RDEIR/SDEIS admits, winter-run Chinook salmon migrate past the diversion points for Sites Reservoir (at the Red Bluff Diversion Dam and at Hamilton City) and past Wilkins Slough well before the month of March, which is when the protections provided by FISH-2 would begin, and they are generally migrating out of the Delta between December and May. *See* RDEIR/SDEIS at 11-79 to 11-80 (noting that half of the annual migration of juvenile winter-run Chinook salmon have passed the Red Bluff Diversion Dam before late October and 90 percent before January 1; noting that winter-run Chinook salmon are caught in Knights Landing rotary screw traps between mid-September to mid-March, with the bulk of the run (90 percent) generally passing between early October to mid-March; noting that winter-run Chinook salmon are generally caught in the Chipps Island trawls between December 1 and May); *see id*. at 11-124 ("the main period of juvenile winter-run Chinook salmon occurrence in the Delta (i.e., December–April")). Indeed, most migrating juvenile Chinook salmon, including nearly all juveniles of the winter-run and late-fall run, will not be protected by this bypass flow requirement as most of these fish have migrated downstream of Knights Landing before March. *See* Williams 2006; NMFS 2019 BiOp at 67-68, 83-84; Munsch et al. 2019 at Figure 3; RDEIR/SDEIS at 11-120.

In other words, mitigation measure FISH-2 will limit pumping that reduces flows in the Sacramento River below 10,700 cfs only ***after*** winter-run Chinook salmon have already migrated downstream to the Delta, and as a result this mitigation measure wholly fails to protect juvenile winter-run Chinook salmon from the harmful effects of the proposed project and alternatives as they migrate down the Sacramento River. The RDEIR/SDEIS' conclusion that the proposed project and alternatives will not cause significant environmental impacts to winter-run Chinook salmon is arbitrary and capricious, and the document must be revised to include adequate mitigation measures that apply when winter-run Chinook salmon are migrating down the Sacramento River.

(ii) The RDEIR/SDEIS Fails to Disclose Significant Environmental Impacts to Winter-Run Chinook Salmon Caused by Reduced Flows in the Sacramento River Because it Misapplies Recent Scientific Studies

Citing recent research demonstrating strong and positive flow-survival relationships for juvenile Chinook salmon, the RDEIR/SDEIS acknowledges that diversions to Sites Reservoir have the potential to reduce Sacramento River instream flows and survival of juvenile salmonids, including winter-run Chinook salmon (RDEIR/SDEIS at p. 11-119). The proposed project includes Mitigation Measure FISH-2.1 which would prevent project diversions from reducing Sacramento River flow below 10,712 cfs at Wilkins Slough during March, April, and May. Above this flow, survival of juvenile Chinook salmon studied by Michel et al. (2021) averaged just over 50 percent in a particular reach of the Sacramento River; below this threshold survival dropped dramatically to 18.9 percent in the same reach.

Michel et al. (2021) measured the effect of flow on survival for a subset of migrating Chinook salmon through a portion of their freshwater life cycle. They measured survival rates downstream of where egg-to-fry survival is measured and upstream of the lower Sacramento River and Delta, where additional mortality occurs; their study focused on juvenile Chinook salmon that are larger than 75mm long. To put their results in context, typical freshwater survival (from egg stage to the outmigrating smolt stage) for Chinook salmon across their range is approximately 10 percent (Quinn 2005; SEP 2019). In the Sacramento River, egg-to-fry survival between 2002 and 2018 averaged 24.4 percent for winter-run Chinook salmon and 13.7 percent for fall-run Chinook salmon (Voss and Poytress 2020). Thus, under current conditions, attaining species-typical survival rates for Chinook salmon is challenging in many years even if survival is 50 percent in the reach that contains Wilkins Slough. It is therefore essential to the viability of Sacramento River Chinook salmon runs that survival in this reach be maximized whenever possible.

However, the proposed flow threshold in this mitigation measure is inadequate to prevent significant impacts to Sacramento River Chinook salmon runs.

First, diversions that reduce Sacramento River flows to the proposed threshold may reduce survival of migrating juvenile Chinook salmon in the size class studied by Michel et al. (2021). Although this study found strong evidence of decreased survival at flows <10,712 cfs, very few observations were made for flows between 14,000 and 21,000 cfs (Figure 3); the effects of reducing flow on survival are less certain in this range and it is quite possible that survival benefits of flows above 10,712 cfs were not detected by Michel et al. (2021). The best available science (including Michel et al. 2015; Henderson et al. 2018; Michel 2019; Munsch et al. 2020; Notch et al. 2020) suggests that decreasing flows in this reach of the Sacramento River (by diverting water to Sites Reservoir) when flows are between 10,712 and approximately 20,000 cfs will reduce survival of Chinook salmon juveniles.

Second, the bypass flow requirement is based around the success of relatively large migrating juvenile Chinook salmon. Diverting flows above the proposed threshold may cause significant negative effects for the much larger portion of the juvenile Chinook salmon population that measures less than 75mm in fork length. Michel et al. (2021) used sonic tags to track survival and movements of the fish they studied; their flow results apply only to fish large enough to carry a sonic tag. Migration behavior and habitat use of juvenile salmon varies with size (Quinn 2005; Williams 2006), so it is highly likely that increasing flow rates benefit smaller fish in ways and at levels that differ from those detected among the large fish studied by Michel et al. (2021). In fact, several other recent studies have documented continuous increases in survival and abundance as Sacramento River flows increase (Michel 2019; Notch et al. 2020); similar continuous positive relationships have been found among Chinook salmon in the San Joaquin River and its tributaries (SEP 2019). Furthermore, Munsch et al. (2019) identified a Sacramento River flow threshold associated with high likelihood of detection of small juvenile Chinook salmon ("fry"; greater than 55mm) in the Delta; they also found that abundance of fry increased continuously with increasing flows. Therefore, it is likely that reducing Sacramento River flows in a range above ~10,712 cfs will reduce survival rates among a significant portion of migrating juvenile Chinook salmon.

Third, the proposed flow bypass mitigation allows no margin for error and is thus likely to result in frequent loss of real survival benefits ascribed to the greater than or equal to 10,712cfs flow threshold. The bypass requirement allows flows to be reduced to exactly the threshold identified by Michel et al. (2021), despite known levels of uncertainty around this parameter estimate. Whereas the benefit of flows above 10,712 cfs is believed to be all-or-nothing (i.e., it is a threshold), errors in estimating that threshold, measuring actual flows in the river, or changes in the threshold from year-to-year or among salmonid populations (e.g., spring-run v. fall-run) could lead to the elimination of all positive effects of this proposed mitigation. In fact, Michel et al. (2021) estimate uncertainty around their flow threshold (at p. 9, Figure 4), and, as with any ecological study, the results are drawn only from a limited number of real-world situations that may not fully characterize natural variability in the flow-survival relationship. As the RDEIR/SDEIS acknowledges (at 11-130): "There is some uncertainty in the modeled flow-survival effects and in the ability to limit potential effects with real-time operational adjustments." These uncertainties must be factored into bypass flow mitigation by raising the threshold by a safety factor that accounts for environmental variability and measurement error.

In addition, the RDEIR/SDEIS' analysis of riverine survival of salmon is flawed and fails to accurately assess environmental impacts because it does not model or analyze the effects of the proposed project and alternatives. First, the RDEIR/SDEIS' analysis of the effects of reduced flows on salmon survival only considers the effects of water diversions on salmon survival in the Sacramento River between January 1 to May 31. *See* RDEIR/SDEIS at 11P-3. However, the vast majority of winter-run Chinook salmon have migrated past Red Bluff Diversion Dam (the upstream diversion point for Sites Reservoir) before January 1 in many years. *See id*. at 11-79 to 11-80. Thus, the analysis in the RDEIR/SDEIS ignores the effects of reduced flows caused by diversions for the proposed project and alternatives that affects the vast majority of winter-run

Chinook salmon, even though the proposed project and alternatives can divert water during these months. Second, the RDEIR/SDEIS' analysis of the effects of reduced flows on salmon survival includes operational restrictions (such as a prohibition on diversions when Delta outflow is less than 44,500 cfs during the months of March to May) that are more protective than, and not included in, the proposed project and alternatives. *Compare* RDEIR/SDEIS at 11P-2 to 11P-3 *with id*. at 2-31, 5A1-29 to 5A1-30, 5A2-28 to 5A2-33. Third, the RDEIR/SDEIS' analysis in Appendix 11P assumes that the proportion of salmon migrating down the Sacramento River on a daily basis is the same proportion that passed the Red Bluff sampling station, but acoustic tag data shows a wide variation in the speed of juvenile salmon migration between Red Bluff and Knights Landing (Klimley et al. 2017); without this assumption, the analysis shows significantly greater reductions in survival of juvenile salmon. *See* RDEIR/SDEIS at 11P-5. As a result of these flawed assumptions, the RDEIR/SDEIS fails to accurately analyze the effects of the proposed project and alternatives.

(iii) The RDEIR/SDEIS Fails to Disclose Significant Environmental Impacts to Winter-Run Chinook Salmon Caused by Reduced Flows in the Lower Sacramento River and Delta

The RDEIR/SDEIS' analysis of the effects of the proposed project and alternatives on the survival of juvenile winter-run Chinook salmon through the lower Sacramento River and Delta also fails to accurately assess impacts and fails to disclose significant impacts from the proposed project and alternatives. As the RDEIR/SDEIS acknowledges, there is a strong flow:survival relationship in several reaches in the Delta, and reductions in instream flow results in reduced survival of juvenile salmon. Perry et al. 2018; *see* RDEIR/SDEIS at 11-123 to 11-124. The RDEIR/SDEIS claims that diversions to Sites Reservoir under the proposed project would result in small changes in survival of salmon migrating through the Delta. RDEIR/SDEIS at 11-124 to 11-125. However, this analysis is misleading to the public and decisionmakers, and it fails to disclose significant environmental impacts to winter-run Chinook salmon that would result.

First, because the RDEIR/SDEIS' modeled effects of the proposed project and alternatives on flows in the Sacramento River at Freeport is inaccurate (estimating smaller reductions in flow than would actually occur under the proposed project and alternatives), *see supra* Section V, the assessment of effects on survival of salmon through the Delta is likewise inaccurate, underestimating the adverse impacts to winter-run Chinook salmon that are likely to occur.

Second, the RDEIR/SDEIS analyzes the reductions in survival through the Delta using the Perry et al. 2018 model, averaged by month and water year type. RDEIR/SDEIS at 11-124. This analysis is misleading because it does not present the annual results – the effects of reduced survival over the course of the year for juvenile salmon that are migrating downstream. The RDEIR/SDEIS also shows that juvenile winter-run Chinook salmon survival through the Delta would be reduced by 1-2 percent under Alternative 1A, based on the IOS model. RDEIR/SDEIS at 11-129. In light of the status of the species, this constitutes a significant impact under CEQA that is not disclosed in the RDEIR/SDEIS.

Equally important, the effects of the proposed project in reducing survival of juvenile winter-run Chinook salmon migrating through the Delta can be far greater when Sites diverts more water from the Sacramento River than in an average water year, which is what is disclosed in Table 11-16. Unlike the analysis of riverine survival in the RDEIR/SDEIS, the analysis of through-Delta survival of salmon only evaluates effects using average water diversions from the Sacramento River by water year type. RDEIR/SDEIS at Table 11-16; id. at Table 11J-1. Annual water diversions by the proposed project and alternatives used in the RDEIR/SDEIS are approximately 344,000 acre feet in a Wet year and 354,000 acre feet in an Above Normal water year type. *See* RDEIR/SDEIS at Table 5B1-3-1c. Yet in wetter water years like 2017, Sites can divert more than 1 million acre feet of water under the proposed operating criteria. *See* Sites Reservoir Project, 2021 Water Estimate, May 28, 2021, at 8 (attached hereto as Exhibit 1). The RDEIR/SDEIS fails to analyze the effects of diversions greater than the average for that water year type, where the reductions in survival through the Delta are likely to be substantially higher as a result of greater reductions in flow at Freeport. *See* Perry et al. 2018; RDEIR/SDEIS at Fig. 11J-1. Reduced survival is the clear consequence of the flow: survival relationship and inadequate operational criteria that are proposed.

The RDEIR/SDEIS' analysis of the effects of the proposed project and alternatives on the survival of winter-run Chinook salmon through the Delta must be revised to incorporate accurate modeling of project operations and to disclose the higher reductions in survival that result in years with greater than average levels of water diversions.

(iv) The RDEIR/SDEIS Fails to Disclose Significant Environmental Impacts to Winter-Run Chinook Salmon

Taken together, the RDEIR/SDEIS shows that the proposed project and alternatives will reduce the abundance of winter-run Chinook salmon, which are listed as endangered under CESA, and will cause winter-run Chinook salmon to drop further below self-sustaining levels. This constitutes a significant impact under CEQA. Cal. Code Regs., tit. 14, § 15065(a)(1).

The RDEIR/SDEIS finds, using the IOS life cycle model, that Alternative 1A causes an average 3 percent reduction in adult abundance (escapement) of winter-run Chinook salmon, as a result of Alternative 1A reducing juvenile survival through the Delta by 1-2 percent and reducing juvenile survival through the Sacramento River by 0-1 percent. RDEIR/SDEIS at 11-128 to 11-129. As described above, these are likely substantial underestimates of the project's impacts; however, even assuming for the sake of argument that they are accurate, in light of the fact that winter-run Chinook salmon are listed as endangered and their population is below self-sustaining levels, these additional reductions in survival and abundance are per se significant impacts requiring mitigation. Cal. Code Regs., tit. 14, § 15065(a)(1). The RDEIR/SDEIS must be revised to disclose this significant impact and to identify adequate mitigation measures that eliminate significant impacts.

(C) The RDEIR/SDEIS Fails to Accurately Analyze Environmental Impacts to Spring-Run Chinook Salmon and Fails to Disclose Significant Impacts of the Proposed Project

As with winter-run Chinook salmon, the RDEIR/SDEIS fails to adequately analyze impacts of the proposed project and alternatives on spring-run Chinook salmon and fails to disclose significant impacts that are likely to occur under the proposed project and alternatives.

First, proposed mitigation measure FISH-2 fails to adequately protect spring-run Chinook salmon from the significant impacts of diversions by Sites Reservoir because substantial numbers of spring-run Chinook salmon would have already migrated down the Sacramento River and into the Delta each year before this mitigation measure would be implemented, resulting in substantial reductions in survival of these migrating juvenile salmon. Significant proportions of spring-run Chinook salmon generally migrate downstream of Hamilton City as early as December, and spring-run Chinook salmon are frequently found in the Delta (in both surveys and salvage) by March. RDEIR/SDEIS at 11-132 to 11-134; *id*., Appendix 11A at 1-13 to 1-21; 2019 NMFS BiOp at 82-83. More than half (50 percent) of the spring-run Chinook salmon population in the Sacramento Basin migrated past the Knights Landing before March 1 in many years (including Brood Years 2015, 2014, 2012, 2010, 2007, 2005, and 2003). RDEIR/SDEIS, Appendix 11A at 1-15. None of the spring-run Chinook salmon that migrate to the Delta before March would be protected by mitigation measure FISH-2, meaning that in many years less than half of the population would be protected by the proposed mitigation measure. As a result, the proposed project and alternatives would cause significant impacts by reducing survival of these migrating salmon.

Second, the proposed flow threshold of 10,712 cfs used in Mitigation Measure FISH-2 is inadequate for the same reasons identified with respect to winter-run Chinook salmon. *See supra*. And as with winter-run Chinook salmon, the RDEIR/SDEIS fails to adequately analyze impacts to riverine or Delta survival because it uses flawed CALSIM modeling that underestimates the reduction in flows into the Delta and fails to analyze impacts to riverine survival before January 1, despite the fact that significant numbers of spring-run Chinook salmon migrate past Red Bluff and even Hamilton City before that date. *Id*. Finally, because spring-run Chinook salmon populations are listed under CESA and are not currently viable, even small reductions in survival caused by the proposed project and alternatives that cause this population to fall further below self-reproducing levels constitute a significant impact under CEQA. Cal. Code Regs., tit. 14, § 15065(a)(1).

(D) The RDEIR/SDEIS Fails to Accurately Analyze Environmental Impacts to Fall-Run Chinook Salmon and Fails to Disclose Significant Impacts of the Proposed Project

Like the flawed analysis of impacts to winter-run and spring-run Chinook salmon, the RDEIR/SDEIS fails to adequately analyze impacts of the proposed project and alternatives on fall-run Chinook salmon and fails to disclose significant impacts that would result.

First, a substantial proportion of the fall-run Chinook salmon population migrates down the Sacramento River by March 1, before mitigation measure FISH-2 limits diversions by the proposed project and alternatives. *See* RDEIR/SDEIS at 11-157 to 11-164, 11-189; *id.*, Appendix 11A at 1-22 to 1-30. For instance, according to the RDEIR/SDEIS more than half of the fall-run Chinook salmon population that migrates past Red Bluff does so before March 1 in most years. *Id.*, Appendix 11A at 1-22 (50 percent passage at Red Bluff Diversion Dam before March 1 for all Brood Years 2019, 2018, 2015, 2014, 2013, 2012, 2010-2004). Similarly, more than half of the run was estimated to have passed Knights Landing before March 1 in most years. *Id.*, Appendix 11A at 1-24 (Brood Years 2019, 2018, 2016, 2015, 2014, 2012-2003). And the RDEIR/SDEIS asserts that the majority of fall-run Chinook salmon are already in the Delta between January and May. *Id.* at 11-189. As a result, a significant proportion of the fall-run Chinook salmon population has already migrated downstream and is not protected by mitigation measure FISH-2, and the proposed project and alternatives would cause significant environmental impacts by reducing the survival of these juvenile salmon down the Sacramento River and through the Delta.

Second, the proposed flow threshold of 10,712 cfs in Mitigation Measure FISH-2 is inadequate for the same reasons identified with respect to winter-run Chinook salmon. *See supra*. And as with winter-run Chinook salmon, the RDEIR/SDEIS fails to adequately analyze impacts to riverine or Delta survival because it uses flawed CALSIM modeling that underestimates the reduction in flows into the Delta and fails to analyze impacts to riverine survival before January 1, despite significant numbers of fall-run Chinook salmon migrating past Red Bluff Diversion Dam and even Hamilton City before that date. *Id.*

(E) The RDEIR/SDEIS Fails to Accurately Analyze Environmental Impacts to Longfin Smelt and Fails to Disclose Significant Impacts of the Proposed Project

The RDEIR/SDEIS ignores or underestimates potentially significant impacts to the San Francisco Estuary's Longfin Smelt population. Longfin Smelt are listed under CESA as a threatened species because they have experienced dramatic declines in abundance over several decades. Abundance of this population is strongly correlated with Delta outflow (Jassby et al. 1995; Kimmerer 2002; Rosenfield and Baxter 2007; Kimmerer et al. 2009; Thomson et al. 2010; Mac Nally et al. 2010) as is juvenile recruitment/productivity (Nobriga and Rosenfield 2016) and distribution (Dege and Brown 2004; CDFG 2009; Lewis et al. 2019b). Entrainment-related mortality is positively correlated with exports, and negatively correlated with Delta outflows and prior abundance indices (CDFG 2009; Grimaldo et al. 2009; Rosenfield 2010).

(i) The RDEIR/SDEIS Fails to Accurately Analyze Impacts from Entrainment

The RDEIR/SDEIS ignores the likely significant impact of additional Longfin Smelt entrainment arising from the proposed project. Given its precarious conservation status, any increase in entrainment-related mortality is likely to threaten the viability of Longfin Smelt in the San Francisco Estuary. This is particularly true given that entrainment of Longfin Smelt has historically been highest when population numbers are low and environmental conditions lead to low Longfin Smelt production (Rosenfield 2010). Despite these known patterns, the RDEIR/SDEIS inappropriately ignores increases in entrainment-related mortality that are likely to occur as a result of increased water exports and decreased Delta outflow. To the extent that Delta Smelt and Longfin Smelt are similar (both smelt have experienced significant declines, are pelagic swimmers, and spawn, at times, in the zone of influence of CVP and SWP export facilities), recent findings on the effects of entrainment-related mortality on Delta Smelt apply, in general, to Longfin Smelt. Smith et al. (2021) state:

> In a population in which recruitment success rates cannot sustain the population, no additional mortality is sustainable . . . No additional mortality can be sustained by the population, but that does not mean that entrainment mortality of 0 will result in its recovery

Smith et al. 2021 at p. 14.

The existing CDFW conceptual model for Longfin Smelt life history finds that combined CVP/SWP exports is a significant predictor of combined CVP/SWP salvage of adult Longfin Smelt (Rosenfield 2010). Also, Delta outflow in January-March is significantly and negatively correlated with total annual Longfin Smelt entrainment (Rosenfield 2010 at Figure 9); salvage consists mostly of juvenile Longfin Smelt and occurs mainly during April-June (Grimaldo et al. 2009). This led CDFW to suggest that Delta outflow in the winter affects the distribution of Longfin Smelt and the subsequent juvenile cohort (CDFG 2009; Rosenfield 2010). Entrainment of larval Longfin Smelt (which is not measured at CVP/SWP fish salvage facilities) is believed to be positively correlated with X2 and increasingly negative values of Old and Middle River (OMR) flow. The RDEIR/SDEIS fails to estimate changes in entrainment to larval Longfin Smelt or to connect such changes in mortality to overall Longfin Smelt population dynamics.

The RDEIR/SDEIS fails to describe any safe level of Longfin Smelt entrainment, much less acceptable increases in that entrainment caused by the project – it simply categorizes negative directional changes in conditions that promote entrainment as “small.” Average X2 increases under all project alternatives – increasing the risk of entrainment for all life stages of Longfin Smelt (CDFG 2009; Rosenfield 2010) in every month from December-May of Critically Dry years when Longfin Smelt are at significant risk of entrainment mortality (Appendix 6B3: Tables 6b3-1-1c, 2c, 3c, and 4c). Because the X2 values reported are averages, it is extremely likely that some years will experience a greater shift of X2 towards the export pumps, resulting in greater entrainment risk to all Longfin Smelt life stages. The assertion that the modeled changes in X2 are “small” is arbitrary and capricious – relatively small changes in Delta outflow or X2 are all that is required to produce large changes in entrainment risk for Longfin Smelt (Rosenfield 2010).

Combined with increasing X2 (which places more Longfin Smelt at risk of entrainment), more negative OMR flows expected under the proposed project and alternatives increase the likelihood of Longfin Smelt entrainment at levels that would pose significant risk to the overall population.

Average OMR is projected to be more negative in December, March and April during Critically Dry years under all project alternatives (OMR is also more negative in January of Alternative 1A; Appendix 5B3, Tables 5B3-6-1c, 2c, 3c, and 4c) – more negative OMR is correlated to the logarithm of Longfin Smelt salvage meaning entrainment-related mortality increases very rapidly as OMR becomes more negative (Grimaldo et al. 2009). Dismissing persistent and directional negative effects on an imperiled species by asserting, without evidence, that they are "small" is arbitrary and capricious. For example, with respect to endangered salmonids, NMFS has repeatedly warned that "[s]mall reductions across multiple life stages can be sufficient to cause the extirpation of a population" and that a "1% to 2% mean reduction in survival is a notable reduction for an endangered species, especially if it occurs on a consistent (e.g., annual) basis" (NMFS 2017 at 736). Similarly, while commenting on Delta Smelt entrainment-related mortality, Kimmerer cautioned against dismissing small but persistent losses to fish productivity and stated that mortality related to export pumping ". . . can be simultaneously nearly undetectable in regression analysis, and devastating to the population. This also illustrates how inappropriate statistical significance is in deciding whether an effect is biologically relevant." (Kimmerer 2011 at p. 7). Thus, conditions under the proposed project that facilitate increased entrainment-related mortality (increasing flow towards the export facilities, increased X2) may have a significant negative effect on Longfin Smelt population viability and the likelihood that this species will recover in the wild.

Entrainment of larval Longfin Smelt has never been effectively monitored, but we know that larval Longfin Smelt (a) are more abundant and weaker swimmers than juvenile or adult Longfin Smelt, (b) associate with the low salinity zone (Dege and Brown 2004; CDFG 2009; Hobbs et al. 2010) and are thus located closer to export facilities in drier years than in years with high Delta outflow, and (c) remain abundant into the late spring and early-summer, at least (as evidence by continued recruitment to the Bay Study's nets well into the summer and fall; Rosenfield and Baxter 2007). Thus, it is likely that entrainment mortality of larval Longfin Smelt follows the same general pattern as entrainment of older life stages -- increasing with increasing X2 and export rates – and that larval entrainment-related mortality much larger than for juvenile and adults, in absolute and relative terms. Also, entrainment of Longfin Smelt larvae likely continues from January through spring and into early summer, as larval fish are abundant throughout this period. The RDEIR/SDEIS must be revised to analyze the effect of the proposed project on entrainment of larval Longfin Smelt and to link the effect of any changes in entrainment-related mortality to overall Longfin Smelt population dynamics.

(ii) The RDEIR/SDEIS Fails to Adequately Analyze Impacts on Longfin Smelt Abundance

The best available science indicates that reductions in Delta inflow and Delta outflow during the winter and spring months under the proposed project will result in decreased Longfin Smelt productivity and overall declines in abundance, which constitute a significant impact under CEQA. Longfin Smelt abundance indices are strongly correlated with Delta outflow (Jassby et al. 1995; Kimmerer 2002; Rosenfield and Baxter 2007; CDFG 2009; Kimmerer et al. 2009;

Thomson et al. 2010, MacNally et al. 2010; Nobriga and Rosenfield 2016). The RDEIR/SDEIS analysis of Aquatic Biological Resources states: "Winter-spring diversions for Alternatives 1, 2, and 3 would reduce Delta inflow and Delta outflow." RDEIR/SDEIS at 11-269. The best available science demonstrates that the proposed project and alternatives will have a negative effect on Longfin Smelt recruitment and overall abundance, constituting a significant impact under CEQA.

Longfin Smelt viability is already severely impaired by reduced abundance. Even maintenance of the population at current levels exposes the population to high risk; further persistent declines in abundance of this CESA-listed fish's population that are projected under the proposed project would contribute significantly to the risk of Longfin Smelt extirpation from the San Francisco Estuary. Furthermore, the status quo for Longfin Smelt represents continued decline towards extinction. Maintenance of Delta outflows at levels permitted under the state's CESA incidental take permit for operation of the State Water Project are expected to result in declines in abundance of the Longfin Smelt population (DWR 2020 Final EIR at p. 5-135, Tables 5.3-8 and 5.3-9) and even that level of decline assumes that Delta outflow will be augmented in April and May of certain years; however, April-May Delta outflow augmentation is not reasonably likely to occur and the biologically important outflow period is December to May (Nobriga and Rosenfield 2016), not March to May. For example, flows were not augmented in April 2021 as low Delta outflows violated D-1641 standards; the state also petitioned to waive Delta outflow requirements in February-April of 2022 despite acknowledging that reductions in Delta outflows below levels set in D-1641 will likely to harm the Longfin Smelt population (Reclamation and DWR 2021). Even prior to being weakened under the state CESA permit and waivers of Bay-Delta water quality control plan standards, status quo protections were demonstrably inadequate to protect Longfin Smelt; this is why the SWRCB (SWRCB 2010, 2017) previously concluded that Delta outflows need to increase in order to protect Longfin Smelt adequately. Thus, the proposed project anticipates degrading environmental conditions from a status quo that is already expected to cause Longfin Smelt population declines.

The RDEIR/SDEIS's characterization of the proposed project's effects on Longfin Smelt understate the true impact of reductions in Delta outflow on this population because it relies on erroneous interpretation and misrepresentation of different models of Longfin Smelt population biology. Furthermore, neither of the analyses of flow effects on Longfin Smelt abundance incorporates potential persistent increases in entrainment-related mortality of Longfin Smelt adults, larvae, or juveniles, described above. Rather, the RDEIR/SDEIS relies on historical relationships between flow and adult abundance, ignoring the likelihood that abundance for any given outflow may decline if entrainment mortality is higher than it has historically been.

Using a computer code that is intended to replicate a population model developed by Nobriga and Rosenfield (2016), the RDEIR/SDEIS concludes that there will be "small" negative effects on Longfin Smelt (RDEIR/SDEIS at 11-270) – these negative effects are visible in all year types (RDEIR/SDEIS Tables 11-69, 11-70; *see also* Table 11-70). However, the RDEIR/SDEIS's implementation of Nobriga and Rosenfield's (2016) population model and its interpretation of model results are unjustified and invalid (the RDEIR/SDEIS references DWR's 2020 implementation and interpretation of the same model, which were similarly flawed and invalid; *see* Appendix A: Critique of CDWR's modeling of Longfin Smelt abundance and productivity under different operational alternatives for the SWP March 12, 2020 (attached hereto as Exhibit 2). As a result, the RDEIR/SDEIS's assertion that the differences between project alternatives and no action alternatives are "uncertain" is without merit. Specifically, the RDEIR/SDEIS applies Nobriga and Rosenfield's (2016) model inappropriately – the original model was designed to evaluate different conceptual alternatives of Longfin Smelt population dynamics, not to predict or compare changes in population abundance under different water management regimes. Nobriga and Rosenfield (2016) found that Longfin Smelt juvenile recruitment was powerfully affected by changes in Delta outflow – and Delta outflow was the only abiotic variable that produced a significant effect. As a result, their model will show lower recruitment of Longfin Smelt for management alternatives that reduce Delta outflow – contrary to the RDEIR/SDEIS's implication, there is no uncertainty associated with this modeling result. The analysis in the body of the RDEIR/SDEIS obscures this certainty by inappropriately comparing all possible outcomes under different management alternatives rather than analyzing year-by-year pairwise differences between NAA and alternatives. In other words, the RDEIR/SDEIS confounds all the variability associated with the estuary's Longfin Smelt populations through time (including a 2-3 order of magnitude decline and that related to natural variation in Delta Outflow from year-to-year) with variation among operational alternatives that differ only in their annual winter-spring Delta outflow. For example, by categorizing years into year types (each of which includes great variation in Delta outflow, *see* Exhibit 2), the RDEIR/SDEIS mistakes natural variability that has nothing to do with project alternatives for "uncertainty" in the outcomes of these alternatives. As a result, RDEIR/SDEIS Figures 11-36 and 11-37 are not valid and are extremely misleading regarding the certainty of persistent negative effects on Longfin Smelt that should be expected from implementation of any of the project alternatives. By presenting the high variation in model estimates of Longfin Smelt abundance across years and across decades as if it represented uncertainty about outcomes under different alternatives, the RDEIR/SDEIS's presentation undermines the entire purpose of comparing alternatives, which is to contrast differences that arise from different water management operations rather than background variation that is not related to the alternatives. In a prior analysis of a version of the underlying code used in the RDEIR/SDEIS, we found that the Longfin Smelt population response to changing Delta outflow is disproportionately high; for example, a 5 percent reduction in Delta outflow produces a greater than 5 percent reduction in projected Longfin Smelt abundance (*see* Exhibit 2). Given that population size in one generation affects abundance in the next generation (Nobriga and Rosenfield 2016), these differences among alternatives would be expected to compound over time (until the system's carrying capacity is reached). To emphasize: Nobriga and Rosenfield (2016) demonstrated that Delta outflow was extremely well correlated, over 5 decades, with Longfin Smelt juvenile productivity – their model predicts that lower Delta Outflow as proposed under the proposed project and alternatives will result in lower Longfin Smelt productivity; the RDEIR/SDEIS's representation of that model and interpretation of its outputs are egregiously flawed and highly misleading.

The RDEIR/SDEIS also estimates changes in population abundance based on regressions between X2 and Longfin Smelt abundance. This estimate is very coarse and should be used to evaluate only the likely relative effects of project alternatives. This analysis reveals significant negative effects on Longfin Smelt abundance as a result of project alternatives in every year type; in fact, this analysis reveals that Longfin Smelt abundance under project alternative 1A will be lower relative to the NAA in over 70 percent of years analyzed in the RDEIR/SDEIS (Compare Appendix 11F Table 11F-7 to Table 11F-8). Here again, the RDEIR/SDEIS inappropriately treats mean abundance differences as though they are static, ignoring deviations from the reported mean difference in each year type (i.e., declines relative to the NAA will be greater in some years) which further increase the risk of irreparable harm to the population, and the compounding effect of abundance declines across multiple generations (Thomson et al. 2010; Nobriga and Rosenfield 2016). Furthermore, this regression approach assumes that Longfin Smelt abundance is a function of outflow alone – in this model, prior abundance plays no role in subsequent abundance. Thus, if this regression approach showed that the population was extirpated, it could magically resurrect the population in subsequent years with higher flows. This obviously underestimates and ignores the permanent harm that can arise from persistent degradation of environmental conditions on Longfin Smelt populations under the proposed project.

(iii) The RDEIR/SDEIS's Proposed Mitigation Measures Fail to Reduce Impacts to Longfin Smelt to a Less than Significant Level

The RDEIR/SDEIS claims to mitigate anticipated negative impacts to Longfin Smelt arising from reduced Delta outflow by requiring 11-13 acres of tidal habitat restoration (negative effects of increased entrainment on Longfin Smelt abundance are ignored). There is no credible evidence to support the RDEIR/SDEIS's claim that tidal habitat restoration (especially such a tiny acreage) will benefit this population or mitigate for the expected (and understated) negative effects of the proposed project. Because there is no known effect of tidal habitat restoration on Longfin Smelt abundance and even the presumed mechanisms are highly uncertain and poorly defined, there is no scientifically supported methodology for calculating the amount of such habitat required to mitigate for the proposed project's effects.

Despite significant tidal marsh habitat restoration in the Delta, the Napa estuary, and the South Bay, there is no evidence yet to demonstrate that these areas provide net benefits for the San Francisco Estuary's Longfin Smelt population (i.e., that they act as a "source" as opposed to a "sink"). Despite the restoration of several thousand acres of shallow tidal habitat that has occurred over the last several decades, Longfin Smelt abundance and productivity have not increased -- the flow-juvenile abundance relationship remains unchanged and survivorship from juveniles to adults has declined (Rosenfield and Baxter 2007; Nobriga and Rosenfield 2016). In fact, Longfin Smelt abundance has declined despite massive investment in shallow tidal habitat restoration.

Although recent research has documented Longfin Smelt occurrence in marshes outside of the Delta-Suisun Bay region (Lewis et al. 2019a), there is no direct evidence that Longfin Smelt detected in these areas contribute to the adult population. Results of a preliminary otolith chemistry "fingerprinting" study concluded, ". . . of the adult fish that were classified with moderate confidence (e.g., 75%), nearly all appeared to have reared in the northern [San Francisco Estuary] . . . " (Lewis et al. 2019b at p. 9 and Figures 17 and 18 at p. 75 of the PDF). Indeed, it is not clear that Longfin Smelt found in shallow tidal habitats downstream of Suisun Bay originated in those habitats or reproduce successfully as a result of those habitats. For example, although researchers have detected substantial numbers of Longfin Smelt west of Suisun Bay, this occurred primarily during the exceedingly wet years 2017 and 2019 (Lewis et al. 2019b) and even then it was not clear that the fish detected were produced in local marshes; Lewis et al. stated (2019b at p. 6) : ". . . it is valuable to consider whether, with high Delta outflows, it is feasible and probable that larval and juvenile Longfin Smelt found in high numbers in San Pablo Bay, and even Lower South San Francisco Bay, could have been transported from Delta and Suisun Bay spawning sites by currents, tides, and winds." Although these same researchers caught pre-reproductive adult and larval Longfin Smelt in shallow tidal habitats downstream of Suisun Bay and the Delta, they were circumspect regarding the importance of spawning and rearing in these habitats, stating that their value "remains unknown." (Lewis et al. 2019b at p. 2; see also at p. 6).

The notion that shallow tidal habitat restoration can mitigate declines in Longfin Smelt caused by reduced outflow is entirely speculative. Among other things, this concept presumes that larval production is limited by spawning and incubation habitat area; juvenile and adult Longfin Smelt are generally not found in shallow habitats (Rosenfield and Baxter 2007; Rosenfield 2010). The underlying hypothesis that the Longfin Smelt population is limited by production of larvae requires that the RDEIR/SDEIS demonstrate that (a) measurable numbers of additional larvae and juveniles will be produced by the required acres of shallow tidal habitat mitigation, and (b) this number of larvae and juveniles exceeds the significant decreases in Longfin Smelt production that can be expected as a result of reductions in Delta outflow. The RDEIR/SDEIS fails to make that comparison, at least in part because the benefit to Longfin Smelt of restoring a certain acreage of shallow tidal habitat is unknown, highly uncertain, and not currently estimable. Additionally, the RDEIR/SDEIS problematically calculates the proposed acreage of mitigation based on differential entrainment of Longfin Smelt expected under the project alternatives versus under the NAA. This is inappropriate and arbitrary because (a) the RDEIR/SDEIS has concluded (without evidence) that entrainment of Longfin Smelt under the proposed project and alternatives "would be similar to the NAA" (at p. 11-268), (b) because the methods used to identify significant reductions in Longfin Smelt abundance under the project do not account for impacts arising from increased entrainment that are additional to the flow impact being mitigated, and (c) because the mitigation calculation assumes (without evidence) some equivalence between acreage of tidal marsh restoration and acreage in which Longfin Smelt are affected by entrainment. Thus, the proposed mitigation calculation is without scientific support and is not relevant to the significant negative effect (reduced Longfin Smelt productivity resulting from reduced Delta outflow) that it is supposed to mitigate.

Far from being a substitute for the well-described negative effects of reduced Delta outflow on Longfin Smelt abundance and productivity, the benefits of restoring putative Longfin Smelt spawning and rearing habitats in shallow tidal environments are highly uncertain, if they have any beneficial effect at all (Lewis et al. 2019b at pp. 44-45 of PDF). Clearly, more research is needed to demonstrate what, if any, value restored shallow tidal habitats have for the Longfin Smelt population in this estuary. Until such research is completed, it will not be possible to determine (a) that constructing these habitats actually benefits the Longfin Smelt population, and if it is beneficial, (b) how much of this habitat is necessary to mitigate impacts of the proposed project. Furthermore, there is no evidence that we know how to "restore" tidal habitats such that they benefit rather than harm Longfin Smelt. Although some shallow habitats where Longfin Smelt are now detected have been the subject of marsh restoration efforts (e.g., the South Bay Salt Ponds), historical records suggest that these fish occurred in these areas prior to restoration (Rosenfield 2010). There is no evidence to assess whether fish in these "restored" habitats do better or worse following habitat restoration. Certainly, there is no evidence to support the RDEIR/SDEIS's calculation of a precise acreage to mitigate for the persistent negative effects the proposed project is expected to have on Longfin Smelt abundance.

Finally, even if Longfin Smelt do reproduce and rear successfully in tidal habitats that have been restored, evidence suggests that any benefits will be limited to years when local stream flows and Delta outflows are high. Indeed, Lewis et al. (2019b at p. 6) write: (a) "It is unlikely that in dry, normal, or possibly even above normal years that such conditions would exists in each of these bay tributaries [west and south of the Carquinez Straights] sufficient enough to support substantial spawning and rearing. Thus in most years, the majority of suitable spawning and rearing habitats would likely occur in Suisun Bay/Marsh and the Delta," and (at p. 11) (b) ". . . given the prevalence of drought conditions and limited outflows from the Napa River and Coyote Creek watersheds due to upstream catchment and diversion, suitable conditions for spawning appear to only occur in years of anomalously high precipitation." This pattern suggests that even if it is effective, restoring shallow tidal habitats in these areas will only counter the proposed project's negative effects during wetter years, whereas declines in Longfin Smelt abundance (and increases in Longfin Smelt entrainment) are expected in drier year types, when the population is at greatest risk. Furthermore, regardless of any mitigation that might occur as a result of the proposed habitat restoration, the benefits of this activity cannot possibly occur until the habitat is actually constructed and functioning. Tidal habitat restoration generally takes many years or decades to complete; therefore, under the very best scenario, negative effects of the proposed project will not be mitigated for several Longfin Smelt generations.

(F) The RDEIR/SDEIS Fails to Accurately Analyze Environmental Impacts to Delta Smelt and Fails to Disclose Significant Impacts of the Proposed Project

The RDEIR/SDEIS incorrectly concludes that the proposed project and alternatives would not cause significant adverse impacts on Delta Smelt, because it fails to analyze important aspects of the problem and because it unlawfully assumes that changes less than 5 percent cannot constitute a significant impact.

First, the RDEIR/SDEIS ignores the effects of reductions in spring outflow on Delta Smelt recruitment. *See* Polansky et al. 2021; IEP MAST 2015. As Reclamation and DWR explained in the recent Temporary Urgency Change Petition submitted to the SWRCB,

> Subsequent analysis in a peer review journal using a nonlinear state space model by Polansky et al. (2021) found statistical support for both a negative effect of March through May X2 and Export:Inflow (E:I) ratio on recruitment of delta smelt. Thus the most recent analysis from Polansky et al. (2021) suggests the TUCP could result in negative effects to delta smelt, based on higher March through May X2 under the TUCP and TUCP with DCC options (~88.3 km) and TUCP with Collinsville X2 option (~82.3 km) relative to the base case (~81.1 km).

Reclamation and DWR 2021. While the RDEIR/SDEIS discusses potential impacts of reduced Delta outflow on zooplankton, *see* RDEIR/SDEIS at 11-260 to 11-262, the document completely ignores Polansky et al. 2021 and the adverse impacts from reduced outflow on the recruitment and subsequent abundance of Delta Smelt.

Second, while the RDEIR/SDEIS acknowledges that diversions by the proposed project and alternatives could reduce abundance of zooplankton prey for Delta Smelt in the low salinity zone, it improperly concludes this would not be a significant impact because the changes in abundance of *P. forbesi* would be less than 5 percent. RDEIR/SDEIS at 11-260 to 11-261, 11-266. However, given the dire status of Delta Smelt, even a very small reduction in prey abundance could constitute a significant impact. *See* Cal. Code Regs., tit. 14, § 15065(a)(1). Moreover, in years when Sites Reservoir would divert more water and cause greater reductions in Delta outflow, there is likely to be greater reductions in Delta Smelt prey abundance as a result of the proposed project and alternatives.

Similarly, the RDEIR/SDEIS finds that diversions by the proposed project and alternatives could reduce sediment loading to the Delta by up to 5 percent. RDEIR/SDEIS at 11-265. Reduced turbidity would significantly harm Delta Smelt, but the RDEIR/SDEIS finds that this impact is less than significant, based on the magnitude of the change and potential mitigation measures. *Id.*; *see id*. at 11-266. However, even a small reduction in sediment supply that reduces turbidity in the Delta may be a significant impact given that could further reduce Delta Smelt below self-sustaining levels, Cal. Code Regs., tit. 14, § 15064(a)(1). Moreover, other agencies have previously concluded that any reduction in sediment supply to the Delta and San Francisco Bay should be considered a significant impact. *See* Bay Conservation and Development Commission, comments on the Bay-Delta Conservation Plan, July 29, 2014 (attached hereto as Exhibit 3). In addition, the potential mitigation measure unlawfully defers mitigation, because it does not describe specific performance metrics that would be used. *See id*., Appendix 2D, at 2D-

46 (stating that performance criteria will be established in the future--analysis of sediment entrainment impacts is deferred until after "at least 5 years" of project operation, and implementation of sediment reintroduction is deferred another 5 years, for at least a decade of unmitigated operation). For comparison, Delta Smelt live only 1 year; so this mitigation will not be implemented for at least 10 generations of Delta Smelt. The failure to identify specific performance standards that the mitigation measure must achieve is unlawful. Cal. Code Regs., tit. 14, § 15126.4(a)(1)(B). In addition, the RDEIR/SDEIS fails to evaluate, let alone demonstrate, that such potential mitigation measures are feasible, particularly since prior analyses (by ICF for the California WaterFix project) found that the vast majority of entrained sediment could not be reused. The RDEIR/SDEIS must be revised and recirculated with: (1) an accurate analysis of impacts from sediment entrainment; (2) analysis of the feasibility of sediment mitigation measures; (3) specific mitigation measures and performance standards identified to ensure that impacts are reduced to a less than significant level; and (4) proposed monitoring to evaluate the implementation of mitigation measures and adaptively modify the measures as needed. Developing mitigation measures a decade after the impact is already occurring is unlawful and imposes unacceptable impacts on the multiple endangered species that depend on turbidity in the Estuary.

Finally, the RDEIR/SDEIS relies on an unlawful mitigation measure (FISH-8.1) to address potentially significant impacts to Delta Smelt from water released from Sites Reservoir, which does not describe specific performance criteria to avoid impacts but instead defers development of these performance criteria to a future process. RDEIR/SDEIS at 11-266 to 11-267 ("Dissolved oxygen and temperature criteria for determining effects will be developed in collaboration with the fishery agencies and will maintain existing DO and temperature levels suitable to delta smelt that will not exceed recognized critical physiological thresholds."). The failure to identify specific performance criteria makes this mitigation measure unlawful. Cal. Code Regs., tit. 14, § 15126.4(a)(1)(B).

(G) The RDEIR/SDEIS Fails to Accurately Analyze Environmental Impacts to Fish Below Golden Gate Dam and Sites Dam and Fails to Disclose Potentially Significant Impacts of the Proposed Project

Flows required for maintaining fish in good condition below Golden Gate Dam and Sites Dam have not yet been identified or incorporated into the project design or mitigation measures. The lack of information on Funks Creek and Stone Corral Creek flow needs (fish assemblage, geomorphic flows, etc.) makes it impossible to understand and comment on the proposed project's environmental impacts. Studies have yet to be conducted on basic hydrology and fish needs. RDEIR/SDEIS at 2-38. The RDEIR/SDEIS must be revised to include sufficient information so decision-makers can evaluate if stream ecosystem needs downstream of the reservoir can be met or will be degraded by the project design. Concerns that should be analyzed in a revised environmental document include:

- valve capacities of only 100 cfs (RDEIR/SDEIS at 2D-40), when Stone Corral Creek flows exceeding 500 cfs are common in wet years;
- effects of emergency releases of up to 2,500 cfs on Stone Corral Creek; and
- sediment and fish passage needs, which should be evaluated earlier than "prior to construction of dams" (hydrogeomorphic technical study described on RDEIR/SDEIS at 2D-42) so they can be incorporated into the project design.

We recommend using the tools and following the approach described in the California Environmental Flows Framework (CEFF; https://ceff.ucdavis.edu/) to conduct this analysis. Steps 1-10 of the Framework should inform the RDEIR/SDEIS, including "propose mitigation measures to offset impacts" as described in CEFF Step 10.

(H) The RDEIR/SDEIS Fails to Accurately Analyze Environmental Impacts to Wetlands and Terrestrial Wildlife and Fails to Disclose Significant Impacts of the Proposed Project

(i) The RDEIR/SDEIS Fails to Adequately Analyze Impacts to Wetlands and Terrestrial Wildlife Because the Analysis is Based on Inaccurate Species Distribution Information

The coarse and inaccurate description of the environmental setting with respect to vegetation, wetlands, and wildlife resources, discussed *supra*, undermines the RDEIR/SDEIS's analysis of the proposed project's impacts to these resources. Without an accurate understanding of where specific resources are located, which the RDEIR/SDEIS fails to provide, it is impossible to understand the nature and extent of the project's impacts. Yet those impacts are likely to be profound, among other reasons because 33 special-status wildlife species are likely to occur in the study area. *See* RDEIR/SDEIS at 10-16.

The RDEIR/SDEIS suggests that the inaccurate assessment of impacts is acceptable for two reasons, neither of which is legally valid. First, the RDEIR/SDEIS suggests that, because detailed on-the-ground surveys will occur in the future, the lack of detailed and accurate information in the RDEIR/SDEIS is acceptable:

> After land acquisition and prior to construction actions, the Authority would complete additional biological surveys to confirm mapped habitat types and the presence/absence of biological resources including, but not limited to, special-status species, state and federal waters, sensitive plant communities and other applicable resources identified as sensitive by state, and/or federal agencies and discussed in Chapter 9, Vegetation Resources; Chapter 10, Wildlife Resources; and Chapter 11, Aquatic Biological Resources, of this document. The Authority would use this information regarding occupied habitat to fulfill the permitting and consultation requirements of the federal and state resource agencies (USFWS, CDFW, U.S. Army Corps of Engineers, Central Valley Regional Water Quality Control Board, and State Water Board).

RDEIR/SDEIS at 2-48. However, deferring this important analysis until after the NEPA and CEQA process fails to comport with the foundational informational purposes of those laws and deprives the public of a meaningful opportunity to understand the project's impacts and provide input. *See City of Agoura Hills*, 46 Cal.App.5th at 692-94. For example, the public cannot understand how the project will impact vernal pools and the wildlife they support and cannot suggest alternatives to reduce any impacts because the RDEIR/SDEIS fails to provide accurate information about the location of vernal pools in the project area.

Second, the RDEIR/SDEIS suggests the lack of accurate and detailed information about impacts to vegetation, wetlands, and wildlife is not a problem because the RDEIR/SDEIS overestimates the project's impacts. For example, with respect to special status species, the RDEIR/SDEIS claims that,

> [i]n general, permanent and temporary impacts on potential habitat for special-status species are overestimated because surveys to assess habitat suitability of land cover types could not be conducted in the study area due to access limitations. Consequently, the entirety of the land cover is considered affected even when specific habitat requirements may be absent (e.g., elderberry shrubs, which are host plants for valley elderberry longhorn beetle, in riparian land cover types).

RDEIR/SDEIS at 10-29. Yet providing only an unrealistic overestimate of the project's impacts that is disconnected from reality fails to provide members of the public and decision makers with an accurate understanding of the project and leaves them unable to meaningfully assess alternatives that could reduce the project's impacts in violation of CEQA and NEPA.

(ii) The RDEIR/SDEIS Fails to Adequately Analyze Impacts to Wetlands and Terrestrial Wildlife Because Key Information and Analysis is Missing

The coarse and inaccurate description of the environmental setting and cursory impacts analysis makes it difficult to meaningfully comment on specific information gaps and flaws in the analysis. Nevertheless, it is clear that the impacts analysis suffers from several additional deficiencies.

First, the RDEIR/SDEIS fails to analyze impacts to wildlife that utilize Sacramento Valley wildlife refuges and private lands surrounding the refuges that are enrolled in U.S. Fish and Wildlife Service ("FWS") and Natural Resources Conservation Services ("NRCS") easement programs. The project area is in close proximity to units of the Sacramento National Wildlife Refuge Complex that are essential for migratory birds and other wildlife, including threatened and endangered species. Project construction and operation could impact wildlife that rely on the refuges, including impacts related to construction-related noise and traffic and addition of transmission lines that could impact migratory pathways. Yet the RDEIR/SDEIS does not appear to discuss how the project will impact wildlife that exist within and migrate to and from the refuges. Additionally, as we mentioned in our comments on the 2017 DEIR/DEIS for the project, there are USFWS and NRCS conservation easement lands in and surrounding the project area that are important for migratory birds and other wildlife. Yet the RDEIR/SDEIS fails to identify these easement lands and does not discuss how the wildlife that depend on these important habitats will be impacted by project construction and operation.

Second, the RDEIR/SDEIS's discussion of impacts to particular species is exceedingly cursory and lacking in detail. For example, giant garter snakes are listed under both CESA and the ESA, and they are known to occur in several parts of the project area. Yet for construction impacts from Alternatives 1 and 3, the RDEIR/SDEIS dedicates only one exceedingly brief paragraph to giant garter snake impacts. RDEIR/SDEIS at 10-79. The description is vague and fails to provide basic information about where, when, and how the impacts are expected to occur. Without this basic information, it is not possible to understand the nature and extent of the project's impact, or to suggest alternative approaches that could reduce those impacts. The RDEIR/SDEIS also fails to discuss giant garter snake impacts in the context of FWS's 2017 Recovery Plan for the Giant Garter Snake. Parts of the project area fall with the Colusa Basin Recovery Unit, and the recovery plan describes specific recovery criteria for that unit. *See* Final GGS Recovery Plan at II-15 to 16. Yet the RDEIR/SDEIS does not describe how the proposed project could impede recovery efforts and does not explain how mitigation for giant garter snake impacts will advance the goals that the final recovery plan establishes. Impacts to other wildlife species are discussed in a similarly cursory manner and are lacking details that are essential for understanding and commenting on the project's impacts.

(iii) The RDEIR/SDEIS Fails to Adequately Describe Measures to Completely Avoid Take of Fully Protected Species

The RDEIR/SDEIS discusses likely project impacts to several State fully-protected species, including golden eagles and bald eagles. In its comments on the 2017 DEIR/DEIS, CDFW explained that "[t]ake of fully protected species is unlawful and subject to enforcement under the Fish and Game Code. The only way for a project to obtain incidental take authorization for any fully protected species is through the development of a Natural Community Conservation Plan (NCCP) (Fish and G. Code, § 2800 et seq.)." Accordingly, CDFW "recommend[ed] the DEIR/DEIS include a discussion of potential for take of fully protected species, and identify measures to completely avoid take of these species."

However, for golden eagles and other fully-protected species, the RDEIR/SDEIS indicates that take may occur, and it fails to describe measures that will completely avoid take. For example, the RDEIR/SDEIS describes the potential for mortality of golden eagles, bald eagles, and white-tailed kite through electrocution or collision with new transmission lines but does not explain how the proposed mitigation measures would ensure complete avoidance of mortality or other forms of take. *See, e.g.,* RDEIR/SDEIS at 10-95 to 10-97. Take of fully protected species could also occur through use of rodenticides, disturbances of nesting sites, and other means, and the RDEIR/SDEIS does not make clear how these impacts would be fully avoided.

(iv) The RDEIR/SDEIS Fails to Propose Adequate Mitigation Measures for Significant Impacts to Wetlands and Terrestrial Wildlife

The RDEIR/SDEIS makes clear that proposed project is likely to have significant, negative impacts on a substantial number of wildlife species, including golden eagles, bald eagles, Western pond turtles, and giant garter snakes, among many others. Because the impacts to these species are potentially significant, the SDEIR/SDEIS must describe feasible mitigation measures that could minimize the significant adverse impacts. CEQA Guidelines § 15126.4(a)(1). Generally, the formulation of mitigation measures may not be deferred until a later time. *Id.* § 15126.4(a)(1)(B). If an agency chooses to defer formulation of specific measures in a CEQA document, it must "commit itself to specific performance criteria for evaluating the efficacy of the measures implemented." *POET, LLC v. California Air Res. Bd.*, 217 Cal. App. 4th 1214, 737-38 (2013). The mitigation measures described in the RDEIR/SDEIS fail to meet these standards and the document's claims that significant impacts will be mitigated to a less-than-significant level are unsubstantiated.

First, the RDEIR/SDEIS impermissibly defers formulation of mitigation measures. This problem is created, at least in part, by the document's failure to accurately describe the environmental setting and its relatedly inadequate analysis of impacts to vegetation, wetlands, and wildlife. In fact, for most wildlife species, the RDEIR/SDEIS includes analysis of the project's impacts as a mitigation measure. *See, e.g.*, Mitigation Measure WILD-1.1, RDEIR/SDEIS at 10-37 ("Once property access is granted and prior to the start of construction, the Authority will retain qualified biologists to assess habitat suitability and conduct surveys for vernal pool branchiopods in the Project area . . . ."). By impermissibly deferring the impacts analysis until the project's mitigation phase, the RDEIR/SDEIS fails to include information about the nature and extent of impacts to vegetation, wetlands, and wildlife, which makes it impossible to describe how impacts will be mitigated with any particularity.

Second, proposed mitigation ratios seem inadequate to reduce the project's impacts to a less-than-significant level. For example, the RDEIR/SDEIS appears to propose a 1:1 mitigation ratio for vernal pools. RDEIR/SDEIS at 9-47. For these rare and ecologically important wetlands, and in light of uncertainties surrounding the efficacy of vernal pool mitigation, this mitigation ratio seems substantially too low. Further, for occupied vernal pool branchiopod habitat, the RDEIR/SDEIS proposes a 2:1 mitigation ratio. RDEIR/SDEIS at 10-38. And "[f]or non-mitigation bank compensation, the performance standard for occupancy of the created/restored pools by listed vernal pool branchiopods is 5% of the total number of created/restored pools supporting listed vernal pool branchiopods over a 10-year monitoring period." RDEIR/SDEIS at 10-39. A 2:1 mitigation ratio for vernal pools occupied by ESA-listed wildlife is too low at the outset, and setting a performance standard for occupancy of restored or created pools at only 5 percent is unreasonable.[13] With such a low mitigation ratio and low expectation of success with

[13] Mitigation Measure WILD-1.3 is also confusing. It states that "[d]irect and indirect effects on occupied habitat will be mitigated by preserving occupied habitat at a 2:1 ratio (habitat preserved : habitat directly or indirectly affected) or by an equivalent or greater amount as determined during ESA Section 7 consultation with USFWS. In addition, direct effects on occupied habitat will be mitigated by creating or preserving occupied habitat at a 1:1 ratio (habitat created : habitat directly affected) or by an equivalent or greater amount as determined during ESA Section 7 consultation with USFWS." RDEIR/SDEIS at 10-38. Does this mean that, for direct

respect to occupancy, this measure is inadequate to minimize a significant, adverse impacts. The same combination of unacceptably low mitigation ratios and low performance standards emerges for several other species. *See, e.g.*, RDEIR/SDEIS at 10-48 (Mitigation Measure WILD-1.8 includes a mitigation ratio for elderberry longhorn beetle habitat at 3:1 for riparian habitat and 1:1 for non-riparian habitat, and establishes a performance standard of 60 percent survival over a five-year period for initial elderberry and native associate plantings).

Third, some mitigation measures are so vague that it is unclear whether the protective measures will actually be implemented. For example, for giant garter snakes, the RDEIR/SDEIS states that,

> [w]hen possible, all construction activity in suitable giant gartersnake aquatic habitat, and upland habitat within 200 feet of suitable aquatic habitat, will be conducted during the snake's active period (between May 1 and October 1). For work that cannot be conducted between May 1 and October 1, additional protective measures, such as installing exclusion fencing or additional biological monitoring, or other measures determined during consultation with USFWS and CDFW, will be implemented.

RDEIR/SDEIS at 10-80. What does "when possible" mean? Must construction occur during the active season so long as it is physically possible? Or can construction occur outside of the snake's active period to avoid additional costs or inconvenience, which would be problematic? For work that must occur during the snake's inactive season, a few examples of possible protective measures are mentioned, but formulation of a plan for minimizing impacts to this threatened species is improperly deferred until a later date.

(I) <u>The RDEIR/SDEIS Fails to Accurately Analyze Cumulative Impacts and Fails to Disclose that the Project Will Cause Cumulatively Significant Impacts</u>

Finally, the RDEIR/SDEIS fails to acknowledge that the impacts of the proposed project and alternatives are cumulatively significant. The RDEIR/SDEIS admits that despite requirements of the ESA and CESA, "the cumulative impact of past modifications and other past and present projects has contributed to the continuing decline in Central Valley and Delta fish populations and their habitats." RDEIR/SDEIS at 31-34. However, the RDEIR/SDEIS fails to conclude that "[t]his overall cumulative impact is significant," unlike DWR's final CEQA document for long term operations of the State Water Project which included the same sentence. *See* DWR, Final EIR, at 4-318 ("Despite these protections, the cumulative impact of past Delta modifications and other past and present projects has contributed to the continuing decline in Delta fish populations and habitat of protected species. This overall cumulative impact is significant.").

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effects on occupied habitat, the mitigation ratio is actually 3:1, with an opportunity for one acre of mitigation to occur through creation of occupied habitat?

Here, the RDEIR/SDEIS asserts that the proposed alternatives 1 and 3 "would not result in an incremental contribution to impacts on aquatic biological resources in the Sacramento River, its major tributaries and flood bypasses, and the Delta," *id*. at 3-36, because the proposed project and alternatives would only cause small changes less than 2 percent, *see id*. at 3-38. However, as shown above the proposed project and alternatives, even with the proposed mitigation measures, would cause significant impacts, and these impacts would cumulatively also be significant. Moreover, give the dire status of native fish populations, particularly Delta Smelt, winter-run Chinook salmon, Longfin Smelt, and other species listed under CESA and/or the ESA, the proposed project's contribution to cumulative impacts are likely to be significant.

For example, state and federal agencies have identified the need to significantly increase Delta outflow in the winter and spring months to prevent the extinction of Longfin Smelt, Delta Smelt, and other species (*see*, *e.g.*, the State Water Board's 2010 Public Trust flows report, the State Water Board's 2018 Framework), but the proposed project and alternatives would reduce Delta outflow in the winter and spring months. Even assuming for the sake of argument that these reductions in Delta outflow would not cause significant impacts from the proposed project by itself, the reduction in Delta outflow during these months would be cumulatively significant and the proposed project would make a considerable contribution to the reduction in Delta outflow. *See, e.g*., RDEIR/SDEIS at Table 5B3-5-1a to Table 5B3-5-1c (showing that Alternative 1A would reduce Delta outflow in March of Above Normal years by more than 5 percent, from 23,170 cfs to 21,860 cfs).

The RDEIR/SDEIS must be revised to adequately address the cumulative impacts of the proposed project and alternatives.

VII. <u>Recirculation of a Revised EIS/EIR is Required</u>

Because of the above-described deficiencies and because the RDEIR/SDEIS fails to disclose that the project and alternatives will cause significant environmental impacts and that the proposed mitigation measures are inadequate to reduce impacts to a less than significant level, recirculation of a revised RDEIR/SDEIS is legally required. *See, e.g., Vineyard Area Citizens for Responsible Growth, Inc. v. City of Rancho Cordova*, 40 Cal.4th 412, 447-449 (2007).

VIII. <u>Conclusion</u>

The RDEIR/SDEIS clearly fails to comply with the requirements of CEQA and NEPA. Among other flaws, it fails to consider a reasonable range of alternatives, fails to articulate a stable and accurate project description, fails to adequately account for climate change, fails to adequately analyze impacts to wide range of aquatic and terrestrial species, and fails to propose mitigation to reduce significant impacts to a less-than-significant level. For these reasons and because the RDEIR/SDEIS is riddled with significant errors, inadequacies, and omissions, the agencies must make substantial revisions to the document and recirculate the revised document for public review and comment.

Thank you for considering our comments.

Sincerely,

Doug Obegi
Natural Resources Defense Council

Rachel Zwillinger
Defenders of Wildlife

Jonathan Rosenfield
San Francisco Baykeeper

John McManus
Golden State Salmon Association

Gary Bobker
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Barbara Barrigan-Parrilla
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Jonas Minton
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Fly Fishers International

Chris Shutes
California Sportfishing Protection Alliance

Ronald Stork
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Cindy Charles
Golden West Women Flyfishers

Mike Conroy
Pacific Coast Federation of Fishermen's Associations &
Institute for Fisheries Resources

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Sites Reservoir Project

2021 Water Estimate

May 28, 2021

Sites

Agenda

- 2009 to 2020 Analysis
- Water Available to Whom, What Timeframe, and What Purpose
- Reclamation's Operation of the Shasta-Trinity Division
- Other Topics From the Group

2009 to 2020 Analysis

Sites

Overview

- Objective
  - Evaluated potential Sites Project operations for recent years not covered by the CalSim II simulation period
- Approach
  - Simple mass balance spreadsheet calculations
  - Estimated annual Sites Project diversion to fill and release using correlations between modeled results (RDEIR/SDEIS Alternative 1B) and historical information
- Results
  - Through the relatively dry period of 2009 – 2020, the average annual Sites Project fill and release values are 269 TAF and 216 TAF respectively
  - Average EOY September storage in Sites Project is 510 TAF

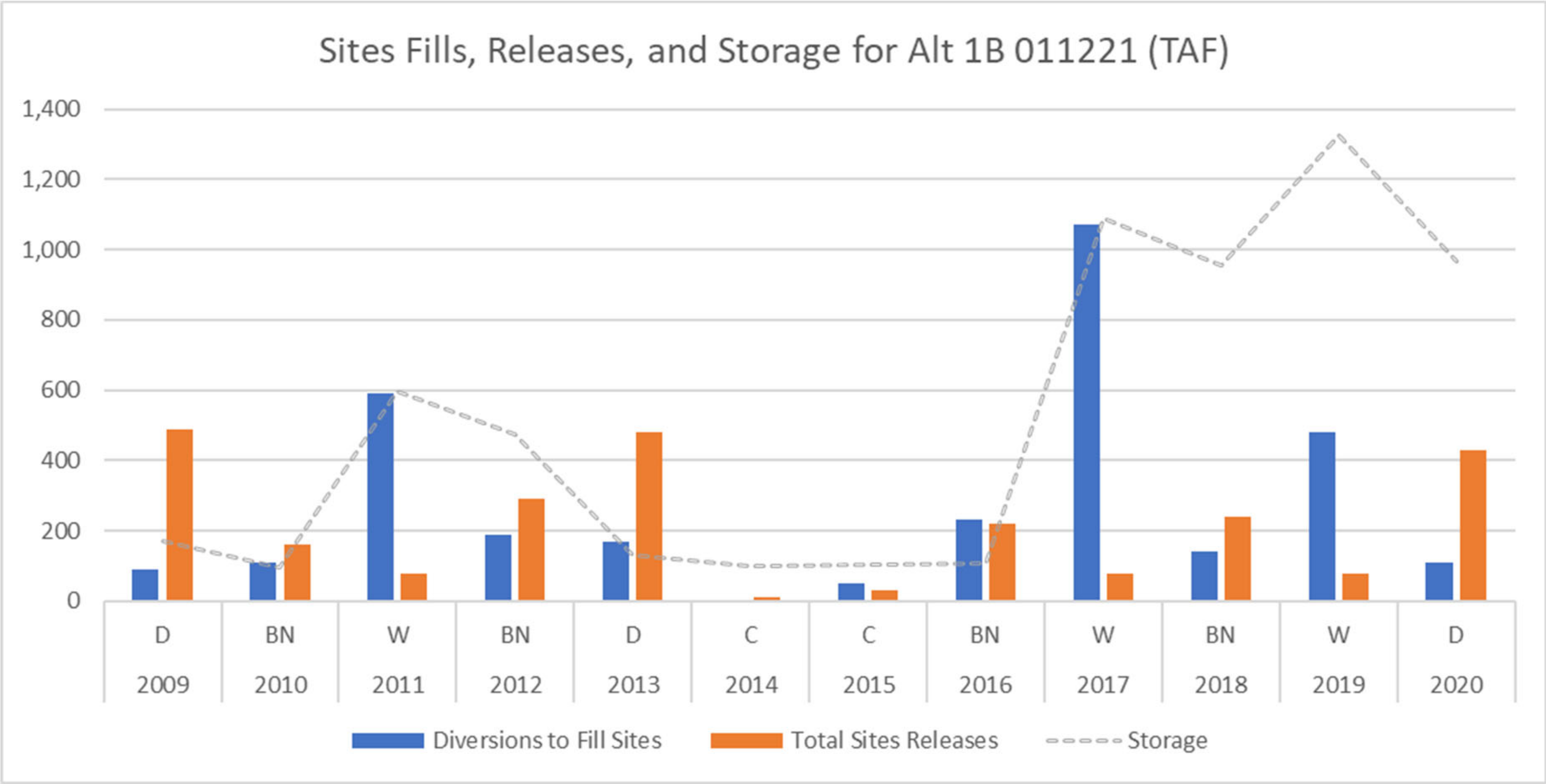
Analysis Performed

- Simple mass balance spreadsheet calculations
- Storage capacity of 1.5 MAF (Alternative 1B)
- Period of record analyzed 2009 – 2020
- Starting Storage for WY 2009 assumed at 600 TAF
- Sites Project Fills for WY 2009 – 2018 were estimated based on historical flow and water operations information (values determined for Alternative 1B using the Daily Divertible & Storable Flow Tool)
- Daily Divertible & Storable Flow Tool
  - Developed in 2018 to estimate the daily diversion potential for the Sites Project in WY 2009 – 2018 and potential effects of diversions on river hydrographs based on observed flow availability
  - Assumes Sites Project intake/conveyance constraints and diversion criteria
  - Tool simulates each year as a separate event and does not include storage or release operation

Analysis Performed

- Sites Project fills for WY 2019 – 2020 were estimated based on regression between historical full natural flows for Sacramento River at Bend Bridge and CalSim II results for diversions to fill Sites Project (Alt 1B)
- Sites Project releases are estimated based on a "similar years" relationship developed from CalSim II results for total releases from the Sites Project (Alt 1B) using historical Sacramento Valley Water Supply Index as the indicator of wetness
- Sites Project fills are constrained by available storage capacity based on annual mass balance calculations
- Sites Project releases are constrained to not exceed storage availability based on annual mass balance calculations (previous month's storage plus the current month's fill minus dead pool storage)

Results



- Results show Sites Project operations for generally dry conditions
- Project accrues fills in wet years to make releases during drier years

Results – Thousand AF

Water Year	Year Type	Diversions to Fill Sites	Total Sites Releases	Total Sites Storage (End of Water Year)
2009	D	90	490	170
2010	BN	110	160	100
2011	W	590	80	600
2012	BN	190	290	470
2013	D	170	480	130
2014	C	0	20	100
2015	C	50	30	110
2016	BN	230	220	110
2017	W	1,070	80	1,090
2018	BN	140	240	950
2019	W	480	80	1,320
2020	D	110	430	970
Average		269	216	510

Limitations

- Sites Project operations for the last twelve years are not evaluated at the same level of rigor as done in CalSim II
- Project fill quantities for 2009 – 2018 are developed rigorously, accurately reflecting hydrologic and operation constraints, however 2019 – 2020 values are approximate
- Project release quantities are approximate and have not been evaluated for consideration of benefits, schedules, and associated operations constraints

Water Available to Whom, What Timeframe, and What Purpose

Sites

Water Available to Whom?

- To all Sites Storage Partners based on:
  - Amount of water in their Storage Allocation
  - How much they request to be released
- Storage Principles Adopted in April 2021
  - Membership / participation (including State and Feds) based on a share of storage
    - For example, we expect the State to have about 244,000 AF STORAGE in the 1.5 MAF reservoir under Prop 1 or about 17.68% of the active storage
    - NOT an AF of water based allocation like the CVP and SWP

Water Available to Whom? (cont)

- Each member allocated a proportion of diversions
  - For example, if 275,000 AF of water is able to be diverted to Sites Reservoir in any one year = 20% of the total allocated storage space in Sites Reservoir (275,000/1.38 MAF = 20%)
  - Each Storage Partner would receive an amount of water equal to 20% of their Storage Allocation, unless the Storage Partner has opted out or their Storage Allocation is full
  - Example assumes a 1.5 MAF reservoir with about 120,000 AF allocated to dead pool
- Each member manages their Storage Allocation based on their needs

What Timeframe?

- Would work with CVP, SWP and State Board to determine
  - Possible environmental uses have more flexibility
    - Shasta exchange to help manage/extend cold water pool
      - Sites delivers to the TC and GCID customers in the spring, reducing releases from Shasta
      - Water that otherwise would have been released is held in Shasta
      - This water is then released later in the calendar year to benefit cold water species
    - Prop 1 water could be flexibly used based on State's request
  - South of Delta member water would move with the rest of transfer water in a year like 2021

What Purpose?

- Whatever purpose our members choose –
  - We are not limiting them beyond the limitations our water rights, Biological Opinions, ITP permits, and CA law

Reclamation's Operation of the Shasta-Trinity Division

Reclamation’s Operations of Shasta-Trinity

- Shasta-Trinity Division would continue to operate under all of the same obligations that exist today
  - Trinity River Restoration ROD
  - Fall flow action ROD
  - 1959 Contract
  - State Water Board orders
  - Etc
- Reclamation’s CVP water rights DO NOT include Sites as a Place of Use
  - Reclamation could not put CVP water in Sites without modifying its water rights
- Sites CANNOT request modifying the CVP water rights in our water right application
  - Sites is requesting to put Sites water in Sites – NOT CVP water in Sites

Other Topics from the Group

Sites

Thank you!

Sites

Sites

CDWR's modeling of the San Francisco Estuary Longfin Smelt population to evaluate new operational plans for the State Water Project and Central Valley Project: Critique

By Jonathan Rosenfield, Ph.D.,
San Francisco Baykeeper, Senior Scientist

with modeling assistance from
UC Davis Otolith Geochemistry and Fish Ecology Laboratory

Introduction

Longfin Smelt were once among the most abundant resident fish species in the San Francisco Bay Estuary (SFE). This population has experienced severe declines since sampling of the SFE's pelagic fish assemblage began in the late 1960's, including substantial declines in recent years. Other coastal populations of this species in California display low abundance and may have declined (CDFW 2009). Recent molecular evidence suggests that the SFE population may serve as a source of both genetic material and colonists for extant populations and unoccupied watersheds to the north (M. Finger. Personal communication, November 7, 2019). Thus, rapid reversal of declines in the SFE Longfin Smelt (LFS) population are important to the ecology of the SFE and may also be essential to the maintenance of this species throughout California.

Longfin Smelt are listed as a "threatened" species under the California Endangered Species Act. The SFE population of this species is "warranted but precluded" for federal listing. Given the well-established, strong, and persistent relationship between Delta outflow and Longfin Smelt abundance and productivity (Kimmerer 2002; Rosenfield and Baxter 2007. Kimmerer et al. 2009; Rosenfield 2010; Thomson 2010; Nobriga and Rosenfield 2016), current proposals to re-operate the Central Valley Project (2019 NMFS BiOp; 2019 USFWS BiOp; Reclamation 2019) and the State Water Project (CDWR 2019a,b) to increase exports and decrease Delta Outflow are likely to have a negative effect on the SFE Longfin Smelt population Thus, CDFW needs tools that can help the Department evaluate the effects of Project operations on LFS viability.

Nobriga and Rosenfield's population model

Nobriga and Rosenfield (2016) developed a quantitative population model (N&R Model[1]) for the SFE LFS population. The purpose of this model was to "*evaluate alternative conceptual models of Longfin Smelt population dynamics to better understand the forces that may constrain the species' productivity during different phases of its life cycle*." (Nobriga and Rosenfield 2016 at p. 44). Contrasting variants of a generalizable population model were parameterized using data from IEP's San Francisco Bay Study (Bay Study). These alternative models were evaluated for their ability to parsimoniously recreate historical LFS population dynamics, as reflected in the Fall Midwater Trawl (FWMT) time series. Results indicated that a

[1] For clarity, I distinguish here between the research presented in Nobriga and Rosenfield (2016) versus the best-fit model variant ("2abc") developed in that paper by referring to the latter as "N&R Model". Furthermore, I distinguish between the N&R Model and the computer code intended to recreate that model -- developed by ICF and MWD – by referring to the computer code as the "R-script".

two-stage population model with density-dependent terms for both recruits-per-spawner and spawners-per-recruit was superior to other conceptual models of local population dynamics that they studied.

Consistent with existing conceptual models and statistical analyses (Jassby et al. 1995; Kimmerer 2002; Rosenfield and Baxter 2007; Kimmerer et al. 2009; Rosenfield 2010; Thomson et al. 2010; Mac Nally et al. 2010), Nobriga and Rosenfield (2016) found that the effect of freshwater flow on relative abundance was statistically powerful and persistent – no other environmental variables contributed to the best-fit model. Nobriga and Rosenfield (2016) suggested that juvenile survival declined through the time series, but they could not demonstrate this conclusively or discriminate between a gradual, long-term decline in survival and a step-change in juvenile survival occurring in 1991.

Applying the N&R Model to compare outcomes among management alternatives
The N&R model was not designed or intended to be a predictive model of LFS population response to alternative management regimes. However, the model can be adapted to compare the relative impact of different management scenarios going forward. Properly applied, the N&R model can estimate (1) the relative differences in expected abundance among alternative operational scenarios; (2) the relative frequency of population growth under those scenarios; and (3) the relative frequency of quasi-extinction (a measure of extreme conservation risk) across scenarios. Also, certain aspects of the model that were of little consequence to Nobriga and Rosenfield's (2016) investigation could have important effects on model predictions in the context of comparing flow scenarios – the justification for these features should be investigated (see footnote 5, below).

Comparing outcomes from different management alternatives with the N&R model
Analyses of the outputs of the N&R model (or any quantitative model) must be valid and rigorous, especially when those outputs are used to evaluate proposed management alternatives. The use of the N&R model to compare alternative operational scenarios requires a different approach to analysis of model outputs than Nobriga and Rosenfield (2016) applied during their screening of conceptual models of LFS population biology. Because the N&R model was not designed to be predictive (in fact, it is known to under-estimate FMWT abundance indices; Nobriga and Rosenfield 2016), model outputs should be used for comparative purposes, to understand the relative difference between treatments. In this case, the appropriate basis for statistical comparisons are *differences* between alternatives *within* model runs (i.e., a paired analysis). By definition, sources of variance that are not related to Delta flow (e.g., randomization of model parameters or time trends that are not related to operational alternatives) should not affect the predicted *differences* among operational alternatives that only change Delta outflow. Consideration of non-flow sources of variance is not appropriate for evaluating the magnitude of differences among operational alternatives. Thus, even though the N&R model generates high variances in abundance indices under each operational alternative within model runs, this variance is of little consequence to the comparison between alternative

operational scenarios. On the other hand, the model's predictions regarding the effect of changes to Delta outflow are expected to be highly consistent, all other non-flow related parameters being equal.

ICF/MWD R-script version of the N&R Model
In 2018, ICF International and Metropolitan Water District developed a version of the N&R model coded in R (the "R-script"; ICF/MWD, July 2, 2018). The R-script was originally developed to analyze the effects of the CA WaterFix project. Several other variants of this model exist, including one that formed the basis of DWR's 2018 CESA ITP application (CDWR 2018); another that produced results found in DWR's 2019 CESA ITP application (CDWR 2019a), and one used to support the CEQA analysis of proposed SWP re-operation alternatives (CDWR 2019c)[2]. Some of these variants compare LFS population dynamics under alternative flow regimes that include historical Net Delta Outflow Index (NDOI), NDOI ±10%, NDOI ±5%, and NDOI + SWP exports (i.e., elimination of SWP exports). I had access to a variant of the R-script that performed this kind of comparison and I asked Dr. Levi Lewis, from UC Davis, to determine how it calculated and presented outputs.

Results from the R-Script: Recruits-per-Spawner and Relative Abundance
The R-script compares alternatives based on modeled median outcomes of each operational alternative within hydrological year-types. Comparing the predicted median RPS or median predicted abundance index under different flow alternatives is statistically questionable as is comparing those results within water-year type. The median is not a stable metric in this context; it likely represents a single year in each replicate and in each alternative*year-type combination. This single year may vary across replicates and alternative*year-type combinations, so comparing medians across alternatives does not necessarily provide a valid comparison of expected population performance in any given year. Also, the median is intended to reflect the central tendency ("average" or "typical" value) of a population. But, median abundance does not represent a "typical" result when the population is known to be declining. The SFE LFS population has declined by orders of magnitude over the past several decades and is very responsive to Delta outflows, which are highly variable; there is no "typical" RPS or abundance in this situation, the median depends on the starting value, the length of the period studied, and the sequence of Delta hydrologies.

[2] I have not been able to identify metadata that would indicate which of these model variants is the most recent and what, if any, differences exist among the variants. The Bay Institute attempted to run the DWR variant of the R-script unsuccessfully (B. Bennett, personal communication). TBI contacted one of the model's authors (C. Phyliss) for assistance and received some modifications to the code in mid-June 2019. TBI passed this model revision to me but it still did not function until small modifications were made to (a) fix a miss-specified selection and (b) source all of the function scripts directly; (Levi Lewis, personal communication, December 2019). I make no claim that this version of the R-script is identical to other variants; however, like the original R-script, it does appear to recreate some of Nobriga and Rosenfield's (2016) results. Model results presented here are intended to illustrate general patterns among operational variants and presentation flaws (which appear common to all the variants I have seen) that indicate invalid statistical comparisons.

Furthermore, it is not appropriate statistically to compare medians (or differences between medians) to estimates of variance around the mean (e.g., standard error); the ITP makes this mistake (CDFW 2019a e.g., footnote 2 of Table 4-10 at p. 4-59[3]), as do all the previous applications of the ICF/MWD R-script that I have reviewed. This error is particularly misleading when medians and mean values are widely divergent, as they are in the case of the R-script's projections of LFS abundance (Figure 1). If the median values are much smaller than the mean values (as they are in this case), then dividing the median by the error around the mean will erroneously suggest that the difference in medians is "small" relative to the variance (see, for example, CDWR 2019a e.g., at p. 4-57).

Not only does the ITP (and other applications of the R-script) compare the wrong estimate of differences between alternatives to the wrong estimate of variance, the R-script grossly overestimates this variance by incorporating sources of variability that are not relevant to the comparison of operational alternatives (e.g., CDWR 2019a e.g., at p. 4-57). The R-script does not appear to track the differences in predicted recruits-per spawner (RPS) or abundance indices among model variants *within* model runs (randomized replicates). Instead, the R-script lumps together the results for each alternative across model runs (replicates) for all years in a water-year type. This conflates several sources of variance, including that associated with variation in flow (which is very large, even within water year types, Figure 2), randomization of non-flow related parameters (e.g., density dependence), and the orders-of-magnitude historical decline in the LFS population. Variance due to these sources is not related to that caused by *differences* among flow alternatives and it is inappropriate to imply that differences among the alternatives are small because the variance in model outputs is artifically high.

The R-script displays modelled outputs using pre-set graphics (i.e., the graphics are part of the script). These graphics are extraordinarily misleading. The graphics produced in the ITP and ICF/MWD (2018) illustrate the underlying flaw in the way that the R-script estimates variance for the alternatives and compares the alternatives. For example, we know from Table 4-10 of the ITP (also Table 4-12) that decreases in Delta outflow under the proposed project lead to consistent decreases in median abundance; yet, the decline is difficult to see because it is compared to an estimate of variance that has nothing to do with the *differences* between alternatives (Figure 3)[4]. I was not able to make the R-script run a paired comparison of alternatives, but I was able to determine the relative size of the differences predicted among alternatives considered by this R-script variant.

[3] The approach described in the table footnote is inappropriate, in general. In particular, the decision to divide "by the Existing 95% confidence interval" is ambiguous, arbitrary, and misleading. The 95% confidence interval is roughly twice as large as the denominator value used in a t-test and other standard statistics (i.e., 1 standard deviation), so, use of the "95% confidence interval" has the effect of making the difference in medians seem even "smaller" compared to the variance.

Scaling the differences among alternatives in water-year median recruitment as a percentage change from median recruitment under the "NDOI" scenario allows one to see the relative magnitude of the effect of different alternatives; this is the essence of what it means to compare alternatives. When the erroneous error estimates described above are removed from the graphics, the R-script output reveals that the operational alternatives will produce large proportional changes in recruitment (Figure 4, bottom panel). In fact, the proportional changes in recruitment are larger than the proportional changes in flow represented by the operational alternatives (Figure 5). In other words, the population response to changing Delta outflow is disproportionately high. The precise median values generated by the R-script are unimportant in this context (and, as described above, the median is a suspect metric); what is relevant is that median recruitment is higher than the status quo under alternatives with higher Delta outflows (NDOI + 5%, NDOI +10%, and NDOI + SWP) and lower than the status quo in alternatives with lower flows. Predicted increases in median recruitment under the NDOI + SWP alternative (Net Delta Outflow equals actual NDOI for a given year plus SWP exports that year) as compared to NDOI alone were 9%, 36%, 25%, 30%, and 34% in wet[5], above normal, below normal, dry, and

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[5] The lower percentage increase related to adding flows in wet years is counterintuitive and may not be justified. Where the R-script predicts counter-intuitive or largely unprecedented outcomes, the proper approach is to investigate what model attributes drive those outcomes and then explore the basis for those elements. Here, the counterintuitive predictions are likely linked to assumptions underlying two functions in the N&R model; these same two functions are likely responsible for Nobriga and Rosenfield's findings that their model was (a) "too strongly density dependent" and (b) underpredicted the historical FMWT time series. In the context of evaluating supplementing Delta outflows during very wet years, the strength of assumptions underlying these functions should be investigated.

(1) Both the N&R model/R-script assume a "Ricker" density dependence function – this is a very strong form of density dependence. Nobriga and Rosenfield (2016) did not explore different forms of the density dependent function (e.g., Beverton-Holt) because (a) finding the best representation of density-dependence was not necessary to their research and (b) there were not sufficient data to discriminate among density-dependent functions. The Ricker term in the N&R model may artificially reduce the difference between flow alternatives when LFS abundance is relatively high, as it is following wet years – i.e., the Ricker term is an equalizer, but there is not sufficient evidence to know whether this degree of density dependence occurs in nature.

(2) The N&R model describes the relationship between recruits-per-spawner (RPS) and Delta outflow as a quadratic equation -- this causes RPS to decline at extremely high Delta outflows (Figure 6). As a result, the model sometimes predicts declines in abundance during very wet years and declines for operational alternatives that increase Delta outflows in very wet years (e.g., in 2017). But empirical data reveal high variance of RPS at high flows and the decision to use a quadratic RPS-flow relationship (as opposed to a linear relationship, for example) is driven by only one year in the data set (1983; Figure 6, lower panel). Again, Nobriga and Rosenfield (2016) could not investigate the best shape of the RPS-flow relationship because of limited data under very high flow conditions. Correcting or at least describing this function (e.g., by bounding it with results of a sensitivity analysis) will improve understanding of how the population behaves under different flow scenarios.

Across a vast range of flows, the N&R model identifies large population-level benefits to increasing outflow; these results are consistent with empirical observations (i.e., the actual data from various fish population monitoring programs). If further investigation reveals that the two features of the N&R model identified above are justified, such that the R-script predicts declines in LFS abundance when additional flows are added to already very high Delta outflows (e.g., NDOI+SWP in a year like 2017), then DFW should consider this specific finding as it evaluates SWP and CVP operations *in years with very high outflows*.

critical year types, respectively. Given that population size in one generation affects population size in the next generation (Nobriga and Rosenfield 2016), these differences among alternatives would be expected to compound over time (until the system's carrying capacity is reached).

Results from the R-script: Quasi-Extinction

The difference in extinction probabilities across flow management alternatives has obvious relevance for evaluating the effects of alternative operational scenarios on LFS conservation status. The R-script attempts to compare alternative futures by assessing the rate of LFS quasi-extinction using the N&R model. This is an entirely different exercise than Nobriga and Rosenfield (2016) presented; they used quasi-extinction only to assess the ability of different models to recreate a known data series. The question CDWR asks the R-script to explore (how often is population abundance expected to drop below a level of extreme concern, aka "quasi-extinction"?) requires a different approach to the quasi-extinction frequency metric. For example, the "seed" value employed in the R-script is many times higher than recent index values for LFS. Because it overestimates the starting population, the R-script will tend to underestimate quasi-extinction frequency. This may generate the erroneous impression that the current LFS population is not at grave risk of extinction. Also, Nobriga and Rosenfield (2016) defined quasi-extinction as $FMWT_{LFSindex}$= 1 because they wanted to evaluate model stability. But, the R-script is trying to evaluate conservation status of the LFS population, so hire thresholds of quasi-extinction thresholds (FMWT >1) are warranted. Using a quasi-extinction threshold value that is relevant to DFW's management responsibilities will result in higher rates of predicted quasi-extinction.

As with the evaluation of predicted future abundance under different operational alternatives, the key comparison of interest in this case is the *relative difference* in quasi-extinction rates among scenarios. Regardless of adjustments to model seed or quasi-extinction threshold values, the R-script is only capable of describing *relative differences* in the frequency of extinction. ICF/MWD (2018) compares the proportional frequency of quasi-extinction under various flow alternatives rather than presenting the *difference* in quasi-extinction rates among alternatives. Again, in order to compare differences in the relative likelihood of extinction (or quasi-extinction), a paired analysis must be employed.

Performing a valid analysis of quasi-extinction probabilities across management scenarios will require adjustments to the R-script described in this appendix and to its quasi-extinction tracker, in particular. To be clear, recent analysis by The Bay Institute confirms that the probability of extirpation of the SFE LFS population is extremely high (see attachment to NRDC 2020), even absent the additional adverse impacts of proposed SWP.

Despite these problems with the ICF/MWD analysis of quasi-extinction it is possible to illustrate the proper application of the modeled quasi-extinction rate. I compared the R-script's quasi-extinction estimate for each operational alternative to the "background" quasi-extinction rate represented by the NDOI scenario. The results indicate that quasi-extinction rates are ~11%

higher in the “NDOI minus 5%” flow scenario (Figure 5). This is a large increase to the probability of extinction, which is already very high.

Summary

The major analytical issues identified above notwithstanding, the R-script analyses available to me at this time reveals that the flow scenarios under consideration generate substantial differences in LFS productivity (RPS), abundance, and rates of quasi-extinction. In general, scenarios with lower Delta outflows, such as those considered in CDWR 2019a and 2019c, result in lower RPS, lower recruitment, and higher probability of extinction. Modeling reveals that the effect of changing flows produces a disproportionate response in recruitment of Longfin Smelt. This outcome is not surprising because Delta outflow is the only environmental variable that corresponds strongly to LFS population dynamics (Jassby et al. 1995; Kimmerer 2002; Rosenfield and Baxter 2007; CDFG 2010; Mac Nally 2010; Thomson 2010; Nobriga and Rosenfield 2016) and Delta outflow is the only environmental variable that warranted inclusion in Nobriga and Rosenfield’s (2016) best fit model (the N&R Model).

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Figures

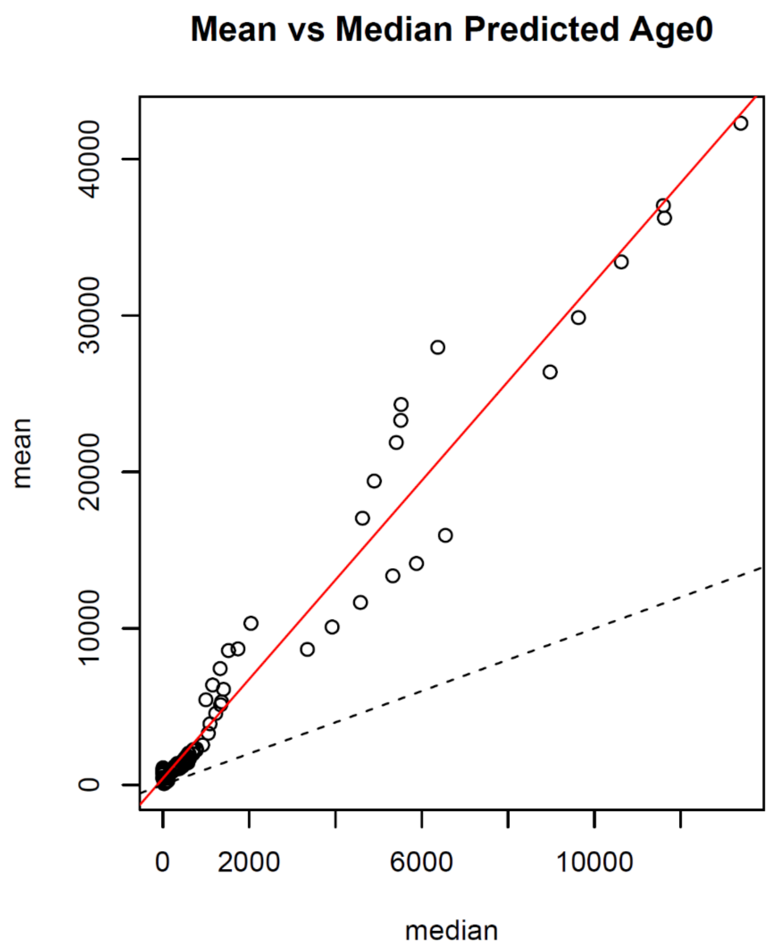


Figure 1: Median versus mean predicted Age 0 Longfin Smelt abundance as projected by the ICF/MWD 2018 R-script. The red-line is the best fit relationship between median and mean values; the dashed line represents a 1-to1 correspondence between the two types of average. Note that mean values modelled by the R-script are many times larger than corresponding median projections.

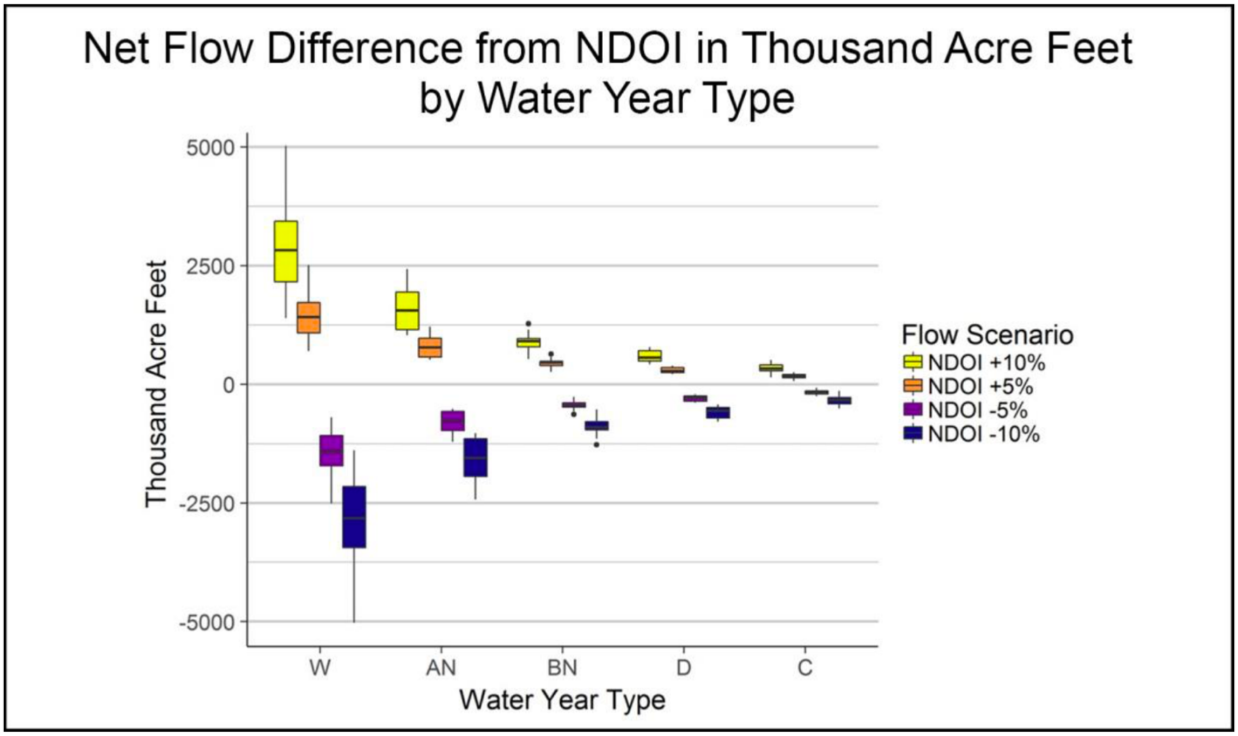
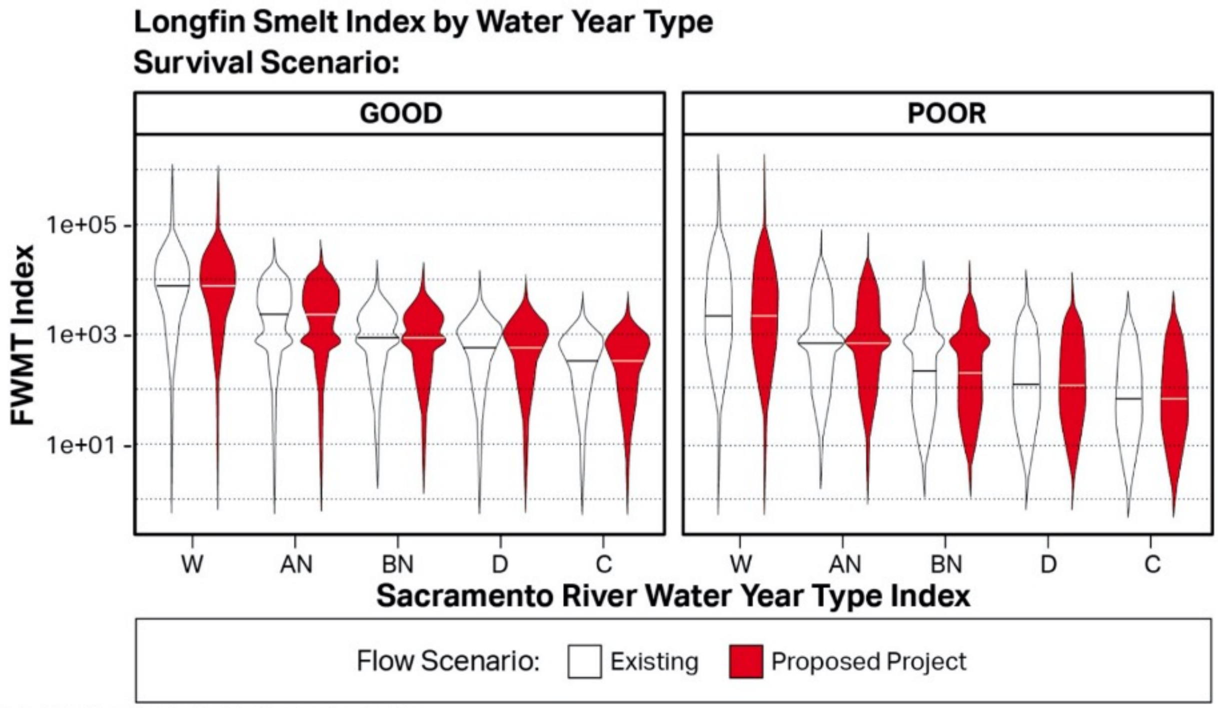


Figure 4-5. Box Plot Summary of Net Total December-May Delta Outflow Difference Between the NDOI Scenario and the Remaining Scenarios By Water Year Type

Figure 2: Differences in total December-May Delta outflow across different water year types and under different operational scenarios (colors of the boxes) as compared to NDOI (the status quo), which equals 0 on the y-axis, as modelled by CDWR (2018). Boxes and whiskers represent different boundaries on the variability of outflow in different water-year*operational scenario combinations. Note that outflow in wetter year-types is much more variable than in drier year types; variability of outflows within year-types contributes to high variability in LFS recruitment modeled by the ICF/MWD R-script. *Copied from CDWR 2018 Figure 4-5 at p. 6.*



Note: Median is indicated by the horizontal line.
FMWT = Fall Midwater Trawl

Figure 4-54. Violin Plots of Predicted Longfin Smelt Fall Midwater Trawl Index by Water Year Type

Figure 3: CDWR's portrayal of modelled differences in Longfin Smelt FMWT index values between existing and proposed operational alternatives for the SWP relative to modelled variance in those predictions. The consistent decline in predicted Longfin Smelt abundance under the proposed project versus existing conditions is obscured because medians (horizontal lines within the violin shapes) are inappropriately plotted in the context of total variance in predicted index values. Note that, viewed on this scale presented by the R-script, even doubling recruitment (for example) might be called a "small" change – but such a conclusion would be erroneous. *Copied from CDWR 2019a Figure 4-54 at p. 4-58.*

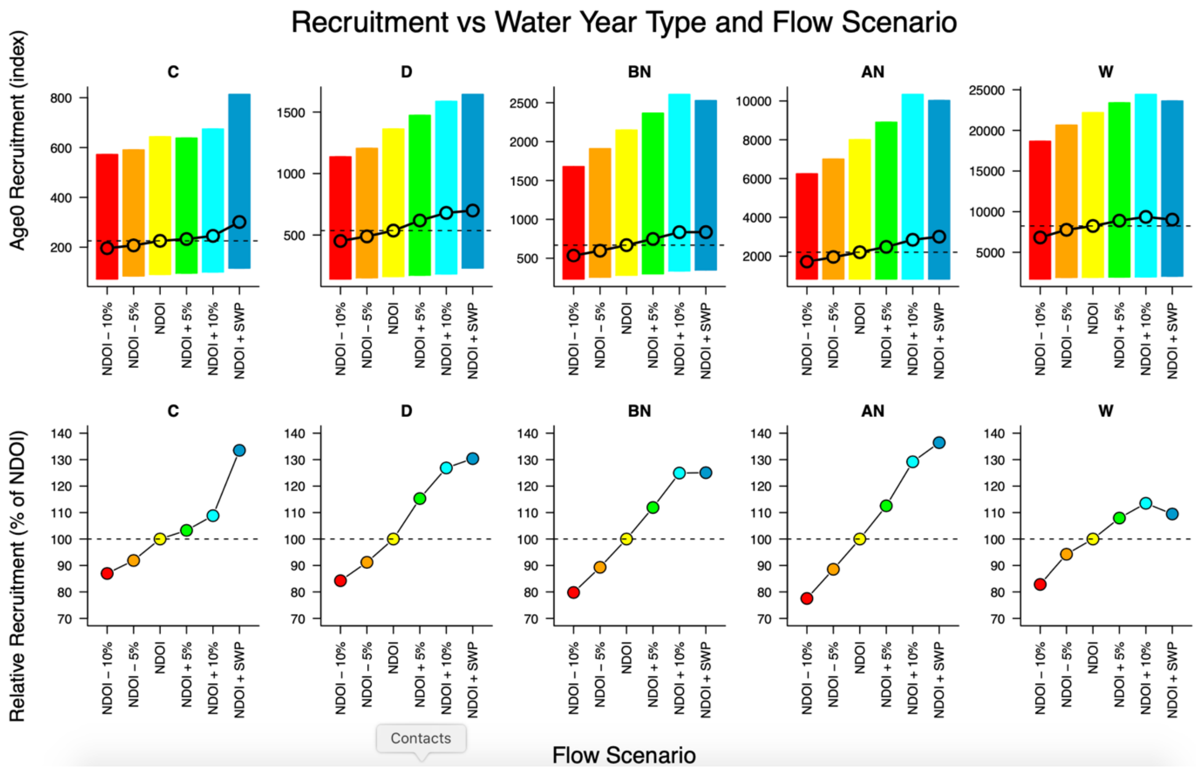


Figure 4: Longfin Smelt recruitment estimated by the ICF/MWD (2018) R-script for different water year types (C=Critically Dry; D=Dry; BN= Below Normal; AN=Above Normal; W=Wet) and operational scenarios (NDOI = net Delta outflow as it occurred in particular years). Top panel shows the median (circles) and variance across all model runs (colored bars) for each combination of year-type and operational scenario. Bottom panel shows the medians as a percentage of the NDOI scenario (status quo) – circles above the dashed line show higher median LFS recruitment than NDOI; circles below the dashed line show reduced LFS recruitment as compared to the status quo.

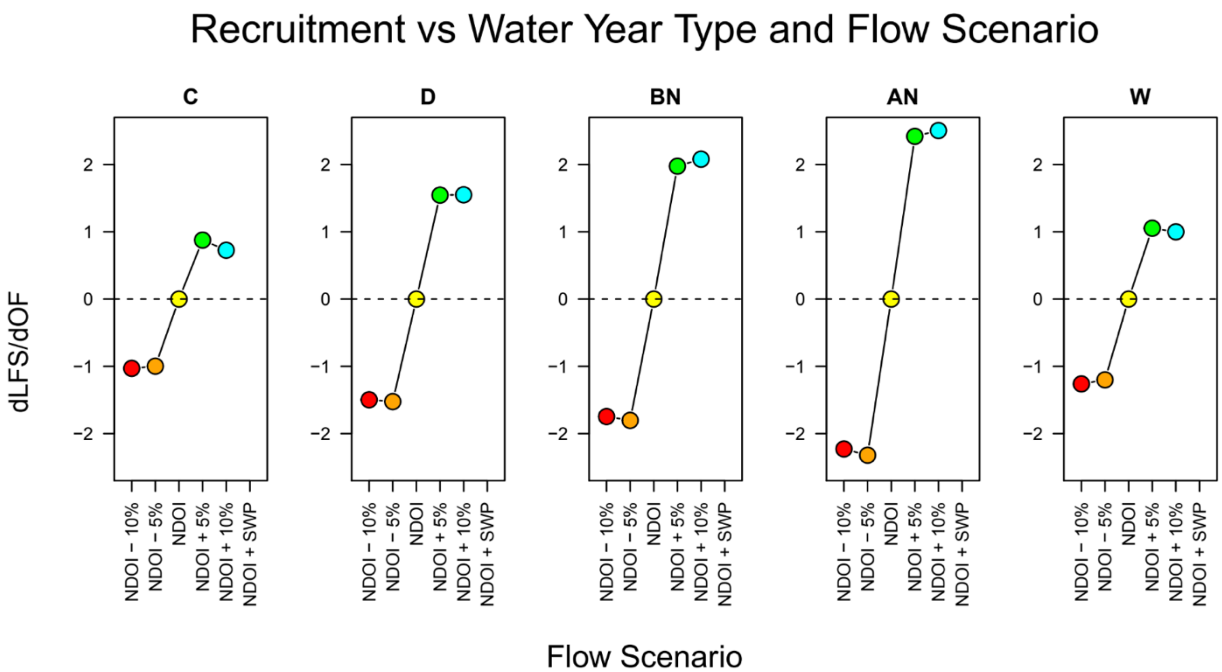


Figure 5: Relative change in Longfin Smelt recruitment (as predicted by the ICF/MWD 2018 R-script) under different operational scenarios. Scores reflect the percentage change in LFS recruitment (see figure 4) divided by the percentage change in the Net Delta Outflow Index for each scenario. Results are presented by water-year type. The status quo scenario (NDOI) is set to zero on the y-axis (i.e., it is the baseline). Values above the horizontal dashed line indicate positive changes in Longfin Smelt recruitment under a given scenario. Y-axis values greater than 1 indicate that the projected percentage change in Longfin Smelt recruitment under a given scenario was greater than the percentage change in flow under that scenario. (Values for the NDOI + SWP scenario are not shown because NDOI+SWP does not represent a consistent change in proportional outflow).

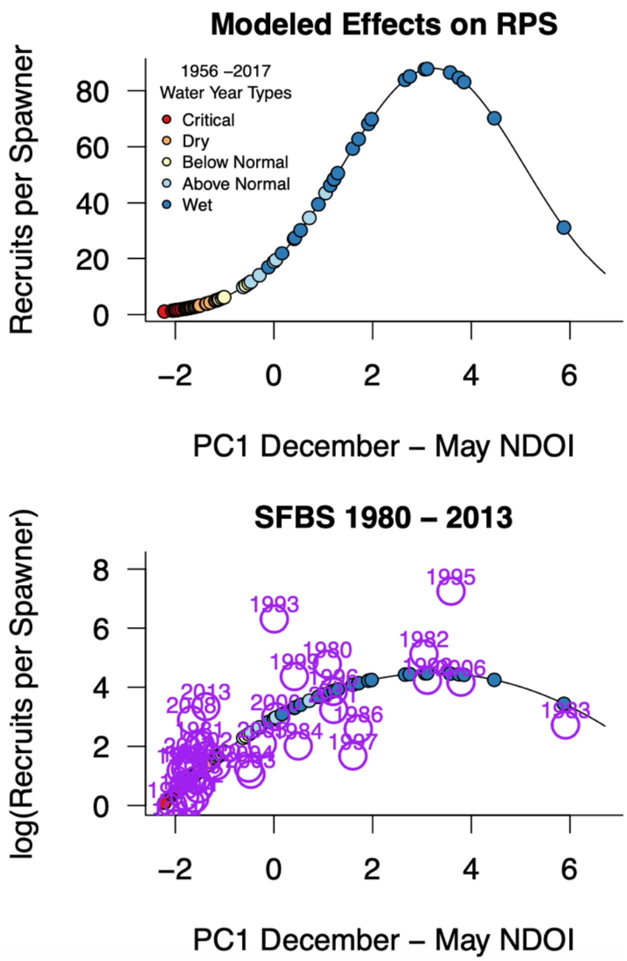


Figure 6: (referenced in footnote 5 of this appendix). Response of Longfin Smelt recruits per spawner (RPS) as a function of December through May NDOI, as modelled in the R-script (top panel) and as seen in actual data (open circles in the bottom panel). In years with the highest winter-spring outflows, the model forces a decline in RPS (top panel). When scenarios that add or subtract flow from NDOI are considered, scenarios that add Delta flows in very wet years (e.g., 1983, 2017) force the model to reduce Recruits-per-Spawner. However, this modeled decline in productivity is supported only by results in one year (1983). Nobriga and Rosenfield (2016) did not explore other forms of the RPS-flow relationship because they were evaluating conceptual models by their ability to recreate historic patterns in LFS abundance; they were not using the model to predict future outcomes of different operational scenarios.

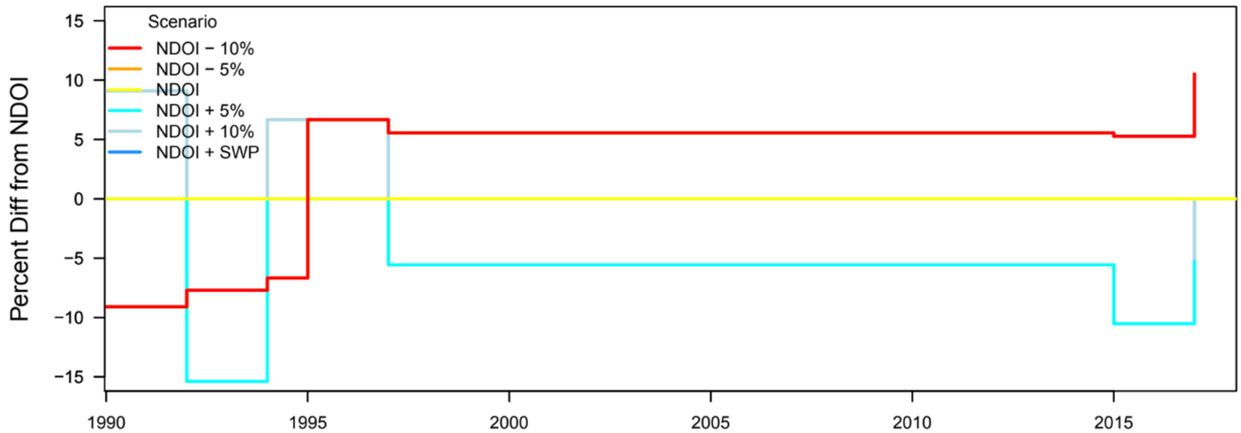


Figure 7: Percentage difference in the cumulative quasi-extinction of 100 replicates during modelled years 1990-2017, as estimated by the ICF/MWD (2018) R-script under different flow scenarios. Because the R-script is not designed to predict *actual* extinction events, but may be able to portray *relative* frequency of quasi-extinction, cumulative quasi-extinction events in each scenario are expressed relative to the NDOI baseline scenario (yellow line). Negative numbers indicate that cumulatively fewer model runs ended in quasi-extinction for a given scenario than for the baseline scenario, in the year indicated. This example is provided only to illustrate the appropriate use and comparison of quasi-extinction events among scenarios. More model runs ended in quasi-extinction in the lower outflow scenarios (after ~1995) compared to the status quo; by the last year of the scenario, quasi-extinctions occurred in ~11% more model runs under the NDOI-minus-10% outflow scenario than under the baseline scenario.

Making San Francisco Bay Better

July 29, 2014

Ryan Wulff
National Marine Fisheries Service
650 Capitol Mall, Suite 5-100
Sacramento, CA 95814

SUBJECT: Bay Delta Conservation Plan (BDCP) Draft Environmental Impact Report and Environmental Impact Statement

Dear Mr. Wulff:

Staff of the San Francisco Bay Conservation and Development Commission (BCDC) are pleased to commend the authors for BDCP's ground-breaking plan. As the first ever aquatic Habitat Conservation Plan/Natural Communities Conservation Plan (HCP/NCCP) in one of the most ecologically, legally and culturally complex areas in the world, the BDCP is an incredible first effort to craft a solution to many of the complex Bay and Delta issues.

In February 2014, Paul Helliker of the Department of Water Resources briefed BCDC Commissioners on the status of the multi-year BDCP project. In May, BCDC staff organized a panel discussion on the BDCP with Bay Area officials and experts (including Mr. Helliker) to highlight some of the concerns and questions the project raises with regard to resources found in San Francisco Bay and Suisun Marsh. Based on comments and questions during these events, the Commission's laws and policies, and staff review of the EIR/S prepared for the BDCP, staff prepared the following proposed comments on these environmental documents. On June __, 2014, BCDC Commissioners considered staff's recommended comments on the BDCP EIR/S and endorsed the comments in this letter.

To be clear, BCDC is commenting on the EIR/S as a responsible agency under CEQA. Implementing any or all of the conservation measure projects located in the Suisun Marsh or San Francisco Bay envisioned by BDCP will require BCDC-issued permits or consistency determinations. BCDC's policies that apply to the BDCP are noted in the last section of this letter.

Jurisdiction. BCDC is responsible for granting or denying permits for any proposed fill (earth or any other substance or material, including pilings or structures placed on pilings, and floating structures moored for extended periods), extraction of materials or change in use of any water, land or structure within the Commission's jurisdiction. Generally, BCDC's jurisdiction over San Francisco Bay extends from the Golden Gate south to San Jose and northeast to the confluence of the San Joaquin and Sacramento Rivers. It includes: tidal areas up to the mean high tide, including all sloughs, and in marshlands up to five feet above mean sea level; a shoreline band consisting of territory located between the shoreline of the Bay and 100 feet landward and parallel to the shoreline; salt ponds; managed wetlands (e.g., areas diked from the Bay and managed as duck clubs); and certain waterways tributary to the Bay. The Commission can grant a permit for a project if it finds that the project is either (1) necessary to the health, safety or welfare of the public in the entire Bay Area, or (2) is consistent with the provisions of the McAteer-Petris Act and the Suisun Marsh Preservation Act, and the San Francisco Bay Plan (Bay Plan) and the Suisun Marsh Protection Plan (Marsh Plan). The McAteer-Petris Act allows fill in the Bay for water-oriented uses in cases when there is no alternative upland location and requires that any fill that is placed in the Bay is the minimum that is necessary for the project. The McAteer-Petris Act also requires that proposed projects include the maximum feasible public access consistent with the project to the Bay and its shoreline.

Project components that extend into BCDC jurisdiction, including the Suisun Marsh, and may affect the waters and environmental resources farther downstream in San Pablo and San Francisco Bays, are subject to the BCDC policies and regulatory framework found in the McAteer-Petris Act, the Suisun Marsh Preservation Act, the Bay Plan, and the Marsh Plan where appropriate. In addition to any permits required under its state authority, BCDC must review federal actions, or federal permits and grants for actions, that affect the coastal zone pursuant to the federal Coastal Zone Management Act (CZMA), to determine their consistency with the Commission's federally-approved management program for the Bay.

San Francisco Bay and Suisun Marsh Effects. The EIR/S states that there would be no significant effects on San Francisco Bay. Commissioners, staff, other state agencies and members of the public raised concerns about possible project impacts west of the Delta in the Suisun Marsh and downstream in the San Francisco Bay. Some of these effects would be significant. Potential significant impacts include possible effects on salinity, sediment supply, and the consequences (intended and unintended) of various restoration programs, and their secondary impacts on Bay habitats and species. The Delta Stewardship Council's (DSC) Independent Science Board (ISB) concluded that more research and analysis is needed on areas west of the Delta to obtain a more complete picture of BDCP's cumulative effects. The ISB noted that "the hydrodynamic modeling needs to capture the entire domain of effects. The current Effects Analysis does not consider the influence of shifting timing of withdrawals on San Francisco Bay circulation patterns and ecology. This is a significant omission with ecologically important implications."

The ISB also noted that the BDCP did not evaluate areas downstream of the Delta (i.e., San Francisco Bay) even though the National Research Council (NRC) scientific review specifically stated that this area should be included. "Adequate justification for lack of consideration of impacts to San Francisco Bay was not provided ... in the document, although there are potential impacts. For example, the expected reduction in sediment supply has the potential impacts of: (1) tidal marshes in the Bay could be less resilient to sea level rise and; (2) increased water clarity in the Bay could render it more responsive to nutrient inputs." The EIR/S should better assess the potential effects on the Marsh and the Bay, identify potential impacts on salinity, sediment delivery and Bay species as potentially significant, and evaluate strategies to avoid or mitigate these effects. This analysis should establish clear standards and thresholds of significance, in consultation with scientific experts.

Water Quality and Salinity. Biological opinions from the National Marine Fisheries Service and the US Fish and Wildlife Service determined that habitat degradation in the Marsh for multiple sensitive species is due, in part, to reduced freshwater inflows from the Delta, yet the BDCP's analysis is lacking in this area. Current Delta fresh water outflows seem inadequate to support or recover endangered species. Studies project that the salinity in San Francisco Bay could increase by 0.30-0.45 practical salinity unit (psu) per decade due to the compounding effects of decreasing freshwater inflow and rising sea level (projected by Cloern et al. 2011 to rise approximately 4 inches per decade). Climate change will affect future Bay salinity and the restoration and conservation measures proposed in the EIR/S. Higher salinity in the Suisun

Marsh due to high diversion years would affect managed wetlands and the Bay's native species, such as the Dungeness Crab, that use the lower salinity of the Bay as a nursery. Also, waterfowl that rely on the lower salinity/freshwater of the Marsh as breeding habitat may be at risk, as higher salinity levels have been shown to be dangerous to ducklings. However, these species are not included in the BDCP's analysis.

The EIR/S states that the BDCP would be implemented using a "decision tree process, a focused form of adaptive management that will be used to determine at the start of new operations, the fall and spring outflow criteria that are required to achieve the conservation objectives of the BDCP for delta smelt and longfin smelt and to promote the water supply objectives of the BDCP. Other BDCP-covered fish species, including salmonids and sturgeon, may also be affected by outflow. Their outflow needs will also be investigated as part of the decision tree process." The EIR/S should clarify how the proposed pipelines will be managed in the long term (e.g., 50 years) given recurring droughts that require changes in future flow regimes. The BDCP should evaluate flow scenarios that provide greater freshwater flows to the Bay beyond the requirements of D1641[1] to recover declining fish populations. Decreased reliance on Delta freshwater diversions may become necessary to protect sensitive and threatened species. Scenario F (Alternative 8: pipeline/tunnel alignment, dual conveyance, intakes at 2, 3 & 5, with 9,000 cfs diversion) would increase Delta outflow up to 1.5 million acre-feet annually. A project alternative that provides for greater Delta outflows is likely necessary to meet the policy objectives in the *San Francisco Bay Plan* (Bay Plan) and the *Suisun Marsh Protection Plan* (Marsh Plan). Also, the EIR/S should evaluate potential impacts on non-listed Marsh and Bay species that rely on salinity levels characteristic of the Bay and the Marsh as required by current X2 standards.

Conservation Measures. Most Conservation Measures are discussed at a programmatic level, rather than at a project level in the EIR/S. The ISB noted that, "the difference in level of detail [of restoration project analyses] presented effectively treats the co-equal goals unequally. We are concerned that the merely programmatic analysis of habitat restoration provides too little basis for decision-making by the Delta Stewardship Council and other parties. Furthermore, the benefits of habitat restoration are assumed when a beneficial cumulative impact is concluded under NEPA or a less than significant cumulative impact is concluded under CEQA. Achieving beneficial conservation measures requires understanding limiting factors, ecosystem processes, sequencing, adaptive management responses, thresholds for certain actions, and interactions and other consequences of these actions…to describe how major uncertainties will be resolved." Also, the Effects Analysis recognizes that suspended sediment has been declining in the Sacramento River, but no analysis of the potential for corresponding increased algal blooms is addressed.

Specific locations for habitat improvements are not discussed in the restoration opportunity areas, including those in the Suisun Marsh. The EIR/S would benefit from further analysis of restoration patterns in the Marsh to determine how they affect salinity patterns in the Marsh and Delta. This may help focus the restoration efforts to specific regions of the Marsh to limit salinity intrusion. There is little discussion in the EIR/S of the effects of climate change on conservation measures. Some Conservation Measures that involve habitat restoration or enhancement should be addressed at a project level of detail in the EIR/S so that they can be implemented early in the project cycle, in timeframes consistent with Conservation Measure 1. Also, additional conservation measures may be needed to address project effects on the Marsh and the Bay, particularly those related to sediment management.

[1] D1641 refers to a State Water Board water rights Decision of 2005 that set water quality (salinity) standards for various monitoring stations in the Bay and Delta and amends certain water rights by assigning responsibilities to the persons or entities holding those rights to help meet the salinity objectives.

Sediment. The BDCP EIR discusses a potential reduction in suspended sediment transport to the Suisun Marsh and San Francisco Bay of approximately eight to ten percent. The EIR/S does not characterize this change as a significant impact. The ISB report to the Delta Stewardship Council raises this as a significant issue. United States Geological Survey researchers have observed a steep reduction suspended sediment concentrations in the Bay and characterize San Pablo Bay as erosional. With projected sea level rise, further reduction in Bay sediment inputs should be considered significant, given Bay wetland restoration targets, current subsided diked-baylands, and the overall Bay-Delta sediment budget. Sediment settling in the new northern forebay, the relocation of flows from channels into underground pipes, new pumping regimes and proposed restoration conservation measures together and separately will alter sediment transport, delivery, and the rate of deposition downstream. Reduced suspended sediment in the Bay will exacerbate nutrient loading problems caused from the sewage treatment plants discharging into the Bay.

Construction of restoration projects, which are highly desirable in the Delta upstream of the Bay, likely will create sediment sinks, thus further reducing sediment flows to the Marsh and San Francisco Bay. The cumulative impacts analysis should consider all of these changes to the Bay sediment regime, using science-based thresholds of significance.

Cumulative Effects. There are several related projects that, cumulatively, could exacerbate the effects of BDCP and adversely affect the Bay and the Marsh that are not addressed in the EIR/S. These projects include, but are not limited to, dredging the Baldwin Ship Channel (between San Pablo Bay and the Port of Stockton) that may include constructing a sill in the Carquinez Strait; proposals to construct seasonal drought barriers or gates in the Delta; and, several proposed water storage projects on existing dams and reservoirs. The issue of storage should be addressed within BDCP, particularly planned projects. The EIR/S should address cumulative impacts of all relevant related projects.

BCDC's Relevant Policies and Related Agreements

Bay Plan Findings and Policies. The Commission's Bay Plan recognizes the tremendous ecological value of the Bay-Delta estuary and the importance of fresh water inflows from the Delta to the survival of fish and wildlife in the Bay and Suisun Marsh. When revising the EIR/S to respond to the Commission's comments and concerns, the authors should consider these applicable findings and policies:

Bay Plan findings on Tidal Marshes and Tidal Flats state, in part, that "San Francisco Bay is a substantial part of the largest estuary along the Pacific shore of North and South America and is a natural resource of incalculable value" and that "the sheltered waters of estuaries support unique communities of plants and animals specially adapted for life in the region where rivers meet the coast."

Bay Plan findings and policies recognize the importance of fresh water inflows to the ecosystem of the Bay. Bay Plan findings on Fish, Other Aquatic Organisms and Wildlife state, in part, that "conserving fish, other aquatic organisms and wildlife depends, among other things, upon availability of ...proper fresh water inflows, temperature, salt content, water quality, and velocity of the water." Fresh Water Inflow Finding A states that "[f]resh water flowing into the Bay, most of which is from the Delta, dilutes the salt water of the ocean flowing into the Bay through the Golden Gate....This delicate relationship between fresh and salt water helps to determine the ability of the Bay to support a variety of aquatic life and wildlife in and around the Bay."

Bay Plan findings and policies also recognize the impact of pollutants passing through the Delta into the Bay. Bay Plan findings on Water Quality state, in part, that "water from approximately 40 percent of California drains into San Francisco Bay carrying with it pollutants from point and nonpoint sources" and that "harmful effects of pollutants reaching the Bay can be reduced by maximizing the Bay's capacity to assimilate, disperse, and flush pollutants by maintaining and increasing...the volume and circulation of water flowing in and out with the tides and in fresh water inflow."

The Bay Plan's Fresh Water Inflow policies require limits on water diversions, preservation of the Suisun Marsh, and cooperation with the State Water Board to ensure adequate fresh water inflow. Policy 1 states that "[d]iversions of fresh water should not reduce the inflow into the Bay to the point of damaging the oxygen content of the Bay, the flushing of the Bay, or the ability of the Bay to support existing wildlife." Policy 2 states that "[h]igh priority should be given to the preservation of Suisun Marsh through adequate protective measures, including maintenance of fresh water inflows." Finally, Policy 3 states, in part, that the "Bay Commission should cooperate with the State Board and others to ensure that adequate fresh water inflows to protect the Bay are made available."

Suisun Marsh Preservation Act. The Nejedly-Bagley-Z'berg Suisun Marsh Preservation Act of 1974 directed BCDC and the California Department of Fish and Game (CDFG) to develop the Suisun Marsh Protection Plan, which was codified into law as the Suisun Marsh Preservation Act of 1977. The Act recognizes the important role of the Suisun Marsh in providing wintering habitat for waterfowl using the Pacific Flyway and critical habitat for other wildlife, including rare and endangered species.

The Suisun Marsh, where salt and fresh water meet and mix, contains approximately 85,000 acres of tidal marsh, managed wetlands, and waterways in southern Solano County. It is an important part of the Bay-Delta ecosystem and requires adequate fresh water inflows to maintain its fish and wildlife habitat.

Section 29003 of the Act finds that continued wildlife use of Suisun Marsh requires, among other things, "[p]rovision for future supplemental water supplies and related facilities to assure that adequate water quality will be achieved within the wetland areas."

Section 29010 finds that "[w]ater quality in the marsh is dependent on the salinity of the water in sloughs of the marsh, which depends in turn on the amount of fresh water flowing in from the Delta."

Suisun Marsh Protection Plan. The Plan recognizes that Suisun Marsh contains "the unique diversity of fish and wildlife habitats characteristic of a brackish marsh." The Plan emphasizes the need to maintain adequate fresh water inflows to preserve this unique habitat.

Water Supply and Quality Finding 2 of the Plan states, in part, that "[t]he most important source of fresh water inflow to the Suisun Marsh is the outflow from the Sacramento-San Joaquin River Delta."

Finding 9 states, in part, that "[t]he State Water Resources Control Board in its Delta Decision, and the Environmental Protection Agency and the Regional Water Quality Control Board in the Water Quality Control Plan for the San Francisco Bay Basin, have set water and soil salinity standards for the Marsh."

Finding 10 states, in part, that "[a]ssuring that sufficient quantities of fresh water will be available to the Marsh to meet the standards and marsh management requirements is as important as determining appropriate water quality standards for the Marsh."

Water Supply and Quality Policy 1 states, in part, "there should be no increase in diversions by State or Federal Governments that would cause violations of existing Delta Decision or Basin Plan standards."

Policy 2 states, "Adequate supplies of fresh water are essential to the maintenance of water quality in the Suisun Marsh. Therefore, the State should have the authority to require the Bureau of Reclamation to comply with State and Federal water quality standards for the Delta and the Marsh. This should be accomplished through Federal legislation if necessary."

Policy 4 states, in part, that "[w]ater quality standards in the Marsh should be met by maintaining adequate inflows from the Delta."

Finally, BCDC staff want to thank you again for providing the Commission with such tremendously helpful opportunities to learn about BDCP. If you have any questions about the comments in this letter or any other matter, please do not hesitate to contact me at (415) 352-3653 (lgoldzband@bcdc.ca.gov), or Joe LaClair, Chief Planner at (415) 352-3656 (joel@bcdc.ca.gov).

Sincerely,

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Executive Director

cc: Commissioners and Alternates
Paul Helliker, Department of Water Resources
Carl Wilcox, Department of Fish and Wildlife
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