February 16, 2023

Zachary Simmons, Project Manager
U.S. Army Corps of Engineers, Sacramento District
1325 J Street
Sacramento, CA 95814

Sent via email to DLL-DCP-EIS@usace.army.mil

RE: Comments on Draft Environmental Impact Statement for the Delta Conveyance Project

Dear Mr. Simmons,

On behalf of the Natural Resources Defense Council, San Francisco Baykeeper, Pacific Coast Federation of Fishermen's Associations, Institute for Fisheries Resources, California Indian Environmental Alliance, Restore the Delta, Friends of the River, California Sportfishing Protection Alliance, Planning and Conservation League, Defenders of Wildlife, Save the Bay, Save California Salmon, Golden State Salmon, and the Bay Institute, we are writing to provide comments on the Draft Environmental Impact Statement for the Delta Conveyance Project ("DEIS"). As discussed below and in the attachments, the DEIS's failure to analyze the environmental impacts of operations of the Delta Conveyance Project, as part of the coordinated operations of the State Water Project ("SWP") and federal Central Valley Project ("CVP"), is inconsistent with the National Environmental Policy Act ("NEPA"), the U.S. Army Corps of Engineers' ("Army Corps") regulations under section 404 of the Clean Water Act, and the Army Corps' NEPA regulations, and the proposed project and alternatives are likely to result in significant adverse environmental impacts that are not disclosed in the DEIS.

I. The DEIS' failure to analyze the environmental impacts of operating the Delta Conveyance Project violates NEPA, Section 404 of the Clean Water Act, and the Army Corps' regulations:

A. The DEIS' Failure to Analyze Environmental Impacts from Operations of the Proposed Project Violates NEPA

NEPA requires federal agencies to take a "hard look" at the environmental impact of a proposed project. *See, e.g., Baltimore Gas & Elec. Co. v. NRDC*, 462 U.S. 87, 97 (1983); *Or. Nat. Desert Ass'n v. U.S. Bureau of Land Mgmt.*, 625 F.3d 1092, 1099 (9th Cir. 2010). The proposed project that should be analyzed in this DEIS is the construction and operation of the Delta Conveyance Project, which is proposed to be integrated into part of the coordinated operations of the State Water Project and federal Central Valley Project. Indeed, the DEIS admits in numerous places that the proposed project is not limited to construction, but includes operations of the new project as part of the CVP and SWP. For instance, the DEIS' description of the proposed action states that the project "would divert water from two new intakes," that "water would be conveyed in a single tunnel," that the project would "provide flexibility for operating both the new and existing facilities," and that "[u]nder all of the action alternatives, operating the new conveyance facilities in conjunction with SWP's existing south Delta export facilities at Clifton Court Forebay would create a dual conveyance system." DEIS at ES-1 to ES-2. Similarly, the DEIS' description of the Project Needs and Objectives includes operating the project. *Id*. at ES-1 (defining the needs and objectives to include "to deliver water," and to "provide operational flexibility").

However, the DEIS fails to consider the environmental impacts of operating the proposed project and alternatives on water quality, fish and wildlife, and many other resources categories under NEPA.[1] *See* DEIS at ES-13 (fish and wildlife); *id*. at ES-34 (water quality); *id*. at ES-32 (surface water). Instead, the DEIS states that, "Effects that result from operation of the action alternatives are not within USACE's authority and are not covered by this EIS. Brief descriptions of the effects of operations are included in Chapter 3, where appropriate; however, they will not be included here." *Id*. at ES-32; *see id*. at 1-1, 3.0-1 to 3.0-2.

The failure of the DEIS to consider the environmental impacts from operations of the proposed project, as part of the coordinated operation of the CVP and SWP, violates NEPA. As discussed *infra*, the proposed project and alternatives result in substantial changes to operations of the federal CVP, as well as substantial changes to the coordinated operations of the CVP and SWP,

[1] Inexplicably, the DEIS states that it considers the potential environmental impacts of continued operations of the SWP and CVP together with the Delta Conveyance Project in some resource categories, such as effects on agricultural lands. *See* DEIS at ES-11 ("Continued activities related to operation of SWP and CVP facilities would not result in the conversion of any Important Farmland to nonagricultural use. If the project was not constructed and operated, other foreseeable state water supply projects would result in the conversion of Important Farmland."); *see id*. at 3.3-23 to 3.3-24 (assessing greenhouse gas emissions from the ongoing operations of the CVP and SWP).

that result in significant environmental impacts that are not disclosed in the DEIS. Furthermore, to the extent that the DEIS can lawfully exclude consideration of the environmental impacts from the operations of the proposed project under the Army Corp's regulations implementing NEPA, this exclusion demonstrates that the Army Corps is not an appropriate lead agency for the DEIS, particularly given the extensive federal role in the coordinated operations of the State Water Project and Central Valley Project, which is part of the proposed project.

B. The DEIS' Failure to Analyze Environmental Impacts from Operations of the Proposed Project Violates Section 404 of the Clean Water Act and Implementing Regulations

The DEIS's failure to analyze the effects of operations of the proposed project and alternatives violates section 404 of the Clean Water Act and implementing regulations. The regulations require that in making factual determinations regarding the effects of proposed discharge of fill under section 404, the Army Corps must consider secondary effects on the aquatic ecosystem, which "are effects on an aquatic ecosystem that are associated with a discharge of dredged or fill materials, but do not result from the actual placement of the dredged or fill material. Information about secondary effects on aquatic ecosystems shall be considered prior to the time final section 404 action is taken by permitting authorities." 40 C.F.R. § 230.11(h)(1). The regulations explain that such secondary effects that must be considered include "fluctuating water levels in an impoundment and downstream associated with the ***operation*** of a dam." *Id*. §230.11(h)(2) (emphasis added). Section 404 therefore requires the Army Corps to consider the environmental impacts of the coordinated operations of the SWP and CVP, including the operations of the proposed Delta Conveyance Project, as secondary effects under section 404.

The U.S. Environmental Protection Agency reached a similar conclusion in the attached 2015 letter to the Army Corps, which emphasized that the Bay Delta "is an aquatic resource of national significance," and expressed concern that operations of the previously considered Delta conveyance project (California WaterFix) "will affect the direction, volume, and timing of freshwater flows through the Delta. As the Bay-Delta ecosystem has suffered significant degradation, it is essential that the direct ***and secondary effects*** of the proposed discharges avoid further contribution to its degradation." *See* Letter from U.S. Environmental Protection Agency to the Army Corps of Engineers dated November 9, 2015 (emphasis added), attached hereto as Exhibit A.

The Clean Water Act section 404 regulations require consideration of secondary effects, which in this case includes effects from changes to the coordinated operations of the CVP and SWP that result from construction of the Delta Conveyance Project. Therefore, even assuming that the DEIS can lawfully be limited to analysis of issues within the Corps' jurisdiction, the DEIS must be revised to include analysis of environmental impacts from changes to the operations of the CVP and SWP.

C. The DEIS' Failure to Analyze Environmental Impacts of the Operations of the Proposed Delta Conveyance Project Violates the Army Corps' NEPA regulations

Even assuming for the sake of argument that (1) operations of the Delta Conveyance Project were not part of the proposed project and that analysis of operations is not required under NEPA and (2) analysis of the environmental impacts of operations of the project were not required under section 404 of the Clean Water Act, the Army Corps' NEPA regulations require an EA or EIS to analyze impacts beyond the scope of the Army Corps' permitting jurisdiction under certain circumstances that are met in this instance. *See* 33 C.F.R. §325, App. B at §§7(b), 8(d). First, the regulated activity is not "merely a link" in a corridor type project, but instead, the regulated activity – permits to allow for dredge and fill and the modification of levees for construction of the new pumping plants for the Delta Conveyance Project – is fundamental to the construction and operation of the proposed project. Second, the operations of the project will affect waters of the United States throughout the Bay-Delta watershed. Third, and most importantly, there is extensive cumulative federal control and responsibility for the project because it involves the coordinated operations of the State Water Project and federal Central Valley Project and will require federal permitting under the Endangered Species Act[2] and other laws. *Id*. As the regulations explain,

> Similarly, if an applicant seeks a [Department of the Army] permit to fill waters or wetlands on which other construction or work is proposed, the control and responsibility of the Corps, as well as its overall Federal involvement would extend to the portions of the project to be located on the permitted fill. However, the NEPA review would be extended to the entire project, including portions outside waters of the United States, only if sufficient Federal control and responsibility over the entire project is determined to exist; that is, if the regulated activities, and those activities involving regulation, funding, etc. by other Federal agencies, comprise a substantial portion of the overall project. In any case, once the scope of analysis has been defined, the NEPA analysis for that action should include direct, indirect and cumulative impacts on all Federal interests within the purview of the NEPA statute. The district engineer should, whenever practicable, incorporate by reference and rely upon the reviews of other Federal and State agencies.

[2] Biological opinions under section 7 of the Endangered Species Act must consider the whole of the action, which in this case would include both construction and operation of the proposed Delta Conveyance Project. *See, e.g., Connor v. Burford*, 848 F.2d 1441, 1457-1458 (9th Cir. 1988). Furthermore, no state or federal agency could lawfully obtain and implement a biological opinion for the construction and operation of a Delta Conveyance Project without first analyzing the environmental impacts of the construction and operation of the project under NEPA. *See San Luis & Delta Mendota Water Authority v. Jewell*, 747 F.3d 581, 645-655 (9th Cir. 2014). A lawful analysis of the effects of construction and operation of the proposed Delta Conveyance Project under NEPA is a necessary prerequisite to any agency being able to construct a Delta Conveyance Project.

33 C.F.R. § 325, App. B, § 7(b)(3).

As discussed *infra*, notwithstanding the deep flaws in the State's draft analysis under the California Environmental Quality Act, the California Department of Water Resources' Draft Environmental Impact Report ("DEIR") demonstrates that the proposed project and alternatives will result in changes to operations of the federal Central Valley Project operated by the Bureau of Reclamation, as well as changes to the coordinated operations of the State Water Project and Central Valley Project, and that these changes to operations of the CVP and SWP as part of the proposed project and alternatives will result in significant environmental impacts that are not disclosed in the DEIS. For all of these reasons, the Army Corps' regulations require the DEIS to consider the operational impacts of the proposed project, and the DEIS must be substantially revised and recirculated to analyze the environmental impacts from operations of the proposed project and alternatives.

II. The Construction and Operation of the Proposed Project and Alternatives is Likely to Cause Significant Environmental Impacts that are Not Considered in the DEIS:

As the attached comments on the DEIR demonstrate, the proposed project and alternatives are likely to result in significant environmental impacts that are not considered in the DEIS. *See* Exhibit B. For instance, the DEIR demonstrates that the proposed project and alternatives result in changes to operations of the federal Central Valley Project, such as reducing storage at Shasta Reservoir in dry years, as well as broadscale changes in the coordinated operations of the State Water Project and federal Central Valley Project. As discussed in the attachment, these changes in operations of the CVP and SWP are likely to result in significant environmental impacts that are not disclosed in the DEIS.

In addition, we note that other state agencies have raised concerns with the environmental impacts of the proposed project and alternatives, the analysis of potential impacts, the environmental baseline, and the failure to consider a reasonable range of alternatives as required by CEQA (and NEPA). *See* Exhibit C. The numerous flaws in the DEIR identified by these state agencies, as well those identified in the comment letter from NRDC et al, preclude the Army Corps from relying on the DEIR to assess environmental impacts from operations of the proposed project.

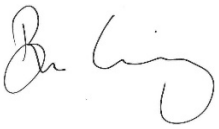
III. Conclusion

The DEIS' failure to consider the environmental impacts of the operation of the proposed Delta Conveyance Project and alternatives violates NEPA, section 404 of the Clean Water Act, and precludes DWR from obtaining a biological opinion under the ESA for the construction of the proposed project. At a minimum, the Army Corps must substantially revise the DEIS to consider environmental impacts of operating the proposed project and alternatives and recirculate the revised DEIS for public review and comment.

Thank you for consideration of our views.

Sincerely,

Doug Obegi
Natural Resources Defense Council



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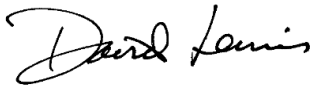

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OFFICE OF THE
REGIONAL ADMINISTRATOR

Colonel William J. Leady, District Engineer
U.S. Army Corps of Engineers, Sacramento District
1325 J Street, 14th floor
Sacramento, California 95814-2922

Subject: Public Notice number SPK-2008-00861 for the proposed California WaterFix project, Sacramento, San Joaquin, Alameda, Contra Costa, and Yolo counties, California

Dear Colonel Leady:

I am writing regarding the proposed discharges of dredged or fill material associated with the California WaterFix project, as described in the subject Public Notice, pursuant to paragraph 3(b) of our agencies' 1992 Memorandum of Agreement implementing Section 404(q) of the Clean Water Act.

The location of the proposed discharges, the San Francisco Bay/Sacramento-san Joaquin Delta (Bay Delta), is an aquatic resource of national importance. The Bay Delta supports hundreds of aquatic and terrestrial species, many threatened or endangered, and serves as the hub for federal and state water projects that provide drinking water to over 27 million Californians and irrigation water to 4 million acres of farmland. In 1987, Congress recognized its significance by directing EPA to give it priority consideration under the National Estuary Program to attain and maintain water quality for water supplies and the protection and propagation of indigenous fish, shellfish, and wildlife.

According to the Public Notice, the proposed discharges will result in the permanent loss or conversion of approximately 775 acres of waters of the United States, including tidal marsh and forested wetlands. Additionally, the proposed project operations will affect the direction, volume, and timing of freshwater flows through the Delta. As the Bay Delta ecosystem has suffered significant degradation, it is essential that the direct and secondary effects of the proposed discharges avoid further contribution to its degradation. Unless mitigated, the proposed discharges will have substantial and unacceptable impacts on the Bay Delta ecosystem, and EPA is committed to working with federal and state stakeholders to avoid these impacts and ensure water supply security for California.

Please do not hesitate to call me at (415) 947-4235 or have your Regulatory Division Chief contact Jason Brush, our Wetlands Section Supervisor, at (415) 972-3483.

Sincerely,

Jared Blumenfeld

cc: Will Stelle, Regional Administrator, National Marine Fisheries Service, West Coast Region
Ren Lohoefener, Regional Director, U.S. Fish and Wildlife Service, Pacific Southwest Region
David Murillo, Regional Director, Bureau of Reclamation, Mid Pacific Region
Tom Howard, Executive Director, California State Water Resources Control Board
Mark Cowin, Director, California Department of Water Resources
Cassandra Enos-Nobriga, Program Manager, Department of Water Resources
Chuck Bonham, Director, California Department of Fish and Wildlife

December 16, 2022

Department of Water Resources
Attention: Delta Conveyance Office
P.O. Box 942836
Sacramento, CA 94236-0001

Sent via email to: deltaconveyancecomments@water.ca.gov

RE: Comments on Delta Conveyance Draft Environmental Impact Report

To Whom It May Concern:

On behalf of the Natural Resources Defense Council, the Bay Institute, California Sportfishing Protection Alliance, Defenders of Wildlife, Pacific Coast Federation of Fishermen's Associations, Institute for Fisheries Resources, Save the Bay, Restore the Delta, San Francisco Baykeeper, Golden State Salmon Association, Save California Salmon, California Indian Environmental Alliance, Friends of the River, and the Planning and Conservation League, we are writing to provide public comments on the Delta Conveyance Draft Environmental Impact Report ("DEIR"). The DEIR fails to comply with CEQA and must be substantially revised and recirculated in order to provide the public and decisionmakers with accurate information regarding the potential environmental impacts of the proposed project and alternatives.

As discussed in more detail below, the DEIR:

- Fails to consider a reasonable range of operational alternatives, including one or more alternatives that do not propose continued implementation of the Trump Administration's biological opinions, which the California Natural Resources Agency has challenged in federal court as unlawful and inadequately protective of listed species and which has been remanded by the court, as well as a range of operational criteria for the proposed North Delta intakes;

- Uses an Improper Project Purpose and Objectives to Exclude Alternatives;
- Uses an Unlawful Environmental Baseline that Misleads the Public and Decisionmakers, including the exclusion of the effects of climate change;
- Fails to Consider the Whole of the Action, including the use of Temporary Urgency Change Petitions to Violate Water Quality Standards;
- Fails to accurately assess environmental impacts to salmon and other native fish species;
- Fails to accurately assess environmental impacts to water quality.

I. The DEIR Fails to Consider a Reasonable Range of Alternatives, Violating CEQA:

CEQA requires that the DEIR consider a reasonable range of alternatives. Cal. Pub. Res. Code §§ 21002, 21061, 21100; tit. 14, Cal. Code Regs. ("CEQA Guidelines") § 15126.6. The DEIR violates this basic obligation 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 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).

First, because this DEIR includes only a single operational alternative, *see* DEIR at section 3.16.1, all of the alternatives result in increased water diversions from the Delta and reduced Delta outflows, *see* DEIR at ES-51, Appendix 5A at B-327 to B-334, and the DEIR reaches identical CEQA conclusions regarding impacts to fish species from operations and maintenance for all of the alternatives, *see id*. at Table ES-2. The DEIR does not include any alternatives that do not increase water diversions from the Delta and improve conditions for native fish and wildlife. In contrast, although DWR's CEQA analysis for the prior Delta conveyance project (the Bay Delta Conservation Plan / California WaterFix project) was deeply flawed, it at least considered more than one operational alternative and included an operational alternative that resulted in increased Delta outflow and reduced water diversions (Alternative 8 in the Bay Delta Conservation Plan DEIR/DEIS). Not only does the current DEIR fail to consider any operational alternatives, but the proposed operational criteria for the North Delta intakes used in the DEIR are substantially less environmentally protective than the operating criteria that were required in permits for the California WaterFix project. *See* Letter from NRDC *et al* to DWR dated October 18, 2021, attached hereto as exhibit A. Particularly in light of the significant environmental impacts that result from the proposed project and alternatives, which will also violate the requirements of the ESA and CESA, the DEIR's failure to consider a range of operational criteria for the North Delta intakes, including operational criteria like those required in WaterFix, violates CEQA.

Equally important, the DEIR fails to consider any alternatives to the continuation of the Trump Administration's biological opinions for the operations of the Central Valley Project ("CVP") and State Water Project ("SWP"), which are included as part of the proposed project. DEIR at 3-

151 (describing South Delta operations of proposed project as "Same as D-1641, 2019 BiOps and 2020 SWP ITP requirements"); *see id*. at 3-144 ("The OMR criteria defined in the regulatory baseline (currently 2019 BiOps and 2020 SWP ITP) are applicable."); *id*. at 3-145 ("The Delta Conveyance Project would not change operational criteria associated with upstream reservoirs.").[1] The proposed project includes continuation of these biological opinions even though the State of California has publicly claimed those biological opinions are unlawful and filed litigation to overturn those biological opinions. *See* Exhibit B. As a result of litigation by conservation and fishing groups and litigation by the State of California, those biological opinions have been remanded and the federal government is in the process of developing new biological opinions, including evaluating a range of operational criteria under NEPA. *See* Bureau of Reclamation, Notice of Intent to Prepare and Environmental Impact Statement and Hold Scoping Meetings on the 2021 Endangered Species Act Section 7 Consultation on the Long Term Operations of the Central Valley Project and State Water Project, 87 Fed. Reg. 11093, 11094-95 (Feb. 28, 2022); *see* Exhibit C.

Moreover, operations of the CVP and SWP have exceeded the incidental take levels in those biological opinions in recent years and fail to prevent operations from jeopardizing listed species. *See, e.g.,* Declaration of Dr. Jonathan A Rosenfield in support of Plaintiffs Motion for Preliminary Injunction For 2022 and Plaintiffs' Opposition to Federal Defendants Motion for Voluntary Remand Without Vacatur, Doc. 325 (Dec. 16, 2021), attached hereto as Exhibit D. And the U.S. Fish and Wildlife Service has issued a proposed rule to list Longfin Smelt as an endangered species under the Endangered Species Act, concluding that existing regulatory

[1] The State's incidental take permit for operations of the State Water Project ("Incidental Take Permit") only addresses operations in the Delta, and it does not authorize incidental take of salmon or other species listed under the California Endangered Species Act ("CESA") caused by operations of the Central Valley Project, nor cause by coordinated operations of the State Water Project and Central Valley Project upstream of the Delta. In response to a Public Records Act request by NRDC, DWR did not provide any documentation of authorization for incidental take resulting from State Water Project operations at Oroville Dam or the coordinated operations of the Central Valley Project pursuant to the Coordinated Operating Agreement. As a result, the State Water Project and Central Valley Project lack legal authorization under CESA for incidental take of listed species caused by upstream operations. In order to comply with CESA and the federal ESA, permitting of the Delta Conveyance Project will need to address the full scope of the coordinated operations of the SWP and CVP, including upstream operations.

In addition, the proposed project and alternatives do not include a requirement for the CVP to comply with the San Joaquin River inflow: export ratio of the 2009 NMFS biological opinion or the related spring outflow provision of the State's Incidental Take Permit, thereby resulting in greater CVP diversions in April and May than were authorized or modeled under the State's Incidental Take Permit. *See* DEIR at 3-151 and n. 10 ("Spring outflow requirement is an existing regulatory requirement for the SWP. In complying with this existing requirement, total SWP exports including the north Delta diversions and the existing south Delta exports will be curtailed as needed.").

mechanisms – including these biological opinions, the State's Incidental Take Permit, and existing water quality standards – are inadequate to prevent the extinction of Longfin Smelt. U.S. Fish and Wildlife Service, Endangered and Threatened Wildlife and Plants: Endangered Status for the San Francisco Bay-Delta Distinct Population Segment of the Longfin Smelt, 87 Fed. Reg. 60957, 60970 (Oct. 7, 2022).

As a result, it plainly violates CEQA not to consider any operational alternatives to continuation of the Trump Administration's biological opinions as part of the proposed project and all of the alternatives.

The operational criteria used in the DEIR appear to be premised on the assumption that the project can divert water in excess of existing regulatory requirements without causing environmental harm. However, state and federal agencies have repeatedly rejected this premise for more than a decade, including the State Water Board's 2010 Public Trust flows report, which explicitly concluded that "The best available science suggests that current flows are insufficient to protect public trust resources" and recommended significant increases in Delta outflow and measures to strengthen protections for fish and wildlife in the Bay-Delta. State Water Resources Control Board, Development of Flow Criteria for the Sacramento-San Joaquin Delta Ecosystem.[2]

State and federal agencies have repeatedly recognized that existing regulatory requirements are inadequate to protect the environment, further demonstrating the need for the DEIR to consider alternatives that would increase Delta inflows and outflows in order to improve environmental protections for salmon and other fish and wildlife. *See, e.g.,* letter from United States Environmental Protection Agency to State Water Resources Control Board regarding Comprehensive Review of Bay-Delta Water Quality Control Plan, dated December 11, 2012;[3] letter from United States Environmental Protection Agency to State Water Resources Control Board regarding Bay-Delta Water Quality Control Plan; Phase 2, dated February 23, 2017.[4] More recently, in 2018 the State Water Resources Control Board concluded that,

> Though various state and federal agencies have adopted requirements to protect the Bay-Delta ecosystem, the best available science indicates that the existing requirements are insufficient.
> …

[2] This agency record is available online at: https://www.waterboards.ca.gov/waterrights/water_issues/programs/bay_delta/deltaflow/docs/final_rpt080310.pdf. This document, and all other references to a specific website, are hereby incorporated by reference.
[3] This agency record is available online at: https://www.epa.gov/sites/default/files/documents/sfdelta-decpost-workshopltr-dec2012.pdf.
[4] This agency record is available online at: https://www.epa.gov/sites/default/files/2017-10/documents/sfbay-water-quality-control-plan-comments-on-scientific-basis-report-2017-02-23.pdf.

> Existing regulatory minimum Delta outflows are too low to protect the ecosystem, and without additional regulatory protections, existing flows will likely be reduced in the future as new storage and diversion facilities are constructed, and as population growth continues.
> …
> Given these potential future demands and limited existing flow requirements in the Bay-Delta watershed, it is imperative that updated flow requirements be established in order to protect fish and wildlife beneficial uses in the Bay-Delta watershed.

State Water Resources Control Board, July 2018 Framework for the Sacramento/Delta Update to the Bay-Delta Plan, at 5-7; *see id*. at 15 ("As discussed above, current outflow volumes are inadequate to protect the ecosystem, and current outflow requirements are even lower and less protective.").[5] Indeed, State law requires that the State Water Resources Control Board's consideration of any change in point of diversion for Delta conveyance to include appropriate Delta flow criteria that is informed by the Board's 2010 Public Trust report, which concluded that existing flows are inadequate and recommended significant increases in Delta outflows. Cal. Water Code § 85086(c)(2).

The State Water Resources Control Board ("SWRCB") began the regulatory process to update the Bay-Delta Water Quality Control Plan in 2008 and issued its July 2018 Framework for completing the update of the Water Quality Control Plan. The DEIR fails to provide a reasoned explanation why it does not consider alternative operational criteria that 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.[6]

And in fact, the State Water Board's CEQA scoping comments explicitly identified the need to consider a range of operational alternatives, including alternative operations that increase Delta outflows and a specific alternative that is consistent with the State Water Board's 2018 Framework to complete the update of the Bay-Delta Water Quality Control Plan:

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[5] This agency record is available online at: https://www.waterboards.ca.gov/waterrights/water_issues/programs/bay_delta/docs/sed/sac_delta_framework_070618%20.pdf.

[6] The State Water Board recently required the proponents of the Sites Reservoir project to provide modeling of their proposed operations of Sites Reservoir that is consistent with the 2018 Framework, in order to process the water rights application for Sites Reservoir. Letter from State Water Resources Control Board to Sites Project Authority dated August 26, 2022, attached hereto as Exhibit E. Like the Sites Reservoir Project, this DEIR is intended to provide CEQA coverage for the State Water Board's consideration of a water rights petition for the Delta Tunnel project, further demonstrating the need for evaluation of alternative operational criteria, including alternatives consistent with the State Water Board's 2018 Framework, in this DEIR.

> The EIR should include a reasonable range of conveyance and operational alternatives…. Operating scenarios should be considered that improve conditions for native fish species that are currently in poor condition by improving Delta outflows, reducing entrainment and impingement related effects of SWP (and possibly CVP) diversions, improving cold water management, and other measures without redirected impacts to native fish species. Specifically, the EIR should evaluate a scenario that is consistent with the State Water Board's efforts to update the Bay-Delta Plan to improve protections for native fish species. In 2018, the State Water Board updated the Lower San Joaquin River Flow objectives in the Bay-Delta Plan and released a Framework for potential updates to Sacramento River and Delta inflow and outflow, interior Delta flow, and cold water habitat objectives included in the plan based on science summarized in the State Water Board's Scientific Basis Report.

SWRCB 2020 at 4-5.

Moreover, as discussed *infra*, the proposed project and all of the alternatives result in significant environmental impacts and the proposed mitigation measures are wholly inadequate to reduce those impacts to a less than significant level. Considering a range of operational alternatives is necessary to identify ways to reduce or avoid these significant environmental impacts.

In light of the extensive scientific record regarding the inadequacy of existing regulatory standards and the need to significantly increase instream flows, Delta outflows, and other measures to avoid significant impacts to the environment, DWR's failure to analyze a reasonable range of operational alternatives in the DEIR, including any alternatives that result in increased Delta outflows and reduced water diversions, is inexplicable – and violates CEQA.[7] Therefore, the DEIR must be revised to consider a range of operational alternatives, including one or more operational alternatives that significantly increase Delta outflow and that is consistent with the State Water Board's 2018 Framework, and the revised DEIR must be recirculated for public review and comment.

II. The DEIR's Project Purposes and Objectives are Inconsistent with State Law, and to the Extent they Exclude Alternatives that Reduce Water Diversions, Violates CEQA:

The DEIR's project purposes and objectives are inconsistent with state law, and to the extent that these project purposes exclude consideration of alternatives that reduce State Water Project

[7] The record developed over the past 14 years, including numerous agency reports and findings, court orders, biological opinions, and independent scientific reviews have provided ample practical experience demonstrating the need to consider one or more alternatives that reduce water diversions from the Bay-Delta, in contrast to the factual situation that the California Supreme Court confronted in 2008. *In re Bay-Delta Programmatic Environmental Impact Report Coordinated Proceedings*, 43 Cal.4th 1143, 1168 (2008).

diversions from the Delta, the project purposes and objectives violate CEQA. *See* DEIR, Appendix 3A, at 3A-34 (screening out the 2013 Portfolio-Based Proposal, which included a 3,000 cfs tunnel, from consideration in this DEIR specifically because that proposal reduces SWP exports from the Delta).

Most notably, State law establishes co-equal goals for the Delta that include restoring the health of the Bay-Delta ecosystem and its native fisheries, Cal. Water Code §§ 85001, 85020,[8] and establishes state policy to reduce reliance on the Delta, *id*. § 85021. In addition, under state law, the California Department of Water Resources has an affirmative obligation to protect and conserve endangered fish species, Cal. Fish and Game Code § 2052, and is subject to the Public Trust.

However, these legal obligations are not reflected in the project's purpose and objectives. None of the project objectives include restoring the Bay-Delta ecosystem and its native fish species, including both species listed under the California Endangered Species Act as well as other important species like fall-run Chinook salmon, as required by state law. *See* DEIR at ES-7, 2-2 to 2-3. Although the DEIR references the Delta Reform Act's co-equal goals, it does not include them in the project purposes and objectives, and ignores the obligation to reduce reliance on the Delta. *Id*. at 2-2. Instead, the project objectives focus exclusively on increasing water diversions from the Delta, *see id*. at 3-69, even though increasing water diversions demonstrably harms native fish and wildlife and fails to reduce reliance on the Delta.

The DEIR's project purposes and objectives must be revised to be consistent with state law, including restoring the health of the Delta and restoring populations of native fish species protected by CESA and the Public Trust. In addition, to the extent the DEIR's project purpose and objectives are interpreted to exclude consideration of alternatives that reduce diversions from the Delta, it is inconsistent with State law and the requirements of CEQA. *See also supra* Section I and footnote 4.

III. The DEIR's Environmental Baseline Misleads Decisionmakers and the Public As to the Effects of Operating the Proposed Project, Violating CEQA:

The DEIR uses an improper environmental baseline that misleads decisionmakers and public regarding the likely effects of operating the project, violating CEQA.

A. The DEIR Fails to Provide Substantial Evidence Justifying the Inclusion of the Trump Administration's Biological Opinions and State Water Project's Incidental Take Permit in the Environmental Baseline, and Inclusion of the OMR Storm Flex Provisions of these Permits in the Environmental Baseline Violates CEQA

[8] Similarly, to the extent that the federal Central Valley Project participates in the project, as proposed in several alternatives, the federal Central Valley Project Improvement Act requires that the Central Valley Project be operated for co-equal project purposes that include protecting salmon and other fish and wildlife, as well as complying with state law. P.L. 102-575, §§ 3406(a),(b).

First, the DEIR states that the environmental baseline includes the conditions and regulatory requirements that were in effect when the Notice of Preparation ("NOP) was issued, but in fact the environmental baseline includes weaker regulatory requirements in the Delta that were adopted after the NOP was issued. The DEIR inaccurately states that the regulatory requirements and other conditions in effect when the NOP was issued includes the 2019 biological opinions and 2020 Incidental Take Permit for the State Water Project. *See* DEIR at ES-26, 4-1, 4-4, 5-16; *id*., Appendix 3C, at 3C-2 to -3; *id*., Appendix 5A at B-18, B-44. The environmental baseline under CEQA generally includes regulatory requirements that are in effect when the NOP was issued. Cal. Code Regs., tit. 14, § 15125(a). However, when the NOP was issued on January 15, 2020, the operations of the SWP and CVP were governed by biological opinions issued in 2008 and 2009, and it was only after the NOP was issued that the agencies adopted the incidental take permit for the State Water Project (on March 27, 2020), and adopted the Record of Decision to implement the 2019 biological opinions (on February 18, 2020). Thus, the environmental baseline should include the 2008 and 2009 biological opinions and other regulations affecting the operations of the SWP and CVP at the time the NOP was issued, absent substantial evidence demonstrating a different baseline is necessary to accurately assess the impacts of the proposed project. Cal. Code Regs., tit. 14, § 15125(a). Moreover, CEQA allows an agency to define the environmental baseline to include "conditions expected when the project becomes operational" in order to provide a more accurate picture of a project's environmental impacts. Cal. Code Regs., tit. 14, § 15125(a)(1).

The DEIR does not provide substantial evidence to justify including these subsequent regulatory decisions in the environmental baseline. Indeed, as the result of litigation, the 2019 biological opinions and 2020 Record of Decision were remanded to the agencies on March 14, 2022, and are due to be replaced with scientifically credible biological opinions in 2024. This remand of these biological opinions occurred before issuance of the DEIR. According to the State of California, the Trump Administration's 2019 biological opinions were unlawful. *See, e.g*., Office of the Attorney General, press release, Attorney General Becerra Files Lawsuit Against Trump Administration for Failing to Protect Endangered Species in the Sacramento and San Joaquin Rivers, February 20, 2020, available online at: https://oag.ca.gov/news/press-releases/attorney-general-becerra-files-lawsuit-against-trump-administration-failing. Rather than using the Trump Administration's biological opinions as the environmental baseline, the DEIR should have used the 2008/2009 biological opinions that were in effect when the NOP was issued. Indeed, the State Water Resources Control Board's scoping comments stated that the DEIR should include the 2008/09 biological opinions as an environmental baseline for analysis.

Using the Trump Administrations' 2019 biological opinions as the environmental baseline misleads the public and decisionmakers as to the effects of the proposed project, because this environmental baseline violates state and federal environmental laws. For instance, as the State's lawsuit and other evidence demonstrates, these biological opinions significantly weakened or eliminated key environmental protections for salmon and other endangered species, and their implementation is leading to extinction of fish species including winter-run Chinook salmon, Delta Smelt, and Longfin Smelt. More recently, the U.S. Fish and Wildlife Service

recently concluded that existing regulatory requirements, including the 2019 biological opinions, Incidental Take Permit for the State Water Project, and existing Bay Delta Water Quality Control Plan are inadequate to prevent the continuing decline and extinction of Longfin Smelt. *See* U.S. Fish and Wildlife Service, Endangered and Threatened Wildlife and Plants; Endangered Species Status for the San Francisco Bay-Delta Distinct Population Segment of the Longfin Smelt, 87 Fed. Reg. 60957, 60970 (Oct. 7, 2022).

Similarly, the DEIR fails to provide substantial evidence why the environmental baseline includes the State's Incidental Take Permit despite this permit post-dating the NOP. As noted above, the U.S. Fish and Wildlife Service has determined the State's Incidental Take Permit is not adequate to prevent the extinction of Longfin Smelt. In addition, DWR has publicly announced that it plans to begin the process to replace this permit (which is also the subject of ongoing litigation).

The DEIR also fails to provide any explanation why the environmental baseline fails to include the update to the Bay Delta Water Quality Control Plan adopted in 2018 by the State Water Resources Control Board (which requires increased instream flows in the months of February to June in the Stanislaus, Tuolumne, Merced, and Lower San Joaquin Rivers). These regulatory requirements were adopted years before the NOP was issued. Nor does the DEIR provide any explanation why the No Action Alternative excludes the 2018 amendments to the Bay-Delta Water Quality Control Plan and the State Water Board's "reasonably foreseeable" regulatory update to that Plan, including the 2018 Framework. *See also* Letter from State Water Resources Control Board to Sites Project Authority, attached hereto as Exhibit E (explaining that the State Water Board's 2018 Framework, which identified a Delta outflow requirement of 55% of unimpaired flow in the winter and spring, is a "reasonably foreseeable" regulatory requirement).[9]

Even assuming *arguendo* use of the 2019 biological opinions and 2020 Incidental Take Permit as part of the baseline, the DEIR's existing conditions baseline also unlawfully includes operational criteria that allow for more water export pumping but have never been used before, in violation

[9] The DEIR makes several other assumptions regarding the baseline that are inconsistent with Reclamation's water rights and existing conditions, including: (1) The existing conditions baseline includes full SJRRP Restoration Flows without regard to channel capacity, *see* DEIR, Appendix 5A-B, Attachment 2, and B-3, even though Restoration Flows are currently severely restricted to avoid seepage and channel capacity constraints, with a maximum of 300 cfs below Sack Dam (compared to approximately 4,000 cfs without such limitations); (2) the environmental baseline excludes Reclamation's obligations to release water under section 3406(b)(2) of the CVPIA b(2), *see* Appendix 5A-B, Attachment 2, at B-6 ("No (b)(2) actions modeled"); and, (3) the environmental baseline excludes Reclamation's obligations to meet Vernalis base and pulse flows under water rights decision 1641, *see id*. at B-3. All of these assumptions distort the modeling of the proposed project and alternatives, misleading the public and decisionmakers as to the likely environmental impacts.

of CEQA. The CEQA guidelines require that, "An existing conditions baseline shall not include hypothetical conditions, such as those that might be allowed, but have never actually occurred, under existing permits or plans, as the baseline." Cal. Code Regs., tit. 14, § 15125(a)(3). The DEIR violates this provision of CEQA in several ways. First, the existing conditions baseline includes the so called "OMR storm flex" provisions of the State's Incidental Take Permit and the 2019 biological opinions in the environmental baseline. However, while these permits allow for more negative flows in Old and Middle River ("OMR") during certain poorly defined conditions, implementation of these permit provisions has never actually occurred. Second, the existing conditions baseline does not require the CVP to meet the I:E ratio from the 2009 NMFS biological opinion or the spring outflow requirements of the State's Incidental Take Permit. *See* DEIR, Appendix 5A, Table 5A-B2.1 ("Met through San Joaquin River Inflow to Export Ratio (SJR IE). Applied to SWP only, under ITP."). However, as a result of the preliminary injunction in federal court litigation and subsequent Interim Operations Plan(s), the CVP has been required to meet these requirements, and CVP pumping has not reached the levels identified in the DEIR's existing conditions baseline since the biological opinions went into effect in 2020. The inclusion of these regulatory provisions in the baseline, that hypothetically could result in increased pumping from the Delta, violates CEQA. Cal. Code Regs., tit. 14, § 15125(a)(3). The DEIR's environmental baseline must be revised to be consistent with CEQA.

The DEIR's modeling of OMR flows, which affects entrainment of fish species by the CVP and SWP, demonstrates how including the Trump Administration's biological opinions and the State's Incidental Take Permit in the baseline misleads the public and decisionmakers as to the effects of the proposed project and alternatives. As the table below shows, January to June OMR under the existing conditions baseline in the 2022 Delta Conveyance DEIR is substantially more negative in dry and critically dry years than was OMR under the existing conditions baseline in the 2015 WaterFix RDEIR/SDEIS:

Comparison of Old and Middle River Flows under Existing Condition Baseline between Delta Conveyance DEIR (2022) and WaterFix DEIR (2015)

	Jan	Feb	Mar	Apr	May	June
Delta Conveyance DEIR, Existing Conditions Baseline (Appendix 5A, Table 5A-B3.3.6.1-B)						
Dry Water Years	-4,812	-4,516	-3,292	-1,813	-2,028	-4,750
Critical Water Years	-4,303	-4,350	-3,001	-1,181	-1,710	-2,084
WaterFix DEIR, Existing Conditions Baseline (Appendix B, Supplemental Modeling, Table B.7-25)						
Dry Water Years	-4,664	-3,986	-2,852	-268	-647	-3,301
Critical Water Years	-4,130	-3,191	-2,010	-950	-1,019	-2,250

These more negative OMR values under the 2019 biological opinions and 2020 Incidental Take Permit also occur in other water year types, particularly in the months of April and May, where

the existing conditions baseline in the 2015 WaterFix RDEIR/SDEIS shows positive OMR in April and May in Wet, Above Normal, and Below Normal years. WaterFix RDEIR/SDEIS, Appendix B, Supplemental Modeling, Table B.7-25; *see also* DWR, Final Environmental Impact Report for Long-Term Operation of the State Water Project, at 5-12 (showing OMR under proposed project and alternatives significantly more negative in April and May than under existing conditions baseline).

The DEIR uses OMR modeling under the existing conditions baseline to assert that the proposed project and alternatives generally would result in slightly lower entrainment than the existing conditions for most species. *See, e.g.*, DEIR at 12-93 to 12-94. Yet compared to the existing conditions baseline in the WaterFix RDEIR/SDEIS from 2015 – the baseline conditions that existed until adoption of the State's Incidental Take Permit and the unlawful Trump Administration biological opinions after issuance of the NOP – the proposed project and alternatives appear to cause substantial increases in negative OMR and entrainment of fish species, particularly in the months of April and May.

Similarly, the increases in export pumping and other changes in operations authorized by the biological opinions and Incidental Take Permit result in far less Delta outflow in the winter and spring months under the existing conditions baseline in this DEIR, even though the California Department of Fish and Wildlife determined those changes in permit conditions between 2015 and 2022 would reduce the abundance of Longfin Smelt:

> Both models predict declines in abundance for LFS under Alt 2B, from 0-4% assuming different survival levels in the RN 2016 model or 1-12% using the updated Kimmerer model. Regardless of the issues with either model, the inherent signal to noise ratios (simulated variability), all model simulations demonstrated a reduction in the FMWT index for LFS under the PP and Alternative 2b as compared to existing conditions. Although, that reduction in the FMWT index was lesser in the Alternative 2b scenario as compared to the PP scenario.

California Department of Fish and Wildlife, Findings of Fact of the California Department of Fish and Wildlife Under the California Endangered Species Act, Attachment 7 (Effects Analysis, State Water Project Effects on Longfin Smelt and Delta Smelt, March 2020), at 75, attached hereto as Exhibit G.

Compared to the existing conditions baseline in the 2015 WaterFix RDEIR/SDEIS, the proposed project and alternatives in this DEIR result in even more substantial reductions in the modeled abundance of Longfin Smelt, because Delta outflow was reduced as a result of adoption of the biological opinions and Incidental Take Permit. That is even more true because the modeling in the State's Incidental Take Permit assumed that the CVP would provide the proportional share of spring outflow required by the SWP under condition 8.17 of the Incidental Take Permit, yet here the DEIR assumes that the CVP will not contribute to spring outflow, resulting in even more severe impacts to Longfin Smelt than those identified in the modeling of the Incidental Take

Permit and related at 2020 Final EIR, due to the greater reductions in Delta outflow and further reductions in the abundance of Longfin Smelt.

The inclusion of the Trump Administration's biological opinions and State's Incidental Take Permit in the environmental baseline, including operational criteria that allow for more pumping but have not been utilized, violates CEQA. The DEIR must be revised to include a lawful environmental baseline.

B. The DEIR's Environmental Baseline Violates CEQA Because it Excludes the Effects of Climate Change, Misleading Decisionmakers and the Public of the Likely Effects of Operating the Proposed Project

Second, the DEIR's environmental baseline violates CEQA because it excludes the effects of climate change[10] that will have occurred by the time that the proposed project is operational. The DEIR analyzes the environmental effects of the proposed project and alternatives compared to the "existing condition" baseline. DEIR at 4-4; *see, e.g., id*. at Table 5-11. But "existing conditions" does not include the effects of sea level rise and climate change, and instead simply repeats the hydrologic conditions of 1922 to 2015 – without accounting for the observed effects of climate change since 1922. DEIR at Appendix 3C-5, 3C-8, 3C-10; DEIR, Appendix 5A, Attachment 1, at B-18; *see id.,* Appendix 5A, Attachment 4, at B-6 to B-7.

There is no question that climate change has and will affect baseline ecological conditions in the Delta. The DEIR admits that "the effects of climate change and sea level rise will foreseeably have a sizeable effect on the Delta environment by 2040." DEIR at Appendix 3C-8. Similarly, the DEIR states that, "By 2050, extreme Delta drought conditions are projected to occur five to seven times more frequently," and "[o]ver the next several decades, dry years will become drier." DEIR at 30-18 to 30-19. Even though the DEIR identifies these likely effects of climate change, the DEIR fails to analyze the effects of operations of the project with extreme drought conditions that occur five to seven times more frequently or much drier dry years as a result of climate change.

Moreover, modeling of the effects of climate change is available: the DEIR incorporates some of the effects of climate change in the No Action Alternative, DEIR at Appendix 3C-3, and it includes several appendices that compare the No Action alternative in 2040 with the effects of the proposed project and alternatives, *see* DEIR at 4-5 to 4-6.[11] However, as the DEIR explains, those appendices that consider the effects of climate change are excluded from the CEQA analysis:

[10] References to climate change in these comments include the effects of sea level rise.
[11] As discussed *infra*, the DEIR's modeling of the effects of climate change are wholly inconsistent with the DEIR's descriptions of the effects of climate change and the best available science.

> These longer-term analyses were performed outside of CEQA requirements to provide information about possible future environmental conditions once conveyance facilities are operational. Because these analyses are provided for informational purposes, no CEQA significance conclusions are presented for potential impacts, and no mitigation measures are recommended to reduce potential impacts.

Id. As a result, the DEIR's analysis of the proposed Delta tunnel and alternatives excludes the effects of climate change in assessing environmental impacts. This violates CEQA and DWR's own guidance regarding the effects of climate change. As DWR's director wrote in 2018,

> Climate change is not a far-off future risk. The extreme hydro-climatic conditions of the last six years —both dry and wet — are exactly the types of conditions scientists have been identifying as the hallmark of what climate change will look like. Today's planning, management, and investment efforts must factor in resiliency and adaptability to climate conditions outside the scope of our historical experience.

DWR, Climate Action Plan, Phase 2: Climate Change Analysis, Guidance September 2018, at V, available online at: https://water.ca.gov/-/media/DWR-Website/Web-Pages/Programs/All-Programs/Climate-Change-Program/Climate-Action-Plan/Files/CAPII-Climate-Change-Analysis-Guidance.pdf. DWR's 2018 guidance further states that with respect to analyzing environmental effects on resources,

> For impact evaluations, DWR projects should consider how expected changes in climate could exacerbate the environmental consequences of the project or generate new consequences that would not have otherwise occurred. This is typically done by comparing estimates of potential project impacts between a project alternative under existing climate conditions to the estimates of potential project impacts for a project alternative under expected future conditions 20–50 years into the future.

Id. at 21. The DEIR fails to follow DWR's own guidance: the DEIR's modeling ignores the observed effects of climate change to date, and ignores the longer term effects of the project and alternatives with the effects of climate change. Instead, the DEIR analyzes effects based on the hydrological conditions that the State has historically experienced – even though those are not the effects that the State is experiencing today.

The failure to analyze effects of operating the project in light of the effects of climate change violates CEQA in several ways. Climate change has already caused significant changes to temperatures and hydrological conditions compared to conditions decades or a century ago, including earlier runoff, increased air and water temperatures, and more frequent drought conditions. For instance, average and median Sacramento River unimpaired runoff from 2000 to

2021 is substantially lower than the average and median Sacramento River unimpaired runoff from 1906 to 2021, as the table below shows:

Sacramento Valley Unimpaired Runoff

	WY Sum	Percent of 1906-2021 Median		WY Sum	Percent of 1906-2021 average
1906-2021 Median	16.00		**1906-2021 Average**	17.758	
2000-2021 Median	13.81	86%	**2000-2021 Average**	16.083	91%

In addition, the DEIR warns that, "Between 1906 and 1960, one third of the water years in California were considered by the California Department of Water Resources (DWR) to have been "dry or critical"; that percentage increased to 46% from 1961 to 2017 (Bureau of Reclamation 2019:H-2)." DEIR at 5-4.

Similarly, DWR's Delivery Reliability Report finds that the actual average SWP Allocation from 2011 to 2020 was significantly lower than their models predict the average allocation would be based on observed hydrology from 1922-2015 (and just adding the years 2004-2015 to their model reduced the long term average allocation, as the table below shows):

	Average Allocation
2019 Delivery Capability Report modeled long term average Table A allocation (modeled based on 1922-2003 hydrology)	2,414 TAF
2021 Delivery Capability Report modeled long term average Table A allocation (modeled based on 1922-2015 hydrology)	2,321 TAF
Actual Table A average allocation 2011-2020	1,880 TAF

And consistent with the predictions regarding the effects of climate change, in October 2022 DWR announced that, "The current drought from 2020 to 2022 is now the driest three-year period on record, breaking the old record set by the previous drought from 2013 to 2015," and the Director warned of the need to plan for hotter, drier future "where we see less precipitation." *See* DWR, New Water Year Begins Amid Preparations for Continued Drought, October 3, 2022, online at: https://water.ca.gov/News/News-Releases/2022/Oct-22/New-Water-Year-Begins-Amid-Preparations-for-Continued-Drought. In other words, over the past 10 years, California has twice set new records for the driest consecutive three year period in the State's historical record (record low runoff in 2013-2015, broken again in 2020-2022), punctuated by very wet years in 2017 and 2019.

Moreover, because the proposed project will not be operational until around the year 2040, *see id*., Appendix 3C, at 3C-3, using the existing condition baseline fails to accurately assess the

environmental impacts of operating the project. The CEQA guidelines allow an agency to define the environmental baseline to include "conditions expected when the project becomes operational" in order to provide a more accurate picture of a project's environmental impacts. Cal. Code Regs., tit. 14, § 15125(a)(1). The DEIR admits that the effects of climate change will be "sizeable" by the time the project is operational. *See* DEIR at Appendix 3C-8.
Modeling results in the DEIR – which are not considered for purposes of CEQA -- demonstrate the significant effects of climate change between the 2020 existing conditions baseline and 2040 No Action Alternative, including:

(1) Significant reduction in upstream reservoir storage. *See* DEIR at 5-17 to 5-18. For instance, end of September Shasta Reservoir storage in critically dry years declines from an average of 1.543 million acre feet (2020) to an average of 1.432 million acre feet (2040), and end of September storage in Oroville Reservoir declines from an average of 1.068 million acre in critically dry years (2020) to 0.834 million acre feet (2040);
(2) Significant increases in water temperatures below Shasta Dam. *Compare id.*, Appendix 5A, Table 5A-D1.13.1-B (existing conditions baseline (2020) Sacramento River at Clear Creek (CCR) average temperatures in critically dry years of 58.2 degrees Fahrenheit in September) *with id*., Appendix 5A, Table 5A-D2.13.1-B (No action alternative (2040) Sacramento River at Clear Creek (CCR) average temperatures in critically dry years of 56.1 degrees Fahrenheit in August, 60.4 degrees Fahrenheit in September, and 59.8 degrees Fahrenheit in October);
(3) Substantial increases in temperature dependent mortality of winter-run Chinook salmon below Shasta dam, *compare id*., Appendix 5A, Table 5A-E2.1-B (existing conditions (2020) average temperature dependent mortality using the Martin Model of 42% in critically dry years and 8% overall) *with id.*, Appendix 5A, Table 5A-E4.1-B (No action alternative (2040) average temperature dependent mortality using the Martin Model of 66% in critically dry years, 18% in dry years, and 14% overall).

Even though the project will not be operational until 2040, the DEIR wholly ignores its own projections of these significant effects of climate change for the purposes of CEQA. The Delta Conveyance Project is clearly a case where using the existing conditions baseline, which excludes the effects of climate change, grossly misleads the public and decisionmakers of the likely environmental impacts of operating the proposed project starting in the year 2040.

By failing to adequately account for the hydrological changes that have already occurred, and those that are anticipated to occur as a result of climate change before the proposed project would be operational, the DEIR's use of "current conditions" as the environmental baseline – hydrological and temperature conditions from 1922 to 2015– does not reflect reality and underestimates the environmental impacts of operating the proposed project. And as discussed at more length *infra*, the use of existing conditions as the environmental baseline violates CEQA because the DEIR fails to adequately evaluate the whole of the action, which includes environmental effects over the life of the project, which necessarily includes evaluating the

effects in 2040 and thereafter, given the very long anticipated life of the proposed project. Cal. Code Regs., § 15126.2(a).

C. The DEIR's Modeling of the Effects of Climate Change in the Appendices Mislead the Public of the Likely Effects of the Proposed Project in Light of Climate Change

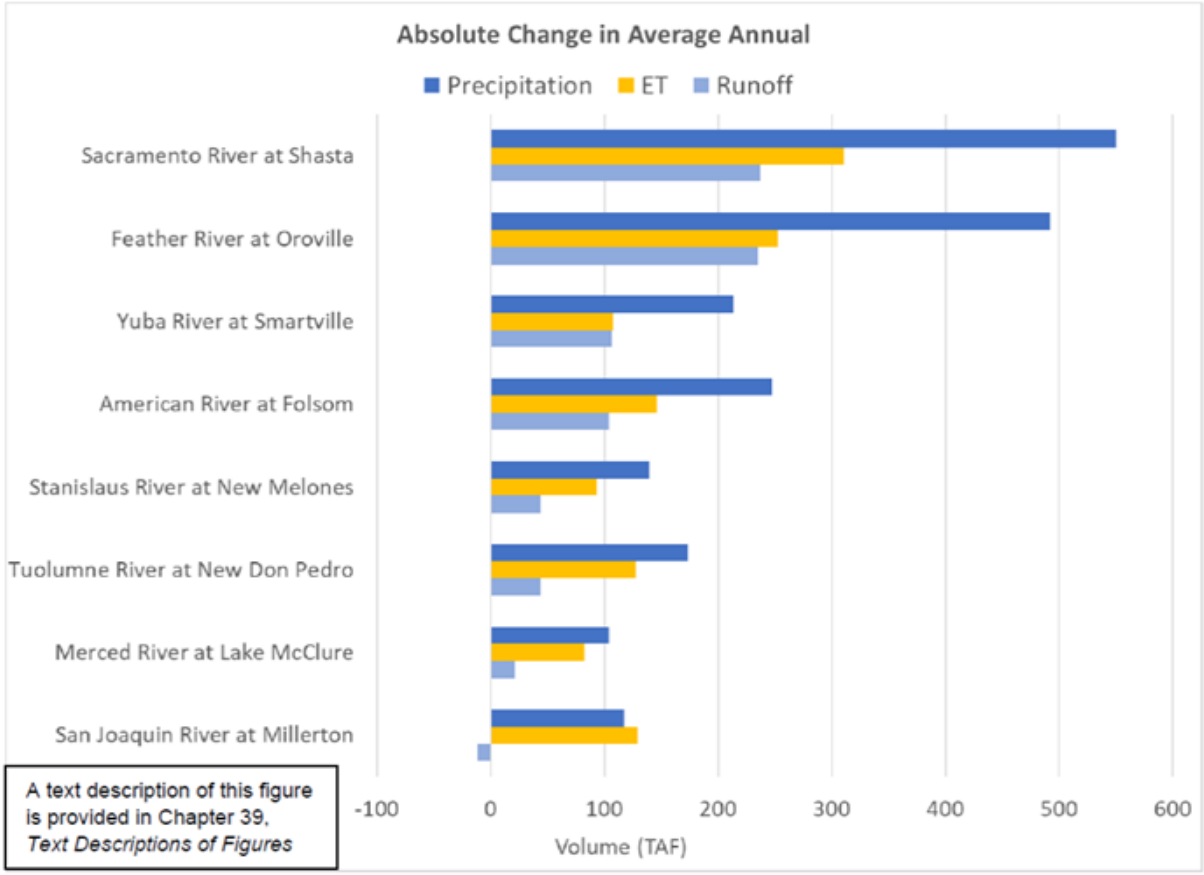
The DEIR's assumptions regarding climate change and sea level rise, including in the No Action Alternative[12] and 2040 modeling, fail to provide adequate and accurate information to decisionmakers and the public regarding the risks and likely environmental effects of operations of the proposed project. While the DEIR claims that it uses "a conservative climate change and sea level rise assumption," DEIR at 4-5, in fact the DEIR uses what it admits are an "extreme" assumption regarding sea level rise, *id*., Appendix 3C, at 3C-10. Moreover, the DEIR's modeling assumptions predict that climate change will increase runoff compared to the historical record – **a hotter, wetter future** – even though the text of the DEIR and other state documents predict climate change will result in reduced precipitation and runoff, more frequent and severe droughts, and **a hotter, drier future**. As a result, the DEIR's modeling and quantitative analysis fails to adequately account for the likely effects of climate change, and dramatically underestimate those effects, resulting in inaccurate and misleading quantitative analysis of the effects of the project in light of the likely effects of climate change in the appendices and No Action Alternative.

First, instead of using the most probable estimate of sea level rise, the DEIR's No Action Alternative instead uses an "extreme assumption" of 1.8 feet of sea level rise by 2040, which the State admits has a less than a 0.5% chance of occurring by 2040. DEIR, Appendix 3C at 3C-10; Ocean Protection Council, State of California Sea-Level Rise Guidance, 2018. As a result, the model assumes more flow through the Delta is necessary to maintain the hydraulic salinity barrier, resulting in higher flows into the Delta and lower reservoir storage. *See* DEIR at 30-25. In contrast, the State's median projection of sea level rise is 0.6 feet by 2040. Ocean Protection Council 2018.

Second, the DEIR fails to provide a reasoned explanation why the No Action Alternative and other modeling of climate change effects use the Central Tendency of the climate models, which predicts precipitation and annual runoff will **increase** compared to today. *See* DEIR at 30-20 (concluding that by 2040 climate change will increase precipitation compared to 1981-2010

[12] The No Action Alternative also continues the Trump Administration's unlawful biological opinions and the State's 2020 Incidental Take Permit for operations of the State Water Project, while also failing to incorporate the State Water Resources Control Board's 2018 amendments to the Bay-Delta Water Quality Control Plan. Nor does the No Action Alternative incorporate "reasonably foreseeable updates to instream flow and Delta outflow objectives in the Water Quality Control Plan for the San Francisco Bay/Sacramento-San Joaquin Delta." *See* Letter from State Water Resources Control Board to Sites Project Authority dated August 26, 2022, attached hereto as Exhibit E. The No Action Alternative should be revised to include these reasonably foreseeable requirements.

conditions: "all major watersheds are projected to be wetter, with average precipitation increases from 2.7% to 4.8%."); *id*., Appendix 30A, at Figure 30A-2. DWR's modelling of the Central Tendency shows increased runoff in the state's rivers, as the graphic below shows, which means there is more water than today to be captured and exported by the tunnel – not less water than today:



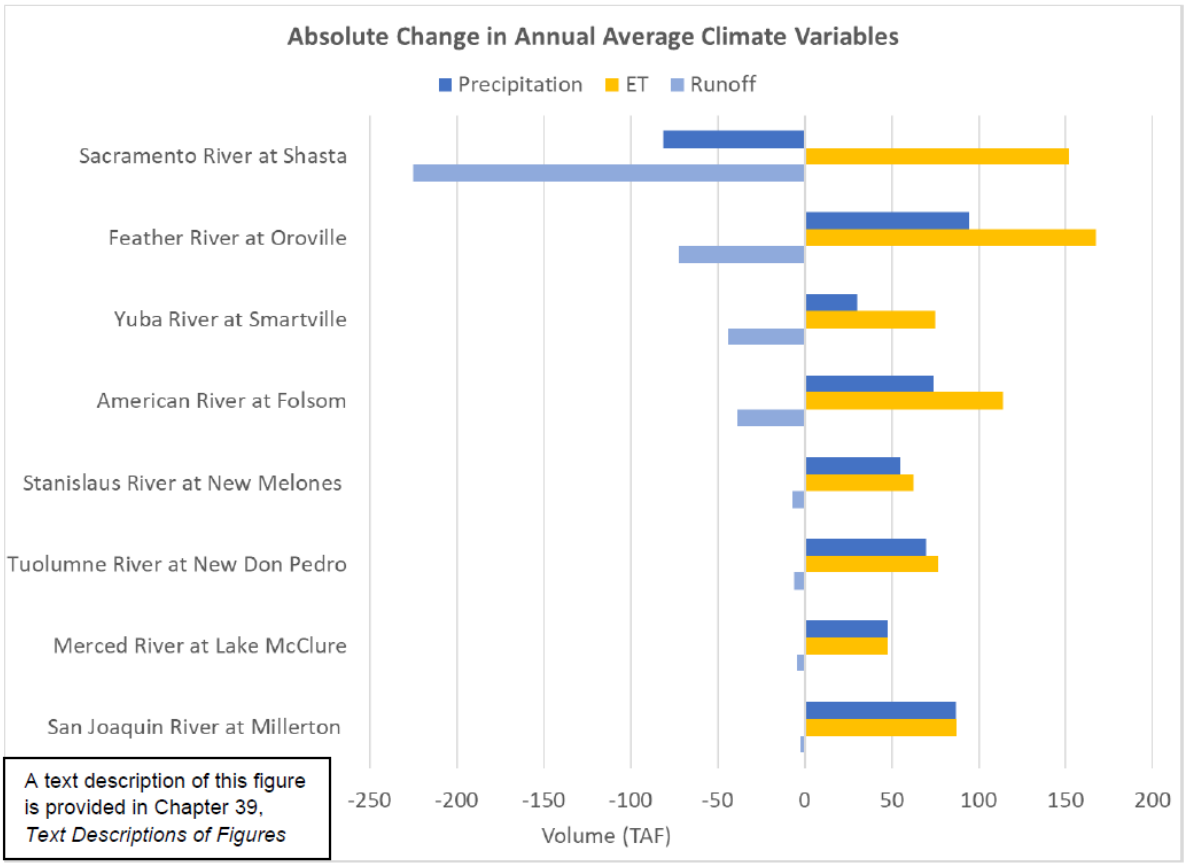
ET= evapotranspiration
TAF=thousand acre-feet

Figure 30A-2. Projected Absolute Changes in Precipitation, Evapotranspiration, and Runoff for Major Watersheds in the Sacramento and San Joaquin River Basins for 2040 CT, Compared to Historical Reference Period (1995)

However, State and Federal agencies have repeatedly found that climate change is likely to decrease runoff. For instance, the State of California's 2022 Water Supply Strategy: Adapting to a Hotter, Drier Future explains that "DWR estimates a 10% reduction in water supply by 2040 … consider[ing] increased temperatures and **decreased runoff** due to a thirstier atmosphere, plants, and soil." *See* Office of the Governor, Natural Resources Agency, Department of Water Resources, California Water Boards, California Environmental Protection Agency, and California Department of Food and Agriculture, Water Supply Strategy: Adapting to a Hotter, Drier Future, August 2022, at 1, available online at: https://resources.ca.gov/-/media/CNRA-Website/Files/Initiatives/Water-Resilience/CA-Water-Supply-Strategy.pdf (emphasis added). Similarly, the Bureau of Reclamation has released updated modeling of the effects of climate change, which estimates that climate change is likely to reduce annual runoff by 1% by 2040.

See Exhibit C. The DEIR does not provide information about the effects of climate change on the frequency of water year types or on runoff in drier water year types (only providing annual averages), but Reclamation's modeling predicts more frequent critically dry years and indicates that DWR's modeling does not result in more frequent critically dry years. *Id*. And in contrast to the DEIR's predictions of increased runoff compared to the 1981-2010 period as a result of climate change, Sacramento Valley unimpaired runoff has declined substantially over the past two decades. *See supra*.

In contrast to the Central Tendency, the DEIR also presents results of the Median climate models, which predicts decreased runoff compared to the historical record:



ET= evapotranspiration
TAF=thousand acre-feet

Figure 30A-3. Projected Changes in Precipitation, ET, and Runoff for Major Watersheds in the Sacramento and San Joaquin River Basins for 2040 Median, Compared to Historical Reference Period (1995)

However, the DEIR does not use the 2040 Median climate change modeling, despite the fact that the median is a better reflection of the "typical" year and is not overly influenced by extremely wet years, as the "mean" (or central tendency) metric is. This median prediction appears more consistent with hydrology over the past two decades. As the DEIR admits, "[i]n the context of climate change, projections of future precipitation are even more uncertain than projections for

temperature. Uncertainty regarding precipitation projections is greatest in the northern part of the state, and a stronger tendency toward drying is indicated in the southern part of the state." DEIR at 5-4. Given this uncertainty, it is irresponsible for the DEIR to assume increased precipitation as a result of climate change (Central Tendency) without equally considering reduced precipitation and runoff as a result of climate change (2040 Median).

Third, the DEIR's modeling of climate change does not account for the effects of increased frequency and duration of droughts as a result of climate change compared to the historical record – as explained in the DEIR. For instance, the text of the DEIR explains that "By 2050, extreme Delta drought conditions are projected to occur five to seven times more frequently," and "[o]ver the next several decades, dry years will become drier." DEIR at 30-18 to 30-19. Similarly, the DEIR warns that, "Between 1906 and 1960, one third of the water years in California were considered by the California Department of Water Resources (DWR) to have been "dry or critical"; that percentage increased to 46% from 1961 to 2017 (Bureau of Reclamation 2019:H-2)." DEIR at 5-4. These results are consistent with expectation of the typical year (the median years) being drier in the future than it was in the past.

However, the DEIR's climate change modeling does not result in extreme drought conditions occurring five to seven times more frequently, or dry years become drier. Instead, the DEIR's climate modeling assumes wetter conditions with increased runoff, including increased runoff in dry and critically dry years.[13] As a result, the DEIR's modeling and analysis underestimate the likely effects of climate change on hydrology, resulting in the DEIR overestimating flows into and through the Delta, and thus underestimating the proposed project's likely adverse environmental impacts and overestimating the volume of water diverted by the proposed project and alternatives.

The modeling of wetter conditions with greater river runoff in the winter and spring months as a result of climate change leads to biased analysis of the effects of climate change on fish and wildlife populations. For example, because the best available science shows that the survival of juvenile salmon down the Sacramento River and into and through the Delta is a function of the amount of flow (Perry et al 2018), the DEIR shows that climate change will increase survival of juvenile salmon migrating through the Delta in the winter and spring months. *Compare* DEIR Table 12-30 (2020 no project alternative) *with id*. Table 12C-9 (2040 No Action Alternative). Similarly, modeling of juvenile salmon survival in the DEIR using the Delta Passage Model[14] shows increased survival through the Delta as a result of the modeled increase in flows through the Delta from climate change:

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[13] The DEIR states that by 2040, climate change effects result in more frequent critically dry years and decreased numbers of wet, AN, BN, and dry years, but it does not quantify these effects. DEIR at 5-15. However, the DEIS' modeling frequently shows increased river flows in critically dry years in 2040 (with climate change) compared to critically dry years in 2020 (without climate change).

[14] As discussed *infra*, the DEIR modified the Delta Passage Model in a manner that fails to use the best available science.

Through Delta survival of winter-run (Delta Passage Model)	**Existing Conditions (2020) Table 12-32**	**No Project Alternative (2040) Table 12C-10**
Wet	0.31	0.33
Above Normal	0.25	0.27
Below Normal	0.19	0.20
Dry	0.16	0.18
Critically Dry	0.14	0.15

In addition, the DEIR's IOS[15] life cycle model predicts that the abundance of endangered winter run Chinook salmon will decline less under climate change compared to existing conditions, notwithstanding the numerous scientific publications that conclude climate change threatens the viability of winter-run Chinook salmon:

Mean Adult Female winter-run escapement (IOS model)	**Existing Conditions (2020) Table 12-38**	**No Project Alternative (2040) Table 12C-16**
Wet	3,769	4,315
Above Normal	3,498	4,880
Below Normal	3,319	4,223
Dry	3,468	3,557
Critically Dry	2,128	2,630
All	3,301	3,997

The same is true for modeling of the proposed project and alternatives in the appendices, where the increased flows modeled to result of climate change leads to similarly unrealistic outcomes. As these examples show, the DEIR fails to provide the public and decisionmakers with accurate information about the likely effects of climate change. As a result, at a minimum the DEIR must be revised to include modeling of the proposed project with Median climate change effects, including modeling and analyses regarding project operations during more frequent and severe droughts.

IV. The DEIR Fails to Consider the Whole of the Action, Violating CEQA:

The DEIR violates CEQA because it fails to consider the whole of the action, including: (1) long term effects of the proposed project; (2) changes in upstream reservoir operations of the CVP

[15] As discussed *infra*, the IOS model assumes that temperature mortality of winter run Chinook salmon does not begin until 56 degrees Fahrenheit, despite the fact that this fails to use the best available science, as the State of California has argued in federal court.

and SWP necessary to adapt to climate change; (3) DWR's operations during droughts, including installation of salinity barriers and submission of Temporary Urgency Change Petitions to allow DWR and Reclamation to violate minimum Delta Water Quality Objectives; and, (4) water transfers. Each of these flaws results in a DEIR that misleads the public and decision-makers as to the likely environmental impacts of the proposed project and alternatives, as discussed in detail below.

A. The DEIR Violates CEQA Because it Fails to Consider Long-Term Effects of the Project

CEQA requires the DEIR to consider the whole of the action, "giving due consideration to both the short-term and long-term effects." Cal. Code Regs., tit. 14, § 15026.2 (a). There is no question that the proposed project and alternatives would be operational for many decades into the future. *See also* DEIR at 4-6. Nor is there any question that the effects of climate change significantly alter the effects of the proposed project and alternatives – resulting in changes in water supply, water quality in the Delta, river flows, water temperatures, and resulting effects on native fish populations. Indeed, even the flawed modeling of the effects of climate change included in the appendices to the DEIR demonstrate these significant adverse effects. Yet the DEIR excludes consideration of long-term effects of the project under CEQA, such as effects in 2040 or 2070 that include the effects of climate change, and only considers the effects of the proposed project compared with the existing condition baseline. *See* DEIR at 4-5 ("These longer-term analyses were performed outside of CEQA requirements to provide information about possible future environmental conditions once conveyance facilities are operational."); *id*. at 4-6 (explaining that the DEIR's approach excludes consideration of the effects of climate change from the analysis). This plainly violates CEQA's mandate to consider long-term effects.

B. The DEIR Violates CEQA Because it Fails to Consider Necessary Changes to Upstream Operations of the CVP and SWP as part of the Long-Term Effects of the Project

CEQA broadly defines a "project" as the whole of the action, even where separate governmental approvals are required. Cal. Code Regs., tit. 14, §15378; Cal. Pub. Res. Code § 21065. This broad definition of project is intended to protect the environment by prohibiting the segmentation or piecemealing of environmental review by dividing a project into several pieces and evaluating the environmental impacts of each piece separately, where each of the individual pieces may have no significant impact on the environment. *See, e.g., Tuolumne County Citizens for Responsible Growth v. City of Sonora*, 155 Cal.App.4th 1214, 1222-23 (2007); *Association for a Cleaner Environment v. Yosemite Community College Dist.*, 116 Cal.App.4th 629, 637-639 (2004). The DEIR violates this basic tenet of CEQA by excluding consideration of necessary changes in upstream operations of the SWP and CVP that are related, foreseeable, and integral parts of the whole of the action.

While DWR proposes to operate the Delta tunnel "in conjunction" with the coordinated operations of the existing facilities of the State Water Project and federal Central Valley Project, *see* DEIR at ES-13, the DEIR fails to adequately consider the changes necessary in upstream operations to adapt to climate change and protect fish and wildlife as part of the whole of the project.[16] The DEIR admits that the proposed project and alternatives could affect upstream reservoir storage and flows. DEIR at ES-47 ("However, because of the effect that integration of the proposed north Delta intakes has on the overall system, their operation could lead to changes in river flows and upstream storages."). However, DWR does not propose any measures to ensure that upstream operations adequately protect fish and wildlife and comply with state and federal environmental laws, particularly in light of the effects of climate change. Instead, DWR's modeling relies on unrealistic upstream operations, misleading the public and decisionmakers as to the likely environmental effects of realistic operations of the proposed project and alternatives.

The DEIR's modeling assumes unrealistic upstream reservoir operations under the existing conditions baseline and all of the alternatives. As a result, the DEIR overestimates water diversions and water supply allocations and underestimates potential environmental impacts of the proposed project and alternatives, including the use of Temporary Urgency Change Petitions to allow the SWP and CVP to violate minimum water quality objectives in the Delta. For instance, the DEIR assumes that under existing conditions, end of September Oroville Reservoir storage will average 1.068 MAF in critically dry years. DEIR, Appendix 5, Table 5A-B3.1.3.1-B. Similarly, the DEIR estimates that the proposed project (Alternative 5) will result in reduced Oroville Reservoir end of September storage, to an average of 1.061 MAF. *Id*., Appendix 5, Table 5A-B3.1.3.4-B. In contrast, DWR has publicly explained that it targets a minimum

[16] In addition, we note that Reclamation would have to comply with NEPA in order to participate in Delta Conveyance, as considered in several alternatives in the DEIR. Indeed, the DEIR shows that even without Reclamation's participation in the project, the proposed project and alternatives affect CVP operations, including reservoir storage, as a result of the Coordinated Operating Agreement. We do not understand how Reclamation could change its operations of CVP facilities without first complying with NEPA. While we understand that the Army Corps of Engineers is preparing a draft EIS that considers the effects of constructing the proposed project and alternatives, no federal agency is preparing an EIS under NEPA that considers the environmental impacts of operating the project. Federal agencies must analyze the effects of constructing and operating this project before implementation of any biological opinion by NMFS or USFWS that authorizes construction and operation of the project under the federal Endangered Species Act. *See San Luis & Delta Mendota Water Authority v. Salazar*, 747 F.3d 581, 645-655 (9th Cir. 2014). Nor could FWS and NMFS solely consider the construction of the project – and exclude the environmental impacts of operations of the project – in a lawful biological opinion under the Endangered Species Act.
Moreover, DWR (and Reclamation) currently lack authorization for incidental take of listed species resulting from upstream operations of the State Water Project and Central Valley Project under the California Endangered Species Act, despite such operations causing incidental take under CESA. *See also supra* footnote 1. Obtaining incidental take authorization for the operations of the Delta tunnel "in conjunction" with the coordinated operation so the SWP and CVP requires considering the whole of the action.

Oroville Reservoir end of September storage of 1.6 million acre feet, because this is the minimum necessary to meet water contracts and downstream obligations. In its 2019 State Water Project Delivery Capability Report, DWR explains that,

> The Oroville carryover target (September storage target) was updated in the model to be consistent with current State Water Project operational guidelines of 1.6 MAF from 1.0 MAF. The Water Operations Office, within the State Water Project, Operations and Maintenance, routinely evaluates the projected demands on Oroville for meeting contractual and regulatory requirements. Recent evaluations have indicated a need to keep storage levels higher what than the previous water supply guidelines methodology was providing.

DWR, Technical Addendum to The State Water Project Final Delivery Capability Report 2019 (Aug. 26, 2020), at 4, available online at: https://data.cnra.ca.gov/dataset/1f404a72-b583-418a-81b9-6fe5d5595cd7/resource/9cab8a24-778f-486b-abf5-bae6c8ee1666/download/dcr2019_technical-addendum.pdf; *see id*. at 11 (explaining that increasing the Oroville carryover storage target from 1.0 to 1.6 will require more conservative operations during the summer, will decrease Dry and Critical year water deliveries, water supply allocations, and exports).

The DEIR likewise assumes Shasta reservoir storage during critical dry years that average 1.586 MAF under the existing condition baseline, *see* DEIR, Appendix 5A, Table 5A-B3.1.2.1-B, and only 1.570 MAF under the proposed project, *id*., Table 5A-B3.1.2.4-B. In contrast, NMFS has previously concluded that a minimum end of September storage of 1.9 MAF is necessary to protect endangered winter-run Chinook salmon under the ESA. NMFS 2017, Proposed Amendment to the Reasonable and Prudent Alternative in the 2009 Opinion, available online at: https://media.fisheries.noaa.gov/dam-migration/nmfs_s_draft_proposed_2017_rpa_amendment_-_january_19__2017.pdf. Modeling more realistic and protective Shasta reservoir operations will require reduced releases from Shasta Dam than those identified in the DEIR, which is likely to result in reduced water deliveries and environmental impacts that are not considered in the DEIR.

Even without considering the effects of climate change, the DEIR admits that upstream reservoir operations would drop to dead pool under certain conditions with the proposed project:

> "With inadequate runoff and pattern changes of snowmelt runoff resulting from climate change, CalSim 3 model results show (although infrequently) simulated occurrences of extremely low storage conditions at SWP and CVP reservoirs during critical drought periods when storage is at dead pool levels (i.e., when the water level is so low that it cannot drain by gravity through the dam's outlets). Instances may also occur in the simulation results in which flow conditions fall short of minimum flow criteria, salinity conditions may exceed salinity standards, diversion conditions fall short of allocated diversion amounts, and operating

> agreements are not met (as described in Chapter 6). High temperatures and lower precipitation levels would result in a rapid drop of carryover storage and performance levels for Folsom, Oroville, and Trinity Reservoirs; however, Shasta Reservoir could be slightly more resilient due to its greater inflow of rain, rather than snowmelt (California Department of Water Resources 2018b:21–22). As noted in Appendix 5A, Modeling Technical Appendix, modeling results are limited and include an inherent degree of uncertainty, likely within 5%. During real-life operations, operators would use real-time adjustments in operation to satisfy regulatory, legal, and contractual requirements given the current conditions and hydrologic constraints.

DEIR at page 30-17; *see id*. at 6-35. Remarkably, the DEIR fails to analyze the environmental impacts from real-life operations that are necessary to avoid such effects, which as discussed *supra,* have caused and will cause significant environmental impacts that are not disclosed in the DEIR.

Furthermore, the DEIR shows that the effects of climate change result in even lower upstream reservoir storage and thereby result in more severe impacts on fish and wildlife from upstream operations of the CVP and SWP. For instance, as noted earlier, end of September Shasta Reservoir storage in critically dry years declines from an average of 1.543 million acre feet (2020) to an average of 1.432 million acre feet (2040), and end of September storage in Oroville Reservoir declining from an average of 1.068 million acre in critically dry years (2020) to 0.834 million acre feet (2040). *See* DEIR at 5-17 to 5-18. This results in significant increases in temperature-dependent mortality of winter-run Chinook salmon in the Sacramento River. *See* DEIR, Appendix 5A, Table 5A-E4.1-B (No action alternative (2040) average temperature dependent mortality using the Martin Model of 66% in critically dry years, 18% in dry years, and 14% overall). Yet the DEIR does not include any changes to upstream operations of the SWP and CVP to adapt to climate change and protect fish and wildlife as required by state and federal environmental laws, including the ongoing process to revise the Trump Administration's unlawful biological opinions. *See also* DEIR at 3-145 ("The Delta Conveyance Project would not change operational criteria associated with upstream reservoirs.").

As discussed below, realistic upstream reservoir operations during critically dry years and droughts are likely to result in significant environmental impacts that are not disclosed or discussed in the DEIR. Because upstream operations of the CVP and SWP are integrated with operations in the Delta, changes in upstream operations of the SWP and CVP to comply with state and federal environmental laws and water rights conditions will ripple throughout the watershed, resulting in effects that are not considered in the DEIR such as lower instream flows that reduce survival of migrating salmon, reduced Delta outflow that harms native fish and wildlife and violates water quality objectives, and lower water diversions. The DEIR's failure to include operational changes at upstream reservoirs to comply with state and federal environmental laws results in a DEIR that misleads the public and decisionmakers as to the likely environmental effects of the proposed project and alternatives.

C. The DEIR Violates CEQA Because it Fails to Consider Likely Operations during Droughts, Including Temporary Urgency Change Petitions

The DEIR fails to disclose the significant adverse effects that are reasonably foreseeable to occur from operations of the proposed project and alternatives during drought conditions, particularly the use of Temporary Urgency Change Petitions ("TUCPs") to allow DWR to violate minimum Delta water quality objectives. Analyses by state and federal agencies have demonstrated that previous TUCPs – which reduced flows into and through the Delta below the minimums required by the 2006 Water Quality Control Plan and Water Rights Decision 1641 – have caused significant harm to fish species, further reducing the survival and abundance of species including Delta Smelt, Longfin Smelt, winter-run Chinook salmon, spring-run Chinook salmon, and fall-run Chinook salmon, depending upon the time of year when such TUCPs were granted. *See, e.g.*, State Water Resources Control Board, Water Rights Order 2015-0043 (Corrected January 19, 2016); *id*., Water Rights Order 2022-0095 (Feb. 15, 2022); *id*., Order Approving Temporary Urgency Changes to Water Right License and Permit Terms Relating to Delta Water Quality Objectives (April 4, 2022), available online at: https://www.waterboards.ca.gov/waterrights/water_issues/programs/drought/tucp/docs/2022/20220404_TUCOb_swrcb.pdf; id., Water Rights Order 2014-0029 (September 24, 2014), available online at: http://www.waterboards.ca.gov/waterrights/board_decisions/adopted_orders/orders/2014/wro2014_0029.pdf; U.S. Bureau of Reclamation and DWR, Temporary Urgency Change Petition Regarding Delta Water Quality, December 1, 2021, available online at: https://www.waterboards.ca.gov/waterrights/water_issues/programs/drought/tucp/docs/2022/2021.12_2022_TUCP.pdf; Declaration of Dr. Jonathan A Rosenfield in support of Plaintiffs Motion for Preliminary Injunction For 2022 and Plaintiffs' Opposition to Federal Defendants Motion for Voluntary Remand Without Vacatur, Doc. 325 (Dec. 16, 2021), attached hereto as Exhibit D; *see also* Exhibit F. Implementation of TUCPs has also contributed to and exacerbated Harmful Algal Blooms in the Delta, and peer reviewed research has concluded that reduced Delta outflow (shifting X2 upstream) significantly contributes to the abundance of toxic cyanobacteria in the genus *Microcystis*. *Id*.; Lehman et al 2020; Lehman et al 2022.

Moreover, TUCPs are reasonably foreseeable in future droughts, and are likely to have similar adverse environmental impacts in the future. DWR and Reclamation have previously admitted that TUCPs like those implemented in 2014-2015 are reasonably foreseeable in future droughts. *See* Exhibit F. More recently, in July 2022 DWR released a Draft EIR for its proposal to install a Delta Salinity Barrier at West False River for up to 40 of the next 120 months, and in that DEIR DWR assumed TUCPs would be implemented whenever the salinity barrier was installed:

> Before installation of the 2015 and 2021–2022 EDBs, the State Water Board issued temporary urgency change orders for D-1641 to establish temporary emergency water quality standards for the CVP's and SWP's water rights. This

> permit process would also occur for the proposed project before installation of the barrier (under all three installation scenarios).

DWR, West False River Drought Salinity Barrier DEIR at 3.5-16, available online at: https://water.ca.gov/-/media/DWR-Website/Web-Pages/Water-Basics/Drought/Files/Publications-And-Reports/WFRDSB_DEIR_July2022_ADA.pdf; *see id.* (explaining that it is "reasonable to assume" that TUCPs that allowed for violation of salinity standards would occur with implementation of the proposed project).

However, the DEIR never analyzes or considers the adverse environmental impacts on fish and water quality from the use of TUCPs that are reasonably certain to occur as part of the proposed project.[17] Violation of water quality standards constitutes a significant impact under CEQA, and the further reductions in the abundance and survival of fish and wildlife listed under CESA that would result from implementation of TUCPs are also a significant impact under CEQA. *See* Cal. Code Regs., tit. 14, § 15065(a)(1). As a result, the DEIR misleads the public and decisionmakers as to the likely environmental consequences of the proposed project and alternatives, violating CEQA.

D. The DEIR Fails to Accurately Analyze South Delta Pumping Allowed under the Proposed Project and Alternatives, Underestimating the Severity of Impacts to Fish Species

Finally, the DEIR's modeling of CVP/SWP operations significantly underestimates South Delta pumping that is allowed under the State's Incidental Take Permit and the Trump Administration's unlawful biological opinions, which are part of the proposed project and alternatives. For instance, the DEIR assumes an OMR limit of -6,250 cfs for both the CVP and

[17] In addition, modeling by the U.S. Bureau of Reclamation shows that TUCPs generally do not increase reservoir storage at Shasta Reservoir, as the minimum 3,250 cfs release from Keswick reservoir is sufficient to meet its share of obligations under D-1641. *See* Exhibit C. Similarly, DWR found that the 2022 TUCP did not improve Shasta storage, instead concluding that the TUCP conserved storage in Oroville and Folsom, but did not improve storage and water temperatures for salmon below Shasta Dam. *See* DWR, Electronic Transmittal: Conserved Water Accounting for Condition 4 of the April 2022 under TUCP Order, online at: https://www.waterboards.ca.gov/waterrights/water_issues/programs/drought/tucp/docs/2022/20220513_Condition4_DWR.pdf; DWR, Electronic Transmittal: Conserved Water Accounting for Condition 4 of the April 2022 under TUCP Order for May 2022, online at: https://www.waterboards.ca.gov/waterrights/water_issues/programs/drought/tucp/docs/2022/20220613-cond4-dwr.pdf; DWR, Electronic Transmittal: Conserved Water Accounting for Condition 4 of the April 2022 under TUCP Order for June 2022, online at: https://www.waterboards.ca.gov/waterrights/water_issues/programs/drought/tucp/docs/2022/20220714-cond4-dwr.pdf. TUCPs cause significant environmental impacts in the Delta and do not provide benefits to salmon or other fish and wildlife in the Sacramento River, as Reclamation and DWR have previously claimed.

SWP, even though the biological opinion imposes no maximum OMR limit, and the California Natural Resources Agency has failed to pursue its claim that the Bureau of Reclamation must comply with CESA. *See* DEIR, Appendix 5A, Attachment B, at Table 5A-B2.1.[18] Similarly, the DEIR assumes OMR Storm Flex is only used for 6 days at -6,250 cfs, *see id.*, even though both the biological opinion and Incidental Take Permit allow OMR storm flex whenever the Delta is in balanced conditions and no other requirements have been triggered, as discussed in the attached letter from NRDC et al to DWR commenting on the State's DEIR for Long Term Operations of the State Water Project. Exhibit H. And the DEIR's modeling and analysis assumes more restrictive OMR in March, April and May of drier years than what is actually required by the biological opinions and Incidental Take Permit. *See* DEIR, Appendix 5A, Attachment B, at Table 5A-B2.1 (modeling -3,500 cfs in March, April and May of non-critical years). These modeling assumptions underestimate the CVP/SWP pumping that is permitted under the proposed project, thereby underestimating negative OMR and the reduction in Delta outflow from the proposed project, and thus underestimating the severity of impacts to fish species that are likely to result.

E. The DEIR Violates CEQA because it Fails to Consider the Effects of Water Transfers

The DEIR excludes the effects of water transfers, claiming that it would not result in increased water transfers. DEIR at 3-147. However, the DEIR also acknowledges that water transfers through the new Delta tunnel could result in reduced carriage water, which is the water loss that occurs when moving transfer water across the Delta to the South Delta pumps. *Id*. Even if there is not an increase in water transfers, reducing carriage water losses, which are typically 20-30% of water transfers, would result in reduced Delta outflow. *See also id*., Appendix 3H, at 3H-5 (Estimating carriage water losses of 20% of maximum authorized water transfers would be approximately 180,000 acre feet of water per year). Reduced Delta outflow that results from water transfers that reduce carriage water, particularly in the summer and fall months, likely would result in significant adverse impacts including reduced survival of Delta Smelt, increased salinity, and increased harmful algal blooms that threaten human health and safety. The DEIR's failure to consider the effects of water transfers, including reduced Delta outflow, as part of the proposed project violates CEQA.

V. The DEIR's Analysis of Cumulative Impacts Violates CEQA:

The DEIR also violates CEQA because it fails to adequately analyze cumulative impacts of the proposed project in conjunction with other relevant projects, including the proposed Sites Reservoir Project. Adequate cumulative impacts analysis is essential under CEQA because,

[18] The DEIR does not appear to include CalSim callouts for the proposed project, only for the existing condition and no action baselines, but the DEIR makes clear the proposed project includes the same requirements.

> the full environmental impact of a proposed project cannot be gauged in a vacuum. One of the most important environmental lessons that has been learned is that environmental damage often occurs incrementally from a variety of small sources. These sources appear insignificant when considered individually, but assume threatening dimensions when considered collectively with other sources with which they interact.

See Bakersfield Citizens for Local Control v. City of Bakersfield, 124 Cal.App.4th 1184, 1213-1215 (2004) (citations omitted). As in that case, other projects that propose to increase diversions from the Bay-Delta, including the Sites Reservoir project, clearly are relevant projects, and their meaningful exclusion from the cumulative impacts analysis in the DEIR prevents the severity and significance of cumulative impacts from being adequately considered.

CEQA requires that the DEIR consider the cumulative effects of the proposed project in combination with other projects that will divert water from the watershed, such as Sites Reservoir, even if the DEIR considers the impacts from each project to be individually minor. Cal. Code Regs., tit. 14, § 15355. CEQA also requires that the discussion of cumulative impacts in the DEIR "reflect the severity of the impacts and their likelihood of occurrence," and must include a "reasonable analysis of the cumulative impacts of the relevant projects." *Id*., § 15130. While the DEIR includes Sites Reservoir on its list of projects considered for cumulative impacts, *see* DEIR, Appendix 3C at 3C-90, the DEIR devotes only three pages to consider cumulative impacts of construction and operation of the proposed project and all other cumulative projects on fish species, *see id*. at 12-245 to 12-248. These three pages in the DEIR grossly understates the severity and significance of the cumulative impacts of implementing both the proposed project and Sites Reservoir, as well as other projects that will increase water diversions from the Bay-Delta. In addition, as discussed *infra*, the DEIR's very brief discussion of cumulative impacts is premised upon mitigation measures that fail to mitigate the adverse impacts to fish species that will result from the cumulative increase in water diversions under the proposed project and other relevant projects.

The amount of water flowing down the Sacramento River and into and through the Delta significantly affects the survival and abundance of numerous fish species, with lower flows generally resulting in lower survival and abundance. Several of the analyses in the DEIR are based on these flow: survival and/or flow: abundance relationships, including for Longfin Smelt, Delta Smelt, all four runs of Chinook salmon, and both Green Sturgeon and White Sturgeon. The DEIR acknowledges that,

> projects diverting water from the Sacramento River could affect fish and aquatic species in an analogous manner to that analyzed for the project alternatives, e.g., by reducing river flow, thereby potentially affecting migration survival for juvenile salmonids (Perry et al. 2018) or abundance of longfin smelt through Delta outflow-abundance relationships (see Impact AQUA-7).

DEIR at 12-247. However, as this discussion shows, the DEIR does not analyze or discuss the severity of the cumulative impacts from the proposed project and other projects (like Sites Reservoir) that propose to divert water from the Sacramento River.

Moreover, none of the modeling in the DEIR includes the cumulative effects of water diversions by the proposed project in combination with the Sites Reservoir project, even though state agencies have reviewed and commented on two CEQA documents for the Sites Reservoir project, and the State Water Resources Control Board has conditionally accepted a water rights application for the project. *See* DEIR at 12-247 (stating that effects from some projects that are considered in the analysis of cumulative impacts are included in the modeling, but that the modeling excludes the effects of Sites Reservoir). Neither project is included in the environmental baseline for the others' DEIR, and neither of the CEQA documents includes modeling of the cumulative effects of the project –even though CalSim modeling of each project is publicly available, which would enable quantitative analysis of the cumulative impacts of these two projects.

The cumulative effects of both projects would result in greater reductions in flows into and through the Delta, with substantially more severe and significant cumulative adverse impacts on fish species, than is observed when each project is viewed in isolation. In addition, the proposed project and the proposed Sites Reservoir are also likely to compete to divert flows, with the two projects proposing to divert at least some of the same molecules of water, and the analyses for both of these projects in isolation – rather than quantitative modeling the effects of both of these projects – simultaneously overestimates likely water supply from these projects while also underestimating the cumulative reduction in Delta inflows and Delta outflows and resulting adverse impacts to fish species.[19]

Yet the DEIR simply states that the cumulative impacts would be "potentially significant for some species," as discussed in the DEIR for the impacts of the proposed project, without any discussion or analysis – let alone modeling – of the severity of the cumulative impacts on fish species. DEIR at 12-147. The DEIR then restates the discussion of mitigation measures in the DEIR (which as discussed *infra* are wholly inadequate to reduce impacts to a less than significant level) and includes a sentence that assumes that similarly inadequate mitigation measures (primarily tidal marsh habitat restoration) would be imposed on these other projects, like Sites Reservoir, and claims that the cumulative impacts would be less than significant with mitigation. *Id*. Like the DEIR's conclusions regarding habitat restoration and other mitigation measures, these conclusions are likewise arbitrary and are not supported by the evidence.

[19] Stated another way, all of the analysis in the DEIR is based on modeling of flows that are projected to occur, rather than considering the effect of the project compared to the minimum instream flows that are required. Because instream flows today are greater than existing requirements in many years, *see also supra* page 4-6, additional storage and diversion projects that reduce instream flows, and/or reduced runoff from drought and climate change, will reduce flows compared to those analyzed in the DEIR, leading to more severe environmental impacts by the proposed project and alternatives. The DEIR does not analyze these cumulative impacts.

CEQA requires more, particularly where the cumulative impact is significant. Cal. Code Regs., tit. 14, § 15130. Indeed, DWR has acknowledged in other CEQA documents that the cumulative impacts of foreseeable projects have significant environmental impacts to fish species. For instance, in its FEIR document for Long Term Operations of the California State Water Project, DWR admitted that,

> The impacts of past projects, including past operation of the SWP, have been included in the description of the baseline environmental conditions provided in Section 3.4. The cumulative impact of these past projects has resulted in a baseline consisting of a trending decline of listed-species population within the Delta and other waterways used by anadromous fish populations in northern California. As noted, multiple factors have contributed to this trending decline, and it is difficult to quantify the proportion of the decline attributable to a specific project, action, or event
> …
> 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.**
> **…**
> The majority of past, present, and reasonably foreseeable projects that are shown in Table 4.6-1 may have impacts on the same aquatic species and/or habitats as the Proposed Project. **Specific quantifiable details regarding the biological impacts of every one of these projects were not available, and therefore this analysis is conducted qualitatively.**

DWR, FEIR for Long Term Operations of the California State Water Project, at 4-317 to 4-318 (emphasis added). While that FEIR erroneously concluded that the cumulative impacts of the proposed project would be less than significant / not cumulatively considerable, it included substantial discussion of the cumulative impacts to fish species from various categories of projects. Moreover, hydrologic modeling of the Sites Reservoir project is available today and this hydrologic modeling could and should be utilized in the DEIR to quantitatively assess cumulative impacts of Sites Reservoir and Delta Conveyance; the failure to use the existing modeling to quantitatively analyze cumulative impacts, given the likely severity of cumulative impacts to listed fish species, is not reasonable.

VI. The DEIR's Analysis and Conclusions Regarding Environmental Impacts to Native Fish Fails to Use the Best Available Science and Misleads the Public and Decisionmakers as to the Likely Effects of the Project:

As discussed below, the DEIR's analysis of environmental impacts from operations of the proposed project fails to use the best available science, is not supported by the evidence, and

underestimates the significant impacts that are likely to result from the proposed project and alternatives. Equally important, the DEIR's conclusions regarding mitigation measures for the impacts that are identified as significant likewise fail to use the best available science, are not supported by the evidence, and are arbitrary and capricious.

A. Winter-Run Chinook Salmon

The DEIR's conclusion that the operations of the proposed project results in less than significant impacts with mitigation to winter-run Chinook salmon, *see* DEIR at ES-33, is contrary to the evidence before the agency. The DEIR also fails to consider important aspects of the problem such as the effects of climate change and the use of TUCPs that reduce survival of winter-run Chinook salmon migrating down the Sacramento River and through the Delta. The DEIR relies on methods to evaluate impacts that fail to use the best available science and that substantially underestimate the likely environmental impacts to the species, yet even these flawed methods still show significant impacts to this highly endangered species, including reduced survival through the Delta and reduced abundance and escapement (in two of the life cycle models). DEIR at Table 12-0. The DEIR's assumption that tidal marsh and channel habitat restoration will mitigate these impacts, *id*. at ES-33, is inconsistent with the best available science and not supported by the evidence. Contrary to the DEIR's conclusion, the proposed project and alternatives will cause significant impacts to the species, and operational changes (including increased bypass flows with unlimited pulse protection at the proposed North Delta Diversion ("NDD")) are necessary to mitigate these impacts.

1. The DEIR's Analyses Demonstrate that the Proposed Project and Alternatives are Likely to Result in Significant Environmental Impacts to Winter-Run Chinook Salmon

The analyses in the DEIR show that the proposed project and alternatives are likely to reduce the survival of juvenile winter-run Chinook salmon migrating through the Delta and reduce the abundance of this critically endangered species. DEIR at Table 12-0. With respect to juvenile survival through the Delta, both the Delta Passage Model and the Perry et al 2018 model (STARS Model) show that all of the alternatives, including the proposed project (Alternative 5), are likely to reduce survival through the Delta compared to the unsustainable status quo, as a result of diversions from the new North Delta intakes that reduce flows into and through the Delta. *Id*.; DEIR at 12-100 to 12-105 (explaining that the Perry et al 2018 model finds that for the key months of December to April, "mean through Delta survival under the Project alternatives was 0-4% lower than existing conditions," and was reduced further in the fall months and in June; Delta Passage Model concludes that the proposed project and most of the project alternatives reduce through-Delta survival by 1-3%). It is important to acknowledge that the status quo for winter-run Chinook salmon is declining abundance; thus, even seemingly small reductions in survival of this critically endangered species increase the risk that the population will be extinguished, constituting a significant impact that warrants changes in operations to avoid these impacts.

In addition to reduced survival through the Delta, two of the three life cycles that are utilized in the DEIR conclude that the proposed project would further reduce the abundance of winter-run Chinook salmon compared to the degraded status quo. The DEIR shows that the proposed project and the alternatives would further reduce abundance of winter-run Chinook salmon by 7-13%, primarily as a result of reduced survival through the Delta. DEIR at 12-121. The OBAN model estimates that the proposed project and alternatives (all except for Alternatives 2a/4a) would reduce the abundance of winter-run Chinook salmon. *Id*. at 12-123. In addition, the OBAN model was also run assuming a 5-10% increase in near field mortality (e.g., as a result of increased predation at the North Delta Diversion facilities), which resulted in even lower overall abundance of the species (and declining abundance under Alternative 2a/4a). *Id*. at 12-123. Moreover, the OBAN model predicts that quasi-extinction of winter-run Chinook salmon (abundance less than 100 spawners) is extremely likely under all the alternatives, with Alternative 2a/4a slightly reducing the risk of extinction due to slightly cooler water temperatures for spawning eggs. *Id*. at 12-123; *id*., Appendix 12B, Attachment 12B.1, at 7-8.

The DEIR recognizes that, "The available information generally indicates that diversion at the NDD would negatively affect winter-run Chinook salmon through flow-survival and habitat impacts." DEIR at 12-126. The DEIR admits that the proposed project and alternatives will cause a significant impact to winter-run Chinook salmon, but it erroneously claims that tidal marsh and channel margin habitat restoration will mitigate these impacts to a less than significant level. *Id*. at ES-33.

Winter-run Chinook salmon are at significant risk of extinction under the degraded status quo, yet the proposed project and alternatives would further reduce survival of the species through the Delta and are likely to result in even lower abundance than today, based on the modeling and analyses in the DEIR.

2. *The DEIR's Analytical Methods Fail to Use the Best Available Science and Significantly Underestimate Impacts to the Species from the Proposed Project and Alternatives*

The methods utilized in the DEIR fail to accurately assess impacts to winter-run Chinook salmon. Most notably, the DEIR ignores the effects of climate change, as discussed *infra*. Even the DEIR's flawed modeling regarding the effects of climate change, which are not considered under CEQA, shows significant increases in temperature dependent mortality of eggs that will require mitigation, and adequate mitigation measures such as increased carryover storage requirements will substantially change water project operations from those presented in the DEIR. As a result, the DEIR fails to provide the public and decisionmakers with accurate information regarding the likely environmental impacts from operating the proposed project starting in 2040.

In addition, several of the specific models used in the DEIR to assess impacts fail to use the best available science and significantly underestimate the adverse impacts of the proposed project as a result.

a. The IOS Life Cycle Model Fails to Use the Best Available Science

The IOS life cycle model relies on a 1999 study by the U.S. Fish and Wildlife Service to estimate temperature mortality, and it estimates 0.001 daily mortality at 55 degrees Fahrenheit and daily mortality of 0.018 at 60 degrees Fahrenheit. DEIR, Appendix 12B, at 12B-116. However, state and federal agencies have rejected use of this study in favor of more recent peer reviewed scientific studies that conclude temperature dependent mortality of winter-run Chinook salmon begins at temperatures equal to 53.5 degrees Fahrenheit (Martin et al 2017, Martin et al 2020), including in recent biological opinions by NMFS. Martin et al 2017 and 2020 demonstrated that lab studies of temperature mortality, like USFWS 1999, significantly underestimated temperature mortality in the real world. Most recently, the State of California argued in court that this USFWS 1999 study fails to use the best available science, and that the Martin et al studies constitute the best available science. *See* Exhibit B. Because the IOS model fails to use the best available science to estimate temperature dependent mortality of winter-run Chinook salmon, it overestimates survival and abundance in light of the effects of climate change and the proposed project.[20]

In addition, the IOS model's evaluation of how Sacramento River flow affects survival, *see* DEIR, Appendix 12B, at 12B-119 to -120, appears to inaccurately model the effects of flow on survival compared with peer reviewed research, such as Hassrick et al 2022. Compared with the results of Hassrick et al 2022, the IOS model appears to significantly overestimate survival of juvenile winter-run Chinook salmon under lower flow conditions, underestimate survival under flows around 24,000 cfs, and overestimate survival at higher flows.

Finally, as discussed below, the IOS model relies on the modified Delta Passage Model to estimate survival of juvenile salmon through the Delta, *see* DEIR at 12B-120, which likewise fails to use the best available science and overestimates survival through the Delta.

b. The Revisions to the Delta Passage Model Fail to Use the Best Available Science

[20] For example, the IOS model predicts there would be no temperature dependent mortality of winter-run Chinook salmon under below normal and dry conditions, and only 14% temperature dependent mortality in critically dry years. DEIR at 12-122 (Table 12-40). According to the National Marine Fisheries Service, from 1996 to 2016 temperature dependent mortality has averaged approximately 68% in critically dry years, 9% in dry years, and 10% in below normal years. *See* National Marine Fisheries Service, January 19, 2017, Proposed Amendment to the Reasonable and Prudent Alternative of the 2009 Opinion, available online at: https://media.fisheries.noaa.gov/dam-migration/nmfs_s_draft_proposed_2017_rpa_amendment_-_january_19__2017.pdf.

While DWR's Delta Passage Model historically found that increased South Delta exports have a weakly negative effect on survival through the Delta, based on studies of salmon with coded wire tags when exports and flows were not strongly correlated as a result of OMR limits, *see* DEIR, Appendix 12B at 12B-102, DWR's revised Delta Passage Model finds that increased South Delta exports by the SWP and CVP ***increase*** the survival of salmon migrating through the Delta, *Id*. at 12B-102 to -103. In the revised model, DWR has eliminated all of the data and analyses of survival that predate the adoption of OMR limits, which limits the data set to a period in which flows and exports are highly correlated as a result of OMR limits. *Id*. Even though exports and flow are highly correlated in this recent data set, and even though the DEIR admits that the effect of exports "was not well supported" in the model that included the effects of flow and claims the data suggests "the absence of a negative effect of exports on survival of Sacramento River-origin" salmon, *see* DEIR at 12B-102, the DEIR's Delta Passage Model concludes that exports have a positive effect on salmon survival, even in situations where flow and exports are not highly correlated. This approach fails to use the best available science.

c. The DEIR Fails to Provide Substantial Evidence to Support its Conclusions Regarding the Winter Run Life Cycle Model Results

The DEIR fails to provide evidence to support its conclusory statements regarding NMFS' Winter Run Life Cycle Model, as neither the main document nor the appendices provided a description of the model, the model inputs, or detailed model results. Moreover, the DEIR does not include any results from the Winter Run Life Cycle Model that incorporate the effects of climate change that have been observed to date, let alone the effects anticipated when the project would be operational in 2040. As a result, the DEIR's conclusory statements regarding the results of the Winter Run Life Cycle Model are not supported by substantial evidence.

d. The DEIR's Assumption that There Will Not be Increased Predation or Mortality at the North Delta Intakes Fails to Use the Best Available Science

The DEIR also concludes that the new fish screens and diversion facilities in the North Delta will not result in increased predation, impingement, or otherwise reduce survival from near field effects. *See* DEIR at 12-90 to 12-92. However, the proposed project and alternatives would construct new large fish screens in the Delta, creating potential hot spots for predation, and many existing structures in the Delta have been identified as predation hot spots, including the Head of Old River Barrier, Delta Cross Channel Gates, and Clifton Court Forebay. Grossman et al 2013. Similarly, NMFS concluded that the WaterFix project would create habitat and opportunity for large predators, resulting in adverse effects to winter-run Chinook salmon, and modeling of effects using the Winter Run Life Cycle Model evaluated a range of near field mortality from 0 to 5 percent. NMFS 2017. While the design of the fish screens has changed from those evaluated in the WaterFix biological opinion, life cycle modeling in the DEIR indicates that if there is additional 5% near field mortality at the North Delta intakes, the proposed project and alternatives would result in far greater negative impacts to the abundance of the species and

would increase the risk of quasi-extinction. DEIR at 12-123 (mean escapement reduction of 12% for the proposed project assuming no near field mortality, rising to a 25% reduction in escapement assuming 5% mortality at the North Delta Intakes); *id*., Appendix 12B, Attachment 12B.1, at 15-24 (increased risk of quasi-extinction for all alternatives).

3. The DEIR's Conclusion that Operational Criteria and Habitat Restoration will Fully Mitigate Impacts is Arbitrary and Capricious

Finally, the DEIR's conclusion that proposed operations criteria and habitat restoration would fully mitigate these adverse impacts is contrary to the peer reviewed research and is not supported by substantial evidence. Specifically, the DEIR claims that the tidal marsh restoration would "reduce negative hydrodynamic effects such as flow reversals in the Sacramento River at Georgiana Slough (CMP-25) and reduced effects from reduced inundation of riparian/wetland benches as a result of NDD operations (CMP-26)." DEIR at 12-126. These statements in the DEIR are inconsistent with the best available science, and the DEIR fails to provide a reasoned explanation to support its conclusions that these mitigation measures will fully mitigate these adverse effects.

First, as the DEIR explains, the Perry et al 2018 analysis reflects the effects of reduced flows on survival of "salmon ***migrating*** through the Delta," not salmon that are rearing in the Delta. *Id*. at 12-100. The DEIR presents no scientific evidence – and we are not aware of any such evidence – showing that restoring channel margin habitat will mitigate the effects of reduced flow to ***migrating*** salmon and improve their survival;[21] instead, the DEIR claims that "DWR will undertake channel margin habitat restoration to mitigate for potential flow-related impacts on riparian and wetland bench habitat used by juvenile Chinook salmon for ***rearing***." *Id*., Appendix 3F, at 3F.1-13.

The DEIR also cites Hellmair et al 2018 to claim that channel margin habitat restoration has been demonstrated to be effective. *Id*. at 3F.1-14. However, while Hellmair et al found that salmon were more likely to be found occupying natural or restored channel habitats (particularly sites with instream cover from terrestrial vegetation or woody material) compared to shorelines that consist of rock revetments, this study does not analyze, let alone demonstrate, that channel margin habitat restoration increased survival of migrating or rearing salmon. In addition, studies in the Sacramento River upstream of the Delta have found that while flow significantly affects survival of migrating salmon, neither the percentage of off channel habitat within 50 feet of the river nor adjacent cover (defined as "the percent of non-armored river bank with adjacent natural woody vegetation") were statistically significant covariates affecting survival. Henderson et al

[21] Even with respect to floodplain habitat, for which there is a much larger body of scientific evidence, while there are numerous studies finding that salmon reared on floodplains generally result in increased size and faster growth rates, there appears to be no scientific evidence finding that salmon reared on the floodplain have higher survival and subsequent abundance than salmon reared in the main channel Sacramento River. *See* Takata et al 2017; *see also* Pope et al 2018.

2017. Thus, the Hellmair study does not support the DEIR's conclusion that channel margin habitat restoration will mitigate the reduction in survival caused by increased diversions from the North Delta intakes, and Henderson et al 2017 likewise does not support the DEIR's conclusion that channel margin habitat restoration is likely to increase survival of migrating salmon sufficient to mitigate the adverse impacts of reduced flows caused by the proposed project and alternatives.

In addition, as the DEIR admits, approximately 47,000 linear feet (8.9 miles) of channel margin habitat has been restored in recent decades as part of levee improvement projects, DEIR at 12-106, yet the DEIR presents no evidence that these channel habitat restoration projects have improved the survival of winter-run Chinook salmon through the Delta. Here, the DEIR appears to propose to restore "up to 4,900" linear feet of channel margin habitat. *Id*. at 3F-18, 3F-56.

Equally important, peer-reviewed studies have found that given existing low abundance of salmon and existing flows into and through the Delta, there is adequate rearing habitat in the Delta for salmon. Munsch et al 2020. That study did not indicate that rearing habitat in the Delta is a limiting factor for salmon at current population levels, and instead suggests that without higher abundance and increased flows, habitat restoration in the Delta is unlikely to improve productivity or provide substantial population level benefits. Similarly, in its 2017 biological opinion regarding WaterFix, NMFS found that for winter-run Chinook salmon, "The proposed Delta habitat restoration did not improve the cohort replacement rate under this scenario because the current low abundance of the winter-run population is not limited by Delta rearing habitat." NMFS 2017 at 810. Furthermore, the effects of tidal marsh habitat restoration do not substitute for flows, but instead depend on adequate flows and temperatures to provide benefits; recent studies have found that the Delta provides rearing habitat that supports higher growth of salmon than salmon that rear in the American River in years with adequate flows, but not in drought years. Coleman et al 2022 (concluding that "variation in water flow and temperature (Figure 1) were likely the primary abiotic factors that generated differences in growth opportunities in each habitat within and among years.").

Second, while tidal marsh habitat can change hydrodynamics to reduce the frequency of reverse flows at Georgiana Slough caused by reductions in flows under the proposed project and alternatives, there is no evidence that tidal marsh habitat restoration would improve survival of migrating salmon in reaches downstream from Georgiana Slough. Perry et al 2018 demonstrates that the effects of flow on juvenile salmon survival through the Delta are not only a result of reverse flows at Georgiana Slough, but instead include flow: survival relationships in many reaches in the Delta, including reaches downstream from Georgiana Slough. *See also* DEIR at 12-17 ("In addition to influencing migratory pathways, Sacramento River flow is positively correlated with juvenile Chinook salmon survival in river reaches transitioning from bidirectional (tidal) flow to unidirectional (downstream) flow with increased river flow (i.e., Sacramento River from Georgiana Slough to Rio Vista; Sutter and Steamboat Slough; and Georgiana Slough) (Perry et al. 2018)."). The published paper concludes that,

> First, survival decreases sharply and routing into the interior Delta (where survival is low) increases sharply as Delta inflows decline below approximately 1,000 $m^3 \cdot s^{-1}$, the point at which transitional reaches shift from bidirectional to unidirectional flow (Figs 7 and 8). In contrast, at inflows greater than 1,000 $m^3 \cdot s^{-1}$, survival is maximized and changes relatively little with flow while routing into the interior Delta via Georgiana Slough is minimized and insensitive to inflow. These findings indicate that water management actions that reduce inflows to the Delta will have relatively little effect on survival at high flows, but potentially considerable negative effects at low flows.

Perry et al 2018. The paper concludes that flows affect reach-specific survival in reaches identified in Perry et al 2018 as reaches 3, 4, 5, and 6, with higher flows resulting in higher survival in those reaches, and lower flows resulting in lower survival. More recently, Hance et al 2021 also found that flow had a positive effect on survival of migrating juvenile winter-run Chinook salmon through most reaches of the Delta, including a positive effect of flow on survival from the interior Delta to Chipps Island. Hance et al 2021. The DEIR fails to consider this study, particularly the conclusion that there is a strong flow: survival relationship between the interior Delta and Chipps Island for migrating juvenile winter-run Chinook salmon. Thus, diverting water through the proposed North Delta intakes (when flows in the Sacramento River at Freeport are less than approximately 35,000 cfs, the equivalent of 1,000 cubic meters per second) affects route selection and reach specific survival in these portions of the Delta, and both of these functions of flow (route selection and reach specific survival rates) affect overall migratory survival.

While habitat restoration is proposed to "reduce negative hydrodynamic effects such as flow reversals in the Sacramento River at Georgiana Slough," the DEIR does not propose that this habitat restoration would eliminate the increase in flow reversals at Georgina Slough caused by the proposed project, nor is there any credible scientific evidence that this habitat restoration would mitigate the effects of reduced flow on reach specific survival of migrating salmon in reaches 3, 4, 5 and 6 identified in Perry et al 2018. In other words, although tidal marsh habitat may partially mitigate the effects on route selection, it would not mitigate the effects on reach specific survival. For the same reasons, there is no basis to conclude that tidal marsh or channel margin habitat restoration would offset or mitigate the adverse effects to juvenile migratory survival caused by reduced flow and identified by the Delta Passage Model. *See also* DEIR at 12B-99 (explaining the reach specific flow: survival relationships in reaches Sac1, Sac2, Sac3, and Sac4 in the Delta Passage Model).

Third, the proposed operational measures are not adequate to minimize and mitigate these impacts. The proposed bypass flows at the North Delta intakes are significantly weaker than what was required in 2017, as they do not include unlimited pulse protection and allow for higher diversions at lower flow levels than previously required. *See* Exhibit A. Even though Perry et al 2018 demonstrates that diverting water from the North Delta Diversion when flows at Freeport are less than 35,000 cfs reduces the survival of salmon migrating through the Delta, the

proposed bypass flow criteria allow the NDD to divert 70 percent of the flows greater than 20,000 cfs. *See* DEIR at 3-153. As a result, when flows at Freeport are 35,000 cfs, the minimum bypass flow is only 22,900 cfs, and the North Delta intakes could pump at full capacity under all of the alternatives, even though this would reduce salmon survival. In addition to reducing survival and subsequent abundance, these inadequate bypass rules will also adversely affect life history diversity,[22] as late migrating salmon are likely to face reduced bypass flows and even lower survival under Level 2 and Level 3 bypass flows. *See* DEIR at 3-153. Moreover, unlike the requirements for WaterFix, the DEIR does not propose unlimited pulse protection or otherwise propose to limit North Delta pumping based on real time monitoring of salmon migration. DEIR at 3-150. As a result, the DEIR does not propose real time operations at the North Delta intakes that could mitigate these impacts.

Therefore, even with the proposed mitigation measures, the proposed project and alternatives are likely to reduce survival of migrating juvenile winter-run Chinook salmon below the degraded baseline conditions under which the species' existence is jeopardized. As a result, the proposed project and alternatives results in significant impacts under CEQA, and mitigation measures – specifically higher bypass flow requirements in the North Delta – are necessary.

B. Spring-Run Chinook Salmon

The DEIR's conclusion in the Executive Summary that the operations of the proposed project results in less than significant impacts to spring-run Chinook salmon, *see* DEIR at ES-33, is contrary to the evidence before the agency – and is inconsistent with the DEIR's own finding in the body of the report. *Compare* DEIR at ES-33 (AQUA-3 conclusion that the impact of operations of and maintenance of all of the alternatives would be less than significant) *with id*. at 12-134 ("it is concluded that the operations and maintenance impact of the project alternatives would be significant for spring-run Chinook salmon."). As with winter-run Chinook salmon, the DEIR also fails to consider important aspects of the problem such as the effects of climate change and the use of TUCPs that worsen survival of spring-run Chinook salmon migrating down the Sacramento River and through the Delta compared to what is presented in the DEIR. And like its analysis of impacts to winter-run Chinook salmon, the DEIR relies on methods to evaluate impacts that fail to use the best available science and substantially underestimate the likely environmental impacts to the species, yet even these flawed methods still show significant impacts to this threatened species, particularly reduced survival through the Delta. DEIR at Table 12-0. And as with winter-run Chinook salmon, the DEIR erroneously claims that tidal marsh and channel habitat restoration will fully mitigate these impacts. Contrary to the DEIR's conclusion, the proposed project and alternatives will cause significant impacts to the species,

[22] Maintaining historic levels of life-history diversity within Central Valley Chinook salmon runs is critical to maintaining population viability as it allows these populations to "distribute the risks that disturbances from droughts, fires, disease, food availability, and other natural and manmade stressors present to populations." SWRCB 2017 at 1-18, McElhany et al 2000; Lindley et al 2007; Satterthwaite et al 2014; Sturrock et al 2015; 2019 SEP Group 2019.

and operational changes (including increased bypass flows with unlimited pulse protection at the proposed North Delta intakes) are necessary to mitigate these impacts.

1. *The DEIR's Analyses Demonstrate that the Proposed Project and Alternatives are Likely to Result in Significant Environmental Impacts to Spring-Run Chinook Salmon*

Similar to winter-run Chinook salmon, the DEIR finds that the proposed project and alternatives will reduce the survival of juvenile spring-run Chinook salmon migrating down the Sacramento River. *See* DEIR at 12-132. Based on analyses using the Delta Passage Model and Perry et al 2018 analysis, the DEIR concludes that the reductions in Sacramento River flows as a result of North Delta diversions will reduce survival of spring-run Chinook salmon migrating through the Delta by 3-4 percent compared to the existing conditions baseline. *Id*. The impacts likely would be even greater for yearling spring run that migrate earlier during the fall months. *Id*. While the DEIR does not include a life cycle model for spring run Chinook salmon, the life cycle modeling for winter-run Chinook salmon demonstrates that even small reductions in survival through the Delta can result in significant adverse population level effects.

For spring-run salmon migrating from the San Joaquin basin, the DEIR finds that survival would be reduced in dry years under the proposed project and most alternatives, and in critically dry years under several alternatives. *Id*. at 12-134.

2. *The DEIR's Analytical Methods Fail to Use the Best Available Science and Significantly Underestimate Impacts to Spring-Run Chinook Salmon From the Proposed Project and Alternatives*

As discussed with respect to winter-run Chinook salmon, the DEIR's failure to consider the effects of climate change, the modifications to the Delta Passage Model, and the assumption of zero near field mortality at the North Delta intakes result in the DEIR significantly underestimating the adverse effects of the proposed project and alternatives on spring-run Chinook salmon. *See supra* sections VI(A)(2), VI(A)(2)(b), VI(A)(2)(d).

Relatedly, the DEIR's modeling of the effects of South Delta exports is inconsistent with the text of the DEIR regarding the effects of South Delta exports. The text of the DEIR references studies that concluded that increased South Delta exports reduce survival of migrating spring-run and fall-run Chinook salmon. DEIR at 12-21 (citing Cunningham et al 2015). Yet the modeling in the DEIR using the Delta Passage Model estimates that increased South Delta exports increase the survival of salmon, including fall-run and spring-run Chinook salmon, as discussed *supra*. The DEIR is internally inconsistent, and it fails to provide a reasoned explanation to support the Delta Passage Model's estimate that increased pumping in the South Delta will increase survival of migrating salmon from the Sacramento River.

In addition, the proposed bypass flows for the North Delta under all alternatives are significantly weaker for the months when spring-run Chinook salmon are migrating through the Delta. The

proposed pulse protection requirements require lower bypass flows under Level 2 and Level 3 than Level 1, and the DEIR indicates that Level 2 and Level 3 pulse protection criteria can apply as early as February. *See* DEIR, Appendix 5A-B, at 5B-58. This results in greater diversions from the North Delta and further reduces flows below the intakes; for instance, between December and April under Level 3 pulse protection, if flows are only 15,000 cfs, the North Delta could divert 3,000 cfs (50% of the flows over 9,000 cfs), reducing flows to 12,000 cfs, whereas under Level 1 pulse protection, if flows are only 15,000 cfs, the bypass flow requirement would be 15,000 cfs – allowing no pumping from the north Delta. *Id*. These weaker protections under Level 2 and Level 3, which would occur more frequently when spring-run Chinook salmon are migrating, would result in significantly lower survival of migrating spring-run Chinook salmon. In addition, the proposed bypass flows are significantly weaker in the months of May, despite the fact that May is a significant month for young of the year spring run Chinook salmon migration through the Delta. *See* DEIR at 12-132. For instance, when flows are only 20,000 cfs at Freeport in May, the pulse protection rules under Level 1 would allow diversion of 2,100 cfs, while Level 2 would allow diversion of 5,250 cfs and Level 3 would allow diversion of 7,600 cfs. DEIR at 3-153. While the DEIR assumes flows in the Sacramento River that are greater than regulatory minimums in the winter and spring months, such flows are not reasonably certain to occur, given the effects of climate change, droughts, and additional water diversion and storage projects. These inadequate bypass flow criteria for the proposed project and alternatives would result in far more severe environmental impacts on spring-run Chinook salmon that are not adequately considered in the DEIR.

Taken together, these operational provisions will not only reduce survival and subsequent abundance of spring run Chinook salmon in general, but will adversely affect life history diversity by further reducing survival of late migrating salmon. *See supra* note 22. The DEIR does not consider these adverse effects to life history diversity from the proposed project and alternatives, which threaten the viability of this species.

3. The DEIR's Conclusion that Operational Criteria and Habitat Restoration will Fully Mitigate Impacts is Arbitrary and Capricious

As discussed with respect to winter-run Chinook salmon, the DEIR's conclusory statements that habitat restoration and operational criteria will fully mitigate significant impacts to spring-run Chinook salmon fails to use the best available science and is unsupported by the evidence. The proposed project and alternatives result in significant adverse impacts that require operational changes to reduce these impacts to a less than significant level.

C. Fall-Run Chinook Salmon

Even though the DEIR explains that the "operations of the north Delta intakes would have negative effects on fall- and late fall-run Chinook in a generally similar manner to what was discussed for winter- and spring-run Chinook salmon," DEIR at 12-143, the DEIR concludes that the impacts to fall-run Chinook salmon would be less than significant before mitigation, *id*; *see*

DEIR at ES-34. As with the flawed analysis of impacts to winter-run and spring-run Chinook salmon, the DEIR relies on flawed analytical methods that underestimate impacts to fall-run Chinook salmon, and the DEIR erroneously concludes that habitat restoration measures proposed for impacts to other species will benefit fall-run Chinook salmon as well. *See supra* section VI(a)(3). In addition, the DEIR also fails to consider important aspects of the problem such as the effects of climate change and the use of TUCPs that worsen survival of fall-run Chinook salmon migrating down the Sacramento River and through the Delta. In contrast to the findings in the DEIR, the proposed project and alternatives are likely to have substantial adverse impacts on fall-run Chinook salmon, particularly in light of the inadequate bypass flows proposed for North Delta diversions under all alternatives.

The proposed North Delta bypass flows would have unreasonable and severe impacts on migrating fall run Chinook salmon that are not adequately considered in the DEIR. As the DEIR admits, fall-run Chinook salmon can migrate through the Delta throughout the winter and spring months, including through June. DEIR at 12-137. However, the North Delta bypass flows generally allow more diversions, and require lower bypass flows, later in the spring. For instance, the proposed bypass flows are only 5,000 cfs in the month of June, which would result in far greater reductions in river flow and salmon survival through the Delta in that month. DEIR at 12-137; *id*. at 12-102 (estimating that juvenile salmon survival through the Delta under the proposed project is reduced in the month of June by 4% in wet years and 10% in above normal years). As noted *supra* with respect to spring-run Chinook salmon, the bypass criteria are also weaker for the month of May, and Level 2 and Level 3 pulse protection likewise provide less protection for fall-run Chinook salmon that migrate later in the spring. Moreover, while the DEIR appears to assume there will be no diversions from the North Delta in May or June of Below Normal, Dry, and Critically Dry years, *see* DEIR at 12-102, the proposed project and alternatives do not prohibit use of the North Delta diversions in those months and years.[23]

D. Central Valley Steelhead

Like winter-run Chinook salmon, the DEIR admits that the proposed project is likely to result in significant impacts to Central Valley steelhead as a result of reduced flow through the Delta. DEIR at 12-152. The DEIR also fails to consider important aspects of the problem such as the effects of climate change and the use of Temporary Urgency Change Petitions that worsen

[23] The DEIR also erroneously assumes that South Delta entrainment of fall-run Chinook salmon would be limited because of protections for spring-run and winter-run Chinook salmon. DEIR at 12-138. However, existing OMR regulatory requirements explicitly do not apply to fall run Chinook salmon, and existing OMR requirements also fail to specifically protect young of the year spring-run Chinook salmon from entrainment and losses in the South Delta. *See also* Exhibit D. Moreover, under the proposed project, South Delta exports would increase in May (Wet, Above Normal, and Below Normal water year types) and would increase in April (Dry and Critically Dry water year types). DEIR at 12-141. This would likely cause additional adverse effects on fall-run Chinook salmon that are not adequately considered in the DEIR. *See* Cunningham et al 2015.

survival of steelhead down the Sacramento River and through the Delta. The DEIR also misstates the conclusions of Buchanan et al 2021 regarding the effects of exports on survival of steelhead, concluding that increased South Delta pumping during April and May by the CVP under continuation of the Trump Administration's biological opinions would have "no difference in juvenile through-Delta survival." *See* DEIR at 12-150. The State of California rejected this position in its filings with the federal court in 2021. *See* Exhibit B. Buchanan et al 2021 found that the San Joaquin River inflow: export ratio is strongly correlated with through-Delta steelhead survival, and the paper specifically warned that its conclusions should not be used to justify changes in management. *See also* Exhibit D.

As with respect winter-run Chinook salmon, the DEIR erroneously concludes tidal marsh and channel margin habitat restoration would reduce these impacts to a less than significant level, assertions that fail to use the best available science and are not supported by substantial evidence. The DEIR cites studies that do not demonstrate that habitat restoration would improve survival of migrating salmon, let alone provide survival benefits to migrating steelhead sufficient to offset the adverse impacts of reduced flow. *See supra* section VI(a)(3); *see also* DEIR at 12-152 (citing Brown 2003 to conclude that tidal habitat restoration "would have the potential" to provide foraging habitat for steelhead). Any comparison of Chinook Salmon shallow water habitat usage to that of Steelhead would be size-specific. Migrating juvenile Steelhead are the size of very large juvenile Chinook Salmon; the scientific literature provides no evidence that large Chinook Salmon smolts benefit from shallow-water rearing habitats (*see, e.g.*, Iglesias et al. 2017; Henderson et al. 2018; Pope et al. 2018), and because the DEIR infers the behavior of migrating Steelhead from Chinook salmon smolt behavior, then steelhead would not be expected to benefit significantly from restored sub-tidal wetland rearing habitat. Moreover, the DEIR admits that "juvenile steelhead's association with habitat variables is weaker than juvenile Chinook salmon," *id.*, further demonstrating that the DEIR's conclusion that habitat restoration would reduce these impacts to a less than significant level is arbitrary and capricious.

E. Delta Smelt

The DEIR erroneously claims that the proposed project and alternatives would result in a less than significant impact to Delta Smelt. DEIR at ES-72. This conclusion is contrary to the evidence, particularly given the extremely dire status of the species. As with other species, the DEIR also fails to consider important aspects of the problem including the effects of climate change and the use of TUCPs that worsen the survival of Delta Smelt.

The DEIR identifies a number of adverse effects on Delta Smelt from the proposed project and alternatives, including reduced abundance of important prey species like *E. affinis* and *P. forbesi*, increased water clarity that results from sediment entrainment in the North Delta intakes, and reduced summer/fall habitat for Delta Smelt. DEIR at 12-5. However, the DEIR fails to adequately consider the severity and implications of these impacts. Since the population is declining towards extinction under existing conditions, the DEIR fails to provide a reasoned

explanation why any further adverse impacts to Delta Smelt would not constitute a significant adverse impact under CEQA. Cal. Code Regs., tit. 14, § 15065(a)(1).

For instance, the DEIR fails to explain why it does not use existing life cycle models (e.g., Rose et al 2013, Polansky et al 2021) to assess the impacts of the proposed project and alternatives. These life cycle models have identified important variables that affect Delta Smelt, including the positive effect of spring outflow on Delta Smelt recruitment, that the DEIR wholly fails to consider. *See* Polansky et al 2021. With respect to summer and fall outflow, the DEIR fails to explain why the reductions in summer and fall outflow under the proposed project and alternatives, which the best available science shows would reduce survival and recruitment of Delta Smelt, do not constitute a significant impact. *Id*.; *see also* DEIR at 12-175 to 12-176.

With respect to effects of the proposed project on entrainment of sediment and turbidity in the Delta, the DEIR also fails to explain why it does not use existing models to quantitatively analyze the effects of North Delta diversions on turbidity in the Delta. *See* Achete et al 2015; Martyr-Koller et al., 2017. Instead, the DEIR speculates that these effects on turbidity "**may be limited** by future increases in sediment entering the Delta," DEIR at 12-176, as a result of more severe storms "over the next century" as a result of climate change, *id*. at 165 (emphasis added). Here, the DEIR selectively and improperly relies on potential effects from climate change in the future (potential for increased sediment by 2040) compared with existing conditions today. Moreover, the DEIR's analysis focuses on sediment, rather than suspended sediment (turbidity), despite the availability of existing models to analyze effects on suspended sediment (turbidity), and it does not account for the limitations and uncertainty of the conclusions in Stern et al 2020.[24]

In addition, the DEIR repeatedly asserts that food availability is a limiting factor for Delta Smelt, *see* DEIR at 12-13, yet the DEIR fails to consider the effects of CVP/SWP pumping in the South Delta on primary and secondary productivity. The DEIR includes modeling of effects of North Delta pumping on phytoplankton, concluding that the proposed project and alternatives would generally entrain zero to eight percent of the phytoplankton carbon. DEIR at 12-171 to 12-174; *id*., Appendix 12B, at 12B-164 to -165. However, while the DEIR mentions Hammock et al 2019 and qualitatively discusses the effects of SWP/CVP pumping in the South Delta on phytoplankton, the DEIR does not disclose the conclusion of Hammock et al 2019 that SWP/CVP South Delta pumping reduces phytoplankton abundance by 74 percent, nor does the DEIR use the model to analyze the effects of SWP/CVP south Delta operations on phytoplankton abundance. The DEIR must be revised to consider these important aspects of the problem.

[24] In addition, Stern et al 2020 concludes that the RCP 4.5 and 8.5 ensemble averages did not show a statistically significant increase in suspended sediment concentration (SSC), explaining that "the nonsignificant trends of a levelling off or decline of sediment are also plausible outcomes," and identifying many sources of uncertainty and limitations in the study.

Finally, the DEIR asserts that the proposed project and alternatives may result in reduced entrainment of Delta Smelt, but these potential benefits are not reasonably certain to occur because the proposed project and alternatives do not require reduced pumping in the South Delta or less negative OMR values, and instead propose the continuation of the Trump Administration's biological opinions for the South Delta. In addition, the DEIR fails to discuss how there is no safe level of entrainment for Delta Smelt, as any level of entrainment mortality reduces the existence of the species. *See* Exhibit D.

Taken together, the available evidence shows that the proposed project is likely to cause significant impacts to Delta Smelt.

F. Longfin Smelt

The DEIR's analysis of impacts to Longfin Smelt fails to accurately assess and disclose the significant environmental impacts that would result from the proposed project and alternatives. The DEIR uses flawed methodology that fails to use the best available science and substantially underestimates the severity of adverse impacts to Longfin Smelt. In addition, the DEIR erroneously concludes that tidal marsh habitat restoration would mitigate these impacts to a less than significant level, which is inconsistent with the best available science and is not supported by substantial evidence.

The DEIR grudgingly admits that the reduction in Delta outflow caused by the proposed project and alternatives would reduce the population of Longfin Smelt by 4-10% under the proposed project, which would constitute a significant impact under CEQA. DEIR at 12-198. However, the text of the DEIR and the methodology used in the DEIR to assess these impacts – like that used by DWR and rejected by the California Department of Fish and Wildlife in 2020 – tends to "obscure" the effects of the proposed project and "have the consistent effect of downplaying the effect" of the proposed project, thereby failing CEQA's mandate to accurate inform the public and decisionmakers of the likely environmental impacts of the proposed project and alternatives. *See* California Department of Fish and Wildlife, Findings of Fact of the California Department of Fish and Wildlife Under the California Endangered Species Act, Attachment 7 (Effects Analysis, State Water Project Effects on Longfin Smelt and Delta Smelt, March 2020), at 74, attached hereto as Exhibit G.

For instance, despite the California of Fish and Wildlife rejecting the use of very similar methodology in 2020 and requiring use of the "'Kimmerer regression' approach" instead, *id*. at 74-75, DWR in this DEIR fails to even present results using the Kimmerer regression approach. And despite the California Department of Fish and Wildlife's reminder to DWR of "the scientific literature's consistent conclusions about the effects of Delta outflow to LFS abundance," *id*. at 75, the DEIR mischaracterizes the consistent scientific conclusions regarding the adverse effects of reducing Delta outflow on Longfin Smelt by describing the effects as "uncertain," *see* DEIR at 12-198, by claiming that changes in abundance are "were very small relative to the variability in the predicted values, which spans several orders of magnitude," *id*. at 12-194, or by erroneously

claiming that Napa River flows are more important than Delta outflow for Longfin Smelt population dynamics, *id*. at 12-195. Notwithstanding DWR's attempts to obfuscate the scientific consensus, numerous peer reviewed scientific studies going back decades have consistently found that winter-spring Delta outflow is a driving factor in Longfin Smelt recruitment and population dynamics. *See, e.g.*, Nobriga and Rosenfield 2016; Thomson et al 2010; MacNally et al 2010; Kimmerer 2002; Kimmerer 2009; Jassby et al 1995. Most recently, in proposing to list Longfin Smelt as endangered under the federal Endangered Species Act, the U.S. Fish and Wildlife Service concluded that,

> We consider reduced and altered freshwater flows resulting from human activities and impacts associated from current climate change conditions (increased magnitude and duration of drought and associated increased temperatures) as the main threat facing the Bay-Delta longfin smelt due to the importance of freshwater flows to maintaining the life-history functions and species needs of the DPS. However, because the Bay-Delta longfin smelt is an aquatic species and the needs of the species are closely tied to freshwater input into the estuary, the impact of many of the other threats identified above are influenced by the amount of freshwater inflow into the system (i.e., reduced freshwater inflows reduce food availability, increase water temperatures, and increase entrainment potential).

87 Fed. Reg. at 60963.[25]

The DEIR also attempts to downplay other adverse effects of the proposed project and alternatives on Longfin Smelt. For instance, the DEIR's modeling shows reduced abundance of prey species important to Longfin Smelt, including *E. affinis* and mysid shrimp. DEIR at 12-193. However, using language that is nearly identical to the DEIR's attempts to mislead the reader regarding the effects of Delta outflow on Longfin Smelt, the DEIR claims that the reduced abundance of *E. affinis* caused by the proposed project and alternatives "are much less than the range of the prediction intervals from this statistical model, which span several orders of magnitude," and concludes that there is little potential for negative effects on Longfin Smelt with respect to food availability, *id*. Moreover, the DEIR does not actually model the effects of the proposed project on mysid abundance (the word "mysid" does not appear in Appendix 12B), and the DEIR's conclusory statements lack any evidentiary support in the DEIR. And with respect to entrainment of Longfin Smelt, the DEIR shows that the proposed project and alternatives would

[25] The DEIR fails to adequately consider that proposed projects to increase diversions from the Bay-Delta, like Sites Reservoir, would also produce negative effects to Longfin Smelt from reduced Delta Outflow, even though the NEPA documents for Sites Reservoir misapplies methods to compare project alternatives with the No Project Alternative, thus underestimating adverse impacts. *See* Sites RDEIR/SDEIS at 11-270 to 11-272. Similarly, with respect to the environmental baseline, the DEIR fails to adequately disclose the major increases in larval and juvenile entrainment resulting from the Incidental Take Permit, which also causes significant reductions in abundance to Longfin Smelt form reduced Delta Outflow. *See* ITP Final EIR at 4-177 to 4-186.

likely result in an increase in entrainment of larval Longfin Smelt. DEIR at 12-188 to 12-190. Given the endangered status of the species, each of these adverse effects are likely to cause significant effects individually and in combination.

The DEIR's conclusion that restoration of less than 150 acres of tidal marsh habitat would reduce these impacts to a less than significant level[26] is arbitrary and capricious. *See* DEIR at 12-198. The DEIR does not cite any scientific studies demonstrating that restoring tidal marsh habitat will increase the abundance of Longfin Smelt, nor is there any credible scientific basis to conclude that the scale of tidal marsh habitat proposed in the DEIR would lead to measurable increases in abundance. While Longfin Smelt may have been found near a restored tidal marsh, *see* DEIR at 12-198, the mere presence of larval Longfin Smelt at a restoration site does not provide scientific evidence demonstrating that restoration of more acres of tidal marsh habitat would increase abundance of Longfin Smelt. For example, results of a preliminary otolith chemistry "fingerprinting" study concluded that, "...of the adult fish that were classified with moderate confidence (e.g., 75%), nearly all appeared to have reared in the northern SFE ..." Lewis et al. 2019 at 9 and Figures 17 and 18. Furthermore, decades of shallow tidal habitat restoration in the San Francisco Bay-Delta estuary have produced no noticeable effect on Longfin Smelt abundance or productivity – in fact, declines have been observed repeatedly in both of these attributes of population viability. The U.S. Fish and Wildlife Service recently concluded that,

> The loss of tidal marsh habitats may have hampered [Longfin Smelt] productivity, but to date, there are no indications that restoration has been sufficient to stem the decline. Therefore, we cannot conclude whether or not the species has lost resilience due to landscape changes that occurred in the 19th and 20th centuries.

U.S. Fish and Wildlife Service, Species Status Assessment for the San Francisco Bay-Delta Distinct Population Segment of the Longfin Smelt, available online at: https://www.regulations.gov/document/FWS-R8-ES-2022-0082-0003/content.pdf, at 56. The DEIR fails to provide a reasoned explanation for its assumption that less than 150 acres of tidal marsh habitat restoration would mitigate these impacts of reduced Delta outflow, particularly given the improvements in scientific understanding in the past decade (*see, e.g.*, Herbold et al. 2014, Nobriga and Rosenfield 2016) and the continued decline in abundance of Longfin Smelt over the past decade despite the habitat restoration required under the prior Longfin Smelt ITP and other actions.

Similarly, while the DEIR cites Lewis et al 2020 to suggest that restored tidal marsh habitat would benefit Longfin Smelt, Lewis et al 2019 and Lewis et al 2020 do not support the DEIR's conclusion. Most notably, Lewis et al 2019 states clearly that the value of restored shallow

[26] Of course, the proposed project and alternatives would not only have to reduce impacts to a less than significant level, but has to ensure that these impacts are "fully mitigated under CESA. Cal. Fish & Game Code § 2081(b)(2). The DEIR claims that this tidal marsh restoration would "reduce the potential effects caused by reduced outflow," but does not claim that it would fully mitigate these impacts. As discussed herein, it would not.

subtidal habitats "remains unknown." Lewis et al 2020 reports findings from "…previously undescribed aggregations of Longfin Smelt that were attempting to spawn in restored and underexplored tidal wetlands of South San Francisco Bay." There is no evidence that restoration activities in these areas of South San Francisco Bay generated any positive effect for Longfin Smelt. In fact, Longfin Smelt occupancy of and recruitment in these restored shallow marsh habitat in South San Francisco Bay appears to be dependent on freshwater flow. Lewis et al 2019 observed successful recruitment of Longfin Smelt larvae to marshes in South San Francisco Bay only in years of locally high freshwater flow into the Bay; during other years, adult Longfin Smelt returning to and spawning in the vicinity of the South Bay Salt Ponds may have represented an ecological sink. And there is no evidence that Longfin Smelt benefited from the existence of the restored shallow sub-tidal habitat in years that were not wet. Regarding their detections of substantial numbers of Longfin Smelt west of Suisun Bay, which occurred primarily during the wet years 2017 and 2019 (and, for restored South Bay salt ponds, only during those two years), they state: "... 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." *Id*. Thus, these papers do not support the DEIR's claim that tidal marsh habitat restoration would mitigate the effects of reduce Delta outflow.

Furthermore, there is little evidence for any mechanism connecting the extent of shallow sub-tidal marsh environments to viability of the estuary's Longfin Smelt population. Contrary to the assumption that restoration of shallow tidal habitat will increase abundance and productivity of the SF Longfin Smelt population by increasing larval production, the local Longfin Smelt population does not appear to be limited by larval production, which is relatively consistent from year to year and shows no correlation with Delta outflow. *See, e.g.*, Dege and Brown 2004; Eakin 2021. Whereas Longfin Smelt larvae are observed in shallow marsh environments, it is not clear what percentage of the population makes use of these areas and the duration of residence in shallow marsh habitats appears to be very short (<1 month). Juvenile Longfin Smelt are rare in shallow, sub-tidal marsh and so would not be expected to benefit from restoration of such habitats. There is also little evidence for a substantial positive effect on SF Longfin Smelt of prey items exported from shallow sub-tidal habitats. For example, although Hammock et al. 2019 found potential support for the hypothesis that tidal marshes can improve Delta Smelt foraging success on the margins of marsh habitats, Hammock et al 2019 did not find evidence to support the hypothesis that tidal marshes export zooplankton to other parts of the estuary. This potential mechanism of providing foraging habitat would likely be less important for Longfin Smelt, given that they aggregate in habitats that are distant from shallow marshes.

Despite the lack of evidence that restored shallow tidal marsh habitat can mitigate for the negative effects of reduced Delta Outflow and increased entrainment of Longfin Smelt, the DEIR explains that it relies on an unpublished 2010 memorandum by Daniel Kratville ("Kratville 2010") to calculate the acreage required to mitigate impacts from "flow-related impacts." *Id*., Appendix 3F, at 3F.1-14; *see id.*, Appendix 12B, at 12B-204 to 12B-205. However, Kratville

2010, which has never been peer-reviewed, only considered the effects of SWP "exports" on entrainment of Delta Smelt and Longfin Smelt, and it did not consider the effects of reduced Delta outflow on the abundance of Longfin Smelt. For instance, Kratville 2010 states that, "This analysis does not take into account the effect of the pumps on elements of delta smelt critical habitat in the estuary such as nutrients, primary production, and secondary production." Kratville 2010 at 6.[27]

The Kratville 2010 methodology is based solely on entrainment of particles as a surrogate for entrainment of larval and juvenile Delta Smelt and Longfin Smelt. Kratville 2010 uses the same approach to calculating mitigation requirements for the effects of pumping on Delta Smelt and Longfin Smelt, even though the effect of winter-spring Delta outflow on Longfin Smelt population dynamics and geographic distribution are very different from, and much stronger than, the effects of Delta outflow on Delta Smelt. Indeed, the words "outflow" and "X2" do not appear in Kratville 2010, and there is nothing to suggest that this analysis accounts for the effects of reduced Delta outflow on Longfin Smelt abundance. [28] For all of these reasons, the DEIR's

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[27] Similarly, the 2009 incidental take permit for operations of the State Water Project required 800 acres of tidal marsh habitat restoration that was explicitly intended to mitigate the effects of entrainment of larval and adult Longfin Smelt. Attachment B to the 2009 incidental take permit explains that,

> The pumping restrictions and operational measures will not, however, fully minimize and mitigate the take of longfin smelt-some longfin smelt will still be lost at the pump. Therefore, the ITP requires further measures to mitigate for these losses. The habitat restoration measures of the ITP, which require DWR to restore 800 acres of longfin smelt habitat in specific locations, will provide mitigation that is roughly proportional to the portion of the longfin smelt population that will be taken after application of the other Conditions of Approval.

California Department of Fish and Wildlife, California Incidental Take Permit 2081-2009-001-03, Attachment B, at 8; see id. ("The Effects Analysis also helps to explain how the Conditions of Approval in the ITP **will minimize and fully mitigate this loss or entrainment in the case of larvae**." (emphasis added). There is no evidence in that permit that the 800 acres of tidal marsh habitat restoration was intended to mitigate the effects of reduced abundance from decreased Delta outflow.

[28] The DEIR also claims that Longfin Smelt could benefit from tidal habitat restoration because the State Water Project's Incidental Take Permit includes "tidal marsh habitat restoration required for outflow impacts to the species." DEIR at 12-198. Yet the California Department of Fish and Wildlife's 2020 Incidental Take Permit does not state that tidal marsh habitat is required to mitigate the effects of reduced outflow; in fact, the agency included Condition of Approval 8.17 to limit the reduction of Delta outflow, concluding that, "Because SWP exports have the effect of reducing outflow, including during the spring, Condition of Approval 8.17 is a key measure to minimize the Project's impacts to LFS in the form of population abundance

reliance on the Kratville 2010 methodology to calculate mitigation for the effects of reduced Delta outflow on Longfin Smelt is plainly arbitrary and capricious.

G. Green and White Sturgeon

The DEIR fails to adequately consider and disclose significant environmental impacts to Green and White Sturgeon, concluding that the impacts of the proposed project and all alternatives will be less than significant. DEIR at ES-34.

The southern distinct population segment of Green Sturgeon, which spawns in the Sacramento River and rears in the Delta, is a federally threatened species. White Sturgeon are a State species of special concern. Both populations experienced extreme rates of mortality in 2022 following an unprecedented bloom of the harmful algae, *Heterosigma akashiwo*; this has raised concerns over the viability of both populations in the San Francisco Bay estuary.

For instance, the DEIR acknowledges that Delta outflows are positively correlated with White Sturgeon recruitment and rearing success in this estuary, and are also likely correlated with recruitment of Green Sturgeon. DEIR at 12-202, 12-208; *see* Israel et al 2009 (citing Kolhorst et al 1991); USFWS 1995; AFRP 2001 Final Plan; NMFS 2010 Testimony to the SWRCB, Exhibit 9. The DEIR indicates that the reduction in Delta outflow from March to July caused by the proposed project and alternatives would likely reduce White Sturgeon year class strength substantially, reducing year class strength by 3% in Wet years, 13-17% in Above Normal years, 15-25% in Below Normal Years, and reducing year class strength from 1 to zero in dry years. DEIR at 12-208. Yet the DEIR erroneously claims these sizeable reductions in abundance are less than significant because of uncertainty. *Id*. at 12-209. Although the DEIR is correct that the mechanism behind these effects is uncertain, *id*. at 12-208, these relationships between Delta outflow and white sturgeon are the best available science, and given the population status of these species, even small reductions constitute a significant impact under CEQA.

Similarly, migration and dispersal of juvenile and larval White Sturgeon and Green Sturgeon will likely be significantly and adversely affected by reduced flows below the North Delta Diversion under the proposed project and alternatives. Israel and Klimley 2008 indicate that the volume of flow in the middle and lower Sacramento River is a stressor that can limit transport and dispersal of larval and juvenile Green Sturgeon; Israel et al 2009 identifies the same potential stressors for White Sturgeon, and rates "flow operations" as the stressors with the highest possible importance and understanding for this species. The proposed project and alternatives would substantially

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reductions." *See* Exhibit G at 85; *id.* at 75 (admitting that Alternative 2b, which included Condition of Approval 8.17, would result in a lesser reduction in the Fall Midwater Trawl index of Longfin Smelt abundance than the proposed project, but still resulted in reduced abundance). In addition, NRDC and other plaintiffs are challenging the 2020 Incidental Take Permit in court, and the mere fact that this prior permit used similar calculations of mitigation measures does not provide any justification for its continued use in the DEIR, given the clearly arbitrary use of Kratville 2010.

reduce flows below the North Delta Diversions, including during the August to March period when Green Sturgeon juveniles would be in the lower Sacramento River.

In addition, the DEIR fails to consider the adverse effects of increased predation as a result of the proposed project. For instance, reduced turbidity – as a result of NDD entrainment of suspended sediment, as well as a result of reduced flows below the NDD – is likely to increase predation of Green Sturgeon and White Sturgeon. Israel and Klimley 2008 and Israel et al 2009 both indicate that predation may be a concern to the youngest/smallest life stages of both sturgeon species, when they are in the riverine environment. Increased water clarity increases predator efficiency on sturgeon. Gadomski and Parsley 2005. Reduced flows and reduced turbidity caused by the proposed project and alternatives are likely to exacerbate the increased predation rates that might arise from either of the individual impacts. Reducing river flows below the new North Delta Diversion may also concentrate predators and prey into a smaller area, may cause a drop in river depth (stage) that will allow sunlight to penetrate through more of the water column, to depths that represent prime sturgeon habitat in many places. And the proposed cylindrical tee-screens located on the river bottom are likely to create new predation hot spots, a common problem with existing water infrastructure in the Delta. The DEIR does not consider potential adverse impacts from increased predation as a result of the proposed project and alternatives.

Finally, the DEIR's conclusions regarding entrainment and impingement of Green Sturgeon and White Sturgeon at the NDD are arbitrary and capricious. For instance, the DEIR asserts that there would be "no risk of entrainment at the north Delta intakes" of larval Green Sturgeon and very small effects on juvenile Green Sturgeon. DEIR at 12-200. However, unlike salmonids, Green Sturgeon adults and juveniles are generally found near the bottom of the water column. *See* DEIR at 12A-51 (citing Chapman et al 2019 and Thomas et al 2019). These concerns are even greater for White Sturgeon, given the geographic distribution of larval White Sturgeon throughout the Delta. DEIR at 12-206. The cylindrical tee-screens located on the river bottom under the proposed project and alternatives are likely to cause adverse effects on Green Sturgeon from impingement and entrainment, yet the DEIR fails to even consider potential impingement and exclusively discusses entrainment, unlike with respect to other species. The DEIR fails to provide a reasoned explanation for its conclusions, given that Green Sturgeon and White Sturgeon are generally found along the bottom of the water column and the DEIR does not discuss impingement.

VII. The DEIR's Assessment of Water Quality Impacts is Inadequate:

Finally, the DEIR's conclusions that the proposed project and alternatives would have less than significant impacts to water quality, DEIR at ES-32, is not supported by substantial evidence. These conclusions also fail to consider important aspects of the problem, particularly the effects of climate change (which will increase water temperatures and the formation of harmful algal blooms), and the use of Temporary Urgency Change Petitions to allow for violations of salinity

and other water quality standards. That is particularly true for impacts regarding chloride (salinity), turbidity,[29] and harmful algal blooms.

With respect to salinity, the DEIR demonstrates that the proposed project and alternatives would increase salinity at several locations in the Delta, including Emmaton and Three Mile Slough, and would increase the frequency of violating the water quality standards for the Sacramento River at Emmaton, the San Joaquin River at Jersey Point, and the San Joaquin River at Prisoner's Point. DEIR at 9-89 to 9-90, 9-93, 9-94; *id*., Appendix 9G-1, at 9G-8. Moreover, the DEIR's claims regarding compliance with water quality standards and use of real time operations to avoid these modeled violations of water quality standards, DEIR at 9-94, fails to consider the routine violation of salinity standards in the Bay-Delta Water Quality Control Plan during critically dry years since 2014 pursuant to Temporary Urgency Change Petitions, the reasonably foreseeable continuation of such violations in future droughts, and the adverse environmental impacts that result of use of Temporary Urgency Change Petitions. Because a violation of water quality standards constitutes a significant impact under CEQA, the DEIR fails to comply with CEQA.

With respect to harmful algal blooms, the DEIR fails to consider the adverse effects of reduced Delta outflow (X2) on the increased magnitude, duration, and intensity of harmful algal blooms. DEIR at 9-26 to 9-27, 9-154. Peer reviewed scientific studies by scientists with DWR conclude that even small shifts in the location of X2 increase harmful algal blooms. For example, Lehman et al. 2020 concluded that even small changes in the location of X2 will dramatically increase the abundance and distribution of harmful algal blooms because there was a "strong correlation of *Microcystis* abundance with the X2 index and water temperature," with their model finding that outflow and water temperatures explained 58-78% of the variation in bloom surface. Most notably, the paper concludes that,

> Importantly, relatively small changes in the location of the X2 index may be important. A shift of the X2 index by only 3 km was associated with a factor of 3 increase in the percent abundance of subsurface Microcystis cells in the cyanobacterial community between the extreme drought years 2014 and 2015 (Lehman et al., 2018). Similarly, the increase in the X2 index from 71 km in July to between 75 and 76 km in August and September may have facilitated retention of cells in the central Delta during the peak of the bloom in 2017.

Lehman et al. 2020. This finding is consistent with other research from the Bay-Delta, which has found that the frequency of these blooms is closely linked to water residence time (i.e., flow rates). Berg M and Sutula M. 2015. Factors affecting the growth of cyanobacteria with special emphasis on the Sacramento-San Joaquin Delta. Southern California Coastal Water Research Project, Technical Report 869 August. More recently, Lehman et al 2022 concluded that X2 (Delta outflow) and water temperature predict much of the variation in *Microcystis* surface

[29] *See supra* page 43 regarding the analysis of impacts to turbidity.

biovolume, that it was "not unexpected that the X2 index would account for most of the variation in the *Microcystis* bloom abundance" in the Delta, and that the Microcystis bloom in 2014 peaked when X2 was above 85 km. The DEIR's failure to consider the proposed project and alternatives' adverse effects of reduced Delta outflow on the formation and extent of harmful algal blooms violates CEQA.

The DEIR's conclusions regarding water quality impacts fail to consider important aspects of the problem and are not supported by substantial evidence.

VIII. Conclusion

The DEIR fails to comply with CEQA, and it must be substantially revised to provide the public and decision-makers with accurate information regarding the effects of the proposed project and alternatives, and recirculated for public comment.

Thank you for consideration of our views.

Sincerely,

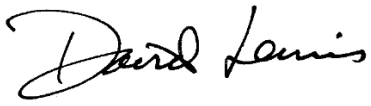
Doug Obegi
Natural Resources Defense Council

Gary Bobker
The Bay Institute

Chris Shutes
California Sportfishing Protection Alliance

Ashley Overhouse
Defenders of Wildlife

Glen Spain
Pacific Coast Federation of Fishermen's Associations
Institute for Fisheries Resources



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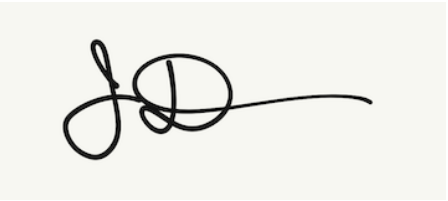

Jann Dorman
Friends of the River

Howard Penn
Planning and Conservation League

Enclosures

State Water Resources Control Board

TO: Department of Water Resources (DWR)
Attention: Delta Conveyance Office

VIA ELECTRONIC MAIL
deltaconveyancecomments@water.ca.gov

ORIGINAL SIGNED BY

FROM: Diane Riddle
Assistant Deputy Director
DIVISION OF WATER RIGHTS

DATE: December 16, 2022

SUBJECT: COMMENTS ON DRAFT ENVIRONMENTAL IMPACT REPORT FOR THE DELTA CONVEYANCE PROJECT

This memorandum provides comments on the California Department of Water Resources' (DWR) July 27, 2022, Draft Environmental Impact Report (Draft EIR) for the Delta Conveyance Project (Project). The State Water Resources Control Board (State Water Board) and Central Valley Regional Water Quality Control Board (Central Valley Water Board) (collectively Water Boards) appreciate the opportunity to comment on the Draft EIR.

General Comments

The mission of the Water Boards is to preserve, enhance, and restore the quality of California's water resources and drinking water for the protection of the environment, public health, and all beneficial uses, and to ensure proper water resource allocation and efficient use for the benefit of present and future generations. The State Water Board administers water rights in California, including those of the State Water Project (SWP) and Central Valley Project (CVP). The State and Regional Water Boards also have primary authority over the protection of the State's water quality and drinking water. To protect water quality, the State and Regional Water Boards develop water quality control plans that designate beneficial uses of water, establish water quality objectives to protect those beneficial uses, and include a program of implementation to

achieve the objectives. Water quality control plans also include requirements for monitoring, special studies, and reporting. These water quality control plans include the State Water Board's Water Quality Control Plan for the San Francisco Bay/Sacramento-San Joaquin Delta Estuary (Bay-Delta Plan) and the Central Valley and San Francisco Bay Regional Water Boards' Water Quality Control Plans for the Central Valley and San Francisco Bay.

The Water Boards will have discretionary approvals over water right and water quality aspects of the Project and are responsible agencies for the Project pursuant to the California Environmental Quality Act (CEQA). As responsible agencies under CEQA, the Water Boards must review and consider the environmental impacts of the Project identified in the EIR that are within their purview and reach their own conclusions on whether and how to approve the Project. (Cal. Code Regs., tit. 14, § 15096, subd. (a).) Specifically, activities that will require approval by the Water Boards include changes to the SWP's and potentially the CVP's water rights to add points of diversion of water to those rights, water quality certification pursuant to Clean Water Act section 401,[1] National Pollutant Discharge Elimination System Permits (NPDES),[2] and potentially other water quality approvals such as a Construction Storm Water General Permit,[3] an Industrial Storm Water General Permit,[4] Waste Discharge Requirements,[5] and a Dewatering Permit.[6] The EIR is also expected to provide information necessary to inform the Water Boards' decision making under the California Water Code, including whether and under what conditions needed approvals should be granted.

On April 15, 2020, the Water Boards submitted a comment letter (attached) on DWR's Notice of Preparation (NOP) of an Environmental Impact Report (EIR) for the Project. The Water Boards identified issues that should be addressed in the development of the Draft EIR, including issues related to the CEQA baseline upon which alternatives are

[1] A permit pursuant to Section 404 of the Clean Water Act is required from the United States Army Corps of Engineers (USACE) because the Project will involve the discharge of dredged or fill material in navigable waters or wetlands. In connection with the USACE permit required for this Project, a Water Quality Certification must be obtained from the State Water Board.

[2] If the proposed project includes construction dewatering and it is necessary to discharge the groundwater to waters of the United States, the proposed project will require coverage under a NPDES permit. If the proposed project discharges waste that could affect the quality of surface waters of the State, other than into a community sewer system, the proposed project will require coverage under a NPDES permit.

[3] Dischargers whose project disturbs one or more acres of soil or where projects disturb less than one acre but are part of a larger common plan of development that in total disturbs one or more acres, are required to obtain coverage under the General Permit for Storm Water Discharges Associated with Construction Activities (Construction General Permit), Construction General Permit Order No. 2009-009-DWQ.

[4] Storm water discharges associated with industrial sites must comply with the regulations contained in the Industrial Storm Water General Permit Order No. 2014-0057-DWQ.

[5] If USACE determines that only non-jurisdictional waters of the State (i.e., "non-federal" waters of the State) are present in the proposed project area, the proposed project may require a Waste Discharge Requirement permit to be issued by the Central Valley Regional Water Quality Control Board.

[6] If the proposed project includes construction or groundwater dewatering to be discharged to land, the proponent may apply for coverage under State Water Board General Water Quality Order (Low Risk General Order) 2003-0003 or the Central Valley Regional Water Quality Control Board's Waiver of Report of Waste Discharge and Waste Discharge Requirements (Low Risk Waiver) R5-2013-0145.

compared; evaluation of a range of operational alternatives, including alternatives that incorporate possible updates to the Bay-Delta Plan; impacts that should be evaluated on aquatic ecosystems and species, water quality, and legal users of water; evaluation of climate change effects; and monitoring and evaluation actions under the proposed Project. Water Boards staff reviewed the Draft EIR for the major issues identified in the NOP and provide the following general comments and specific comments identified in the attached table.

Baseline Regulatory Conditions:

For the evaluation of Project impacts, the Draft EIR assumes baseline conditions include State Water Board Decision 1641 (D-1641) implementing the 1995/2006 Bay-Delta Plan, the 2019 Biological Opinions (BiOps) issued by the National Marine Fisheries Service (NMFS) and the U.S. Fish and Wildlife Service (USFWS), and the 2020 Incidental Take Permit (ITP) issued by the California Department of Fish and Wildlife (CDFW) on the Coordinated Long-Term Operations (LTO) of the SWP and CVP. The State Water Board's comments on the NOP recommended that the EIR evaluate the effects of the Project with and without the recent 2019 changes to the BiOps. The State Water Board indicated that it is important to understand the effects of the 2019 BiOps in combination with the proposed Project because the State has filed suit on the 2019 BiOps which may result in modifications to or invalidations of those BiOps. In addition, the changes to the BiOps are not well understood because they were made recently and have not been fully implemented due to court orders and drought conditions. The 2019 BiOp changes could have large effects on export operations and Delta hydrodynamics as well as aquatic species (Reclamation's Environmental Impact Statement identified that the 2019 BiOp changes could result in increases in exports of up to 600 thousand acre-feet per year on average given existing infrastructure). These effects in combination with the effects of the Project should be evaluated and disclosed. Given the unknown outcome of the litigation and current BiOp reconsultation process, the Water Boards continue to recommend evaluation of both regulatory baselines.

The Draft EIR also does not include an evaluation of recent updates to the Bay-Delta Plan. In 2018, the State Water Board updated the Lower San Joaquin River Flow and southern Delta salinity objectives and associated program of implementation in the Bay-Delta Plan (2018 Bay-Delta Plan). The State Water Board is currently in the process of implementing these updates. Appendix 4C of the Draft EIR (page 4C-2) states that the updated elements of the Bay-Delta Plan are not included in the regulatory baseline conditions in the Draft EIR. The Draft EIR states that 2018 Bay-Delta Plan update elements were not included because the south Delta salinity standards metrics of compliance are not yet developed to the point that they can be modeled. However, this does not explain why flow objectives are not evaluated in the Draft EIR. State Water Board staff are available to assist with the development of scenarios that serve this purpose.

Project Operational Alternatives:

The Draft EIR states that the alternatives evaluated in the EIR are the result of an extensive screening process. However, the Draft EIR only includes construction and conveyance capacity related alternatives, despite comments provided by the State Water Board on the NOP and on other occasions indicating that a reasonable range of operational alternatives should also be evaluated given that the operations of the project will have long term effects on the environment well beyond construction. Instead, the Draft EIR includes alternatives combining three tunnel alignments, three north intake locations, and conveyance capacities ranging from 3,000 cubic feet per second (cfs) to 7,500 cfs. The Draft EIR presents Alternative 5 (Bethany Alignment with 6,000 cfs conveyance capacity from two north Delta intake locations, Intakes B and C) as the proposed Project.

The Draft EIR provides only one set of operations criteria for the Project. The Draft EIR also includes an evaluation of a possible alternate regulatory regime in Appendix 4C that includes provisions from the March 2022 Voluntary Agreements (VAs) Memorandum of Understanding proposing voluntary measures for the update and implementation of the Bay-Delta Plan. However, this scenario does not include specific proposed operating criteria for the Project and includes assumptions that are not proposed operating constraints, as described further below.

Water Board staff recommend the EIR evaluate a reasonable range of operational alternatives in order to provide the Water Boards and other responsible agencies with analyses to inform their decision-making processes. This is particularly important given that pursuant to the Delta Reform Act, the State Water Board will need to include appropriate Delta flow criteria for the Project in any approval of a water right change petition needed for the project. These alternatives should include an evaluation of flow criteria for the Project that would improve conditions for native fish species, which are currently in poor condition given the current cumulative impacts to native fish and wildlife species resulting from existing flow modifications and other activities explained in the State Water Board's 2017 Scientific Basis Report in support of potential updates to the Bay-Delta Plan. Flow criteria that would improve Delta outflows, reduce fish entrainment and impingement at SWP (and possibly CVP) diversions, and improve cold water management without redirected impacts to native fish species should be evaluated.

Specifically, the EIR should evaluate a scenario that is consistent with the State Water Board's efforts to update and implement the Bay-Delta Plan to improve protections for native fish species. As mentioned above, the State Water Board updated the Lower San Joaquin River Flow and southern Delta salinity objectives in the Bay-Delta Plan in December 201 and is proceeding to implement these objectives. In July 2018, the State Water Board released a Framework[7] for potential updates to Sacramento River and

[7] The Framework can be found at: https://www.waterboards.ca.gov/waterrights/water_issues/programs/bay_delta/docs/sed/sac_delta_framework_070618%20.pdf

Delta tributary inflows and cold-water habitat, Delta outflows, and interior Delta flow provisions included in the plan based on science summarized in the State Water Board's Scientific Basis Report[8]. These possible updates to the Bay-Delta Plan should be evaluated in the EIR as possible operating constraints on the Project that would mitigate the potential impacts of the Project on fish and wildlife. Although the EIR determines that with mitigation operational impacts from the Project would be less than significant, as explained further below, there is scientific uncertainty concerning whether the habitat restoration actions proposed as mitigation for reduced Delta outflows and other impacts from the Project will be capable of reducing impacts to less than significant levels, particularly with respect to cumulative impacts. Further, while more stringent operational constraints on the Project would not be expected to have additional significant impacts that require evaluation under CEQA, specific evaluations of possible interactive effects would confirm this conclusion and ensure adequate CEQA documentation for the Board's decision-making processes, thereby avoiding possible delays in processing DWR's, and possibly Reclamation's, water right change petition. An analysis of the amount of water that would be available for export using Project facilities if more stringent flow criteria were imposed would also serve to inform the Board's determination concerning what flow criteria are appropriate for the Project.

In addition to more stringent flow criteria, the Water Board's NOP comments also recommended evaluation of possible VA measures proposed by DWR and various water agencies. Although the March 2022 VA was evaluated as a possible alternate regulatory regime in Appendix 4C, that modeling "conservatively assumes the proposed project would not divert excess Delta outflow in January through June during times in which total Delta outflow is less than 29,200 cubic feet per second (cfs)." However, this assumption does not appear to be an operating constraint for the proposed Project. While the assumption is not a proposed operating constraint, the high bypass flow assumption significantly affects the results of the modeling and other analyses, making the evaluation of limited utility in understanding how the proposed Project would interact with a VA and what the proposed operating rules should be to ensure VA flows provide intended benefits. The EIR should evaluate specific proposed operating constraints for the Project with a possible VA regulatory regime. While the Water Boards understand that the term of the VA is proposed to be 8 years, there are also provisions in the VA that would provide for extension of the VA. As such, it is important to understand how this and other proposed new water supply infrastructure would interact with the VA, particularly in cases where the projects involve the same water right holders and water rights involved in the VA.

In addition to the above, operations criteria during continuous, multi-year extreme drought conditions similar to the 2012-2016 and the current (2020-2022) periods should be evaluated. This is particularly important given the challenges meeting water quality

[8] The Scientific Basis Report can be found at: https://www.waterboards.ca.gov/waterrights/water_issues/programs/bay_delta/docs/2022/201710-bdphaseII-sciencereport.pdf

and flow requirements which have occurred during recent drought conditions and the effect that reducing Delta outflows could have on future water quality conditions.

Operations of the North Delta Intakes:

In addition to the above, the EIR should address the following topics related to the proposed operating criteria for the Project as part of alternate operating criteria or as part of the Project (including possible mitigation).

Sweeping and Approach Velocities

The Draft EIR states that the north Delta intakes would be subject to a maximum approach velocity of 0.2 feet per second and a minimum sweeping velocity of 0.4 feet per second at the proposed fish screens (3.16.1.1 Approach and Sweeping Velocity Requirements). Additionally, the sweeping velocity would be at least double the approach velocity to minimize fish drawn to the intakes. The Draft EIR (Section 3.17.2.1 Real-Time Decision-Making Framework) identifies that the average river velocity downstream of the north Delta intakes, estimated as the flow (upstream flow less the diversion flow) divided by the river's cross-sectional area, could be used as a surrogate for the sweeping velocity (page 3-158). The two north Delta intakes would be located in different channel alignments with Intake B on an outside bend of the channel and Intake C on a straight reach. Fish screens located at these locations would experience different hydraulic conditions, e.g., sweeping and approach velocities, even under the same flow conditions. Water Board staff recommend the inclusion of a monitoring strategy to measure and integrate these hydraulic parameters into real-time operational decision making.

The Draft EIR indicates that the approach/sweeping velocity criteria could be relaxed (e.g., allowing for higher approach velocity) when the presence and entrainment risk of Delta smelt at the north Delta intakes is expected to be low based on temperature/calendar off-ramps (page 3-158). However, such relaxation of approach/sweeping velocity criteria without field monitoring for fish presence would risk entrainment of fish species, including Delta smelt and juvenile salmonids. The Project should incorporate fish monitoring to inform relaxation of operating criteria along with a consultation process with regulatory agencies (fisheries agencies and the State Water Board).

Bypass Flow Criteria

Sub-Table A (pages 3-152 through 3-154) provides bypass flow criteria for operations of the north Delta intakes and related Sacramento River flow conditions. The bypass flow criteria in the Draft EIR are the same as those provided in the California WaterFix Project which proposed three north Delta intakes with a maximum diversion capacity of 9,000 cfs. The proposed Project (Alternative 5) would have a maximum diversion capacity of 6,000 cfs. In a study evaluating the effects of the north Delta water

diversions proposed as part of the California WaterFix, Perry et al.[9] (2018a) determined that the October-November bypass rules and Level 3 bypass rules during December-June would considerably increase the frequency and duration of reverse flows at the Sacramento River downstream of Georgiana Slough and the proportion of juvenile salmon entering the interior Delta. Perry et al. (2018a) recommended developing operational rules for the north Delta intakes to control flow reversals that would require detailed real-time predictions of tides and tidally varying river flows in order to account for variation in tidal cycles that affect the frequency, magnitude, and duration of reverse flows at a given Freeport flow. While the proposed Delta Conveyance Project has a lower total possible diversion amount than the California WaterFix Project proposed, it is still possible that the Project could have significant reverse flow effects without appropriate operating constraints. The EIR should evaluate alternative operating constraints consistent with the recommendations of Perry et al. (2018a) that would be more protective of juvenile salmonids.

In a separate study, Perry et al.[10] (2018b) found that as Delta inflows (from the Sacramento River) declined below approximately 1,000 cubic meters per second (m^3/s) (≈35,000 cfs) juvenile salmonid routing into the interior Delta increased and their survival decreased. As inflow declines and tidal influence moves upstream into transitional reaches (defined as the reach between riverine and tidal reaches) in the Delta, both travel time and distance increase because juvenile salmon may be advected upstream on flood tides (Perry et al. 2018b). Based on this research, the EIR should evaluate a range of alternative bypass flows, including higher bypass flow criteria than are currently proposed in the Draft EIR.

The Draft EIR provides three different “Levels” of bypass flow criteria that would be applied during the December through June period. The Draft EIR describes the conditions for moving to higher levels (i.e., from Level 1 to 2, and from 2 to 3) that would allow the Project progressively higher diversions (i.e., less restrictive) at the north Delta intakes. The implementation of bypass flow criteria and progression to the less restrictive diversion criteria could only occur under continued favorable hydrologic conditions (e.g., flows above 20,000 cfs) and when the risks to aquatic resources are low. The EIR should also evaluate alternative operating criteria that would require moving to more restrictive bypass flow criteria (i.e., from Level 3 to 2, and 2 to 1) based on flow and/or fish monitoring.

The proposed minimum bypass flows during October and November are 7,000 cfs; however, the proposed minimum bypass flows during the more sensitive time period for native fish species from December to June are substantially lower at 5,000 cfs

[9] Perry, R.W., J.G. Romine, A.C. Pope, and S.D. Evans. 2018. Effects of the proposed California WaterFix North Delta Diversion on flow reversals and entrainment of juvenile Chinook salmon (Oncorhynchus tshawytscha) into Georgiana Slough and the Delta Cross Channel, northern California: U.S. Geological Survey Open File Report 2018-1028, 46 p., https://doi.org/10.3133/ofr20181028.

[10] Perry, R. W., A. C. Pope, J. G. Romine, P. L. Brandes, J. R. Burau, A. R. Blake, A. J. Ammann, and C. J. Michel. 2018. Flow-mediated effects on travel time, routing, and survival of juvenile Chinook salmon in a spatially complex, tidally forced river delta. Can. J. Fish. Aquat. Sci. 75: 1886–1901. dx.doi.org/10.1139/cjfas-2017-0310.

according to the Sub-Table A. The reasoning for these lower bypass flows should be explained and more protective alternative bypass flows during the December through June period that would provide higher levels of protection for fish residing in the area or migrating through the north Delta intake reaches should be evaluated.

Pulse Protection

The Draft EIR summarizes the conditions for initiation and cessation of (fish) pulse protection criteria in Table 3-14. The pulse protection criteria were developed for the protection of winter-run Chinook salmon and are expected to provide ancillary protection to other anadromous fish species, including steelhead and spring-, fall-, and late fall-run Chinook salmon. The Draft EIR (Section 3.16.1.3 Pulse Protection) states that the pulse protection would be initiated when "a large number, and relatively high concentration, of winter-run-sized juvenile salmonids begin migrating into the Delta from upstream locations" to minimize potential decreases in survival of emigrating salmonids in the north Delta intake reach. However, the initiation criteria for pulse protection described in the Draft EIR is based on flow increases and not fish density in the Sacramento River at Wilkins Slough. For the California WaterFix Project, both the initiation and cessation of the pulse protection operation at the proposed north Delta intakes was informed by fish catch at Knights Landing (Knight Landing Catch Index) (California WaterFix Project ITP 2017). An alternative operating scenario with similar fish catch-based criteria for pulse protection operations should be evaluated in the EIR.

Water Board staff note that the proposed operations include one pulse protection period per water year (after December 1) with the possibility for one additional pulse protection if the pulse period begins before December 1. As stated above, the pulse protection and related low-level pumping criteria were designed to primarily protect winter-run sized Chinook salmon emigrating through the Sacramento River with the first flow pulse. The EIR should also evaluate operating criteria to provide a similar level of protection to other salmonids (spring-, fall-, and late fall-run Chinook salmon and California Central Valley [CCV] steelhead) that might be migrating through the Sacramento River at different times. Previously, the California WaterFix Project ITP (2017) included unlimited pulse protections for winter-run and spring-run Chinook salmon. The EIR should include alternative operating criteria with additional pulse protections that would provide protections for other salmonid fish.

The Draft EIR indicates that a pulse protection period could last for just 5 days or less after the flow peak based on the initiation and ending criteria in Section 3.16.1.3 (page 3-143) and Table 3-15. This could happen during the October-November period when an early-season storm increases flows in the Sacramento River and mobilizes salmonid migration, as occurred in October 2021. The Draft EIR cites the research by del Rosario et al. (2013) for the development of the pulse protection flow criteria and its effective duration. The study (del Rosario et al. 2013) provides information on the patterns of winter-run (sized) Chinook salmon juvenile entry into the Delta, estimated at the Knights Landing rotary screw trap, and Delta exit, estimated at Chipps Island. However, the passage time from Wilkins Slough to Knights Landing and to the north Delta intakes that would inform Project operations has not been determined. The study

by del Rosario et al. (2013) states that the first day that flows at Wilkins Slough reached 400 m^3/s (≈14,000 cfs) or 500 m^3/s (≈17,600 cfs) was one day before the catch spike and within 3-7 days before the median catch (of cumulative catch) at Knights Landing. It determined that the Delta residence time of winter-run Chinook salmon juveniles ranged from 40 to 110 days, with an average of 87 days. Based on this information, the pulse protection and low-level pumping for potentially very short periods, i.e., 5 days, may not provide full protection for the early migrating juvenile salmonids. If a pulse protection begins in the October-November period and ends with five consecutive days of Wilkins Slough flow decreasing after the peak flow, the north Delta intakes could divert a high proportion of the Sacramento River flow that is above the minimum bypass flow criteria of 7,000 cfs. The EIR should evaluate alternative operating constraints that provide for longer bypass flow periods.

Further, the Draft EIR defines the pulse protection criteria as flow in the Sacramento River at Wilkins Slough greater than 12,000 cfs. However, during water year 2021, the flows at Wilkins Slough never exceeded this criteria. The EIR should evaluate alternative operating constraints that would apply when hydrologic conditions meeting the pulse protection criteria do not occur but juvenile salmonids would be migrating.

Spring Delta Outflows (San Joaquin River Inflow to Export [I:E] Ratio)

The EIR should clarify whether the water diverted from the north Delta intakes would be included in assessing the proportional share of export reductions to provide incidental spring outflows during April and May (2020 ITP Condition of Approval 8.10 SWP Proportional Share, 8.17 Export Curtailment for Spring Outflow). The 2020 SWP ITP requires that the SWP reduce exports from April 1 to May 31 of each year to achieve the SWP proportional share of export reductions established by the ratio of San Joaquin River at Vernalis flow to combined CVP and SWP exports (I:E Ratio). The EIR should also clearly describe whether this condition was used as a modeling criterion.

Project Impacts on Water Quality:

Chapter 9 of the Draft EIR evaluates the impacts of the project of water quality. Section 9.3.2 provides a list of conditions for evaluating whether water quality effects resulting from a project alternative would be considered significant under CEQA. Number 8 on that list is “Conflict with or obstruct implementation of a WQCP.” In Section 9.3.4, Cumulative Analysis, the EIR states that “cumulative analysis for water quality in the study area considers past, present, and reasonably foreseeable future projects and programs being completed in combination with the effects of any one of the project alternatives or the No Project Alternative.” Table 9-54 lists the programs, projects and policies evaluated but does not contain the updates and implementation processes for the Bay-Delta Plan described above.

Throughout Section 9.3.3, the Draft EIR states that for whichever water quality constituent is being analyzed, project alternatives would not cause more frequent exceedance of the Bay-Delta Plan objectives for the constituent because project facilities would be operated to objectives as implemented through D-1641. However,

since D-1641 was implemented, water quality and Delta outflow objectives have not been achieved during drought conditions and DWR and Reclamation have requested temporary urgency changes to water right requirements to relax those requirements. The EIR should demonstrate how the Project will be operated to avoid the need for future temporary urgency change petitions (TUCPs) and future violations of water quality and flow requirements. Additionally, D-1641 does not account for all possible water quality concerns in the Bay-Delta, such as harmful aquatic blooms.

Further, the modeling analysis may not fully represent the impacts to water quality if the north Delta Diversion is operated for reasons other than carriage water benefit (such as export water quality benefits) as the modeling assumes. The north Delta diversion could be utilized to a greater extent than the modeling shows, which would affect circulation of water in the Delta, increase residence time, and could lead to a degradation of water quality. In order to understand the full range of possible effects of the project, the EIR should evaluate a a scenario in which the north Delta diversion is used to the greatest extent possible similar to the analysis in Appendix 4B that assumes the opposite.

As noted in the Draft EIR, cyanobacteria blooms are a significant water quality concern in the Delta. The severity and frequency of blooms has increased in the last decade, as have the types of cyanobacteria toxins detected. The Draft EIR concludes that the project would have no significant impact on cyanobacteria blooms. The potential impact is difficult to determine however, because the analysis is incomplete. The impacts of project operations on cyanobacteria blooms were determined by an assessment of changes in bloom drivers at nine assessment locations concentrated in western and north central channels and mainstem rivers. However, the assessment locations did not encompass small and mid-sized tributary channels in the eastern, central, and southern portions of the Delta. The impacts analysis should directly examine potential impacts in small and mid-sized channels (e.g., Disappointment Slough, Turner Cut, North Fork Mokelumne and Grant Line Canal) where responses to subtle changes in water residence time, source water proportion, and water temperature are expected to have greater effects on cyanobacteria growth and persistence than in main river segments. Without assessing potential for increasing cyanobacterial harmful algal blooms (CHABs) across the entire Delta, it is difficult to determine impacts of the proposed Project operations.

Project Impacts on Aquatic Resources:

The Draft EIR uses a 5 percent threshold for determining significant impacts of the Project on fish species (Section 12.3.2 Thresholds of Significance), and states that this threshold was selected based on “best professional judgment” of the authors. The Draft EIR also considers the relative certainty of impacts (e.g., quantitative estimates based on population-level analysis vs. inferences based on changes to habitat indicators) as part of the impact conclusion. The EIR should provide scientific references supporting the use of a 5 percent threshold and the weighting of the relative certainties of impacts, particularly given the degraded status of many native fish species. Such references

should include studies (field-level or model-based) showing the relationships between the aerial extent and quality of rearing habitats and changes in population sizes of fish.

Impacts on Salmonid Species

The Draft EIR only provides qualitative discussions of the Project's potential near-field effects at the north Delta intakes on migrating juvenile salmonids. Fish mortality due to entrainment and impingement and predatory losses at the north Delta diversion intakes have not been quantitatively analyzed or incorporated in the assessment of overall project impact on salmonid species. The Project includes installation of a series of cylindrical tee screens suspended in the water column at the north Delta intakes. The Draft EIR states that the sweeping and approach velocity criteria would limit the potential for fish impingement and injury from the screen and the 1.75 mm screen opening size proposed for the north Delta intake would effectively exclude juvenile salmonids of 22 mm standard length (25 mm fork length) or greater. However, the sited case study on the operation of cylindrical tee screens and their effectiveness in reducing impacts to fish is derived from the Columbia River with a different screen configuration and greater flow than the Delta. The OBAN model for the evaluation of winter-run Chinook salmon escapement used additional five and ten percent mortality rates, as a sensitivity analysis, to account for the potential impacts at the north Delta intakes. The EIR should incorporate consideration of the potential additional mortality attributable to the operation of the north Delta intakes in the analysis of the Project impacts on aquatic species.

The Draft EIR indicates that the proposed Project would result in adverse hydrodynamic conditions, reduced available rearing habitats in the Delta, and reduced through-Delta survival of salmonid species. The proposed Project would generally decrease the survival of anadromous salmonid populations (winter-, spring-, fall- and late fall-run Chinook salmon, and steelhead) migrating through the north Delta intake reach and the Delta. The operations of the Project under the proposed operations criteria (Alternative 5) would result in significant negative population-level impacts on the populations of winter-run and spring-run Chinook salmon and steelhead exceeding the five percent threshold (Impact AQUA-2, 3, and 5). Additionally, through-Delta survival of fall-run and late fall-run Chinook salmon would also be reduced by up to three percent under Project operations (Alternative 5). As discussed above, there would also likely be additional mortality attributable to the near-field effects at the north Delta intakes, which has not been included in these estimates.

Despite evidence of significant population-level impacts, the Draft EIR concludes that Project impacts on salmonid species would be "less than significant" with mitigation measures, citing that the Compensatory Mitigation Plan (CMP) 25[11] would reduce negative hydrodynamic effects and CMP 26[12] would reduce the effects from reduced inundation of riparian/wetland benches (page 3-126). However, the Draft EIR only

[11] CMP-25: Tidal Habitat Restoration to Mitigate North Delta Hydrodynamic Effects on Chinook Salmon Juveniles

[12] CMP-26: Channel Margin Habitat Restoration for Operations Impacts on Chinook Salmon Juveniles

provides the acreages of tidal habitat and linear footages of channel margin and tidal bench habitats in Appendix 3F (Section 3F.4.3) and does not analyze the potential change in fish abundance attributable to habitat restoration (e.g., increased juvenile survival rates). The Draft EIR also does not provide supporting information on how these mitigation measures could reduce Project impacts on juvenile salmon migrating through and rearing in the Delta at levels that would compensate for the population-level decreases of adult escapement estimated based on the life cycle models (e.g., winter-run Chinook salmon population reductions under IOS and OBAN models). The EIR should provide scientific references (field-level or model-based) supporting the relationships between the aerial extent and quality of rearing habitats and changes in population sizes of various fish species.

Water diverted at the north Delta intakes would move the extent of "transitional reaches" (explained as the reach between riverine and tidal reaches; Perry et al. 2018b) further upstream, which would worsen the flow reversal in the mainstem Sacramento River. The Draft EIR cites Perry et al. (2018b) to support the restoration of tidal wetlands as a compensatory mitigation measure to dampen tidally-driven reverse flows to a level that would compensate for the reduced survival of juvenile salmonids resulting from reduced flows in the mainstem Sacramento River and increased routing into the interior Delta (Appendix 3F; Section 3F.4.3.4). However, this reference does not provide any information on the potential benefits of tidal habitat restoration on the hydrodynamics in the Sacramento River reach below the north Delta intakes. The EIR should further analyze the hydrodynamic benefits of habitat restoration as mitigation measures in relation to the population-level impacts on salmonids. In addition, given the uncertainty of the effectiveness of habitat restoration actions to mitigate impacts of the Project, a range of operating criteria should be evaluated for the Project that would avoid impacts regardless of habitat restoration actions.

Winter-Run Chinook Salmon Life Cycle Models

Three life cycle models were used to assess the population-level impacts of the Project on winter-run Chinook salmon: IOS, OBAN, and the Winter-run Chinook Salmon Life Cycle Model (Impact AQUA-2). The IOS model indicates a 9 percent reduction in adult female winter-run Chinook salmon escapement under the proposed Project. The IOS model did not consider the near-field effects of the north Delta intakes, which would be expected to make this reduction in escapement even larger. Similarly, the OBAN model results indicate a 12 percent decrease in winter-run Chinook salmon escapement under the proposed Project compared to existing conditions. When the potential near-field mortality effects are included, a 25 to 36 percent reduction in winter-run Chinook salmon escapement (with 5 to 10 percent mortality) would be indicated under OBAN. In contrast, the Winter-run Chinook Salmon Life Cycle Model results suggest higher spawner abundance (5.19 percent) under the proposed Project compared to existing conditions. The Draft EIR notes the different outcomes among the three life cycle models and suggests that the mechanisms and explanation would be investigated and reported on during the permitting process. The EIR should fully explain these contrasting results and address the near-field effects at the north Delta intakes. As

discussed above, the EIR should also consider a range of operating criteria that would reduce impacts, regardless of habitat restoration actions.

Impacts on Delta and Longfin Smelt

The Draft EIR indicates that the proposed Project would have significant negative impacts on Delta smelt and longfin smelt. The EIR indicates that the Project would decrease the populations of longfin and Delta smelt as the continued operations of South Delta export facilities and the new north Delta intakes would further reduce Delta outflows and reduce the spatial extent and quality of habitats. Project impacts on Delta smelt are considered "significant" as the operations of the north Delta intakes would worsen the conditions for the already critically low population. Operations of the Project would also result in negative population-level impacts on longfin smelt that would exceed the 5 percent threshold based on the analysis of Delta outflow and Fall Midwater Trawl (FMWT) index.

The Draft EIR concludes that impacts of the Project on Delta smelt and longfin smelt would be "less than significant" with mitigation measures, CMP-27 (Tidal Habitat Restoration for Operations Impacts on Longfin Smelt; 1,100 to 1,400 acres) and CMP-28 (Tidal Habitat Restoration for Operations Impacts on Longfin Smelt, 110 to 140 acres). However, the Draft EIR does not provide clear evidence as to how the proposed habitat restoration will reduce significant operational impacts to less than significant. The Draft EIR does not identify specific locations for tidal habitat restoration projects, nor does it evaluate any population-level benefits the restored habitat would provide to Delta smelt and longfin smelt.

Chapter 12 Aquatic Resources refers to Appendices 12B *Bay Delta Methods and Results* for aquatic resources impacts and 3F *Compensatory Mitigation Plan* for evaluation of potential benefits of tidal wetland restoration. Appendix 12B (Section 12B-19) provides methods the Draft EIR used to calculate the benefits of tidal habitat restoration mitigation for longfin and Delta smelt. The methods evaluate potential fish entrainment at the south Delta export facilities based on differing hydrologic conditions (export to inflow ratios) using the DSM2-Particle Tracking Model (PTM) runs but do not identify how the estimated entrainment of particles (assuming they represent larval and juvenile fish) are translated into population-level fish indices (e.g., FMWT longfin smelt index). The EIR should identify the potential locations and aerial extent of tidal wetland restoration projects used in CMP-27 and CMP-28 and evaluate their benefits on Delta smelt and longfin smelt populations using the best available scientific methods, including appropriately accounting for uncertainty related to the outcomes of habitat restoration, which while promising are still uncertain. Additionally, the EIR should clarify if these tidal restoration projects would be additional to those that are already in progress or proposed as part of VAs or other processes. The EIR should also evaluate

the population level effects using the Delta smelt life cycle models[13] (e.g., Polansky et al. 2021; Smith et al. 2021).

Effects of Climate Change on Hydrology

The Draft EIR uses climate change forecasts for future conditions (year 2040) that are warmer (1.8°C to 1.9°C higher temperatures) and wetter than current conditions (2.7 to 4.8 percent higher precipitation) that result in higher inflows to rim reservoirs (by 2.0 to 4.6 percent) and the Delta (by 3.4 percent) (Draft EIR Table 5-1). The Water Board's comment letter on the NOP recommended that the EIR evaluate an overall drier hydrology in the EIR consistent with Governor Newsom's "California's Water Supply Strategy, Adapting to a Hotter, Drier Future" which identifies that hotter and drier weather conditions spurred by climate change could reduce California's water supply by up to 10 percent by the year 2040. Scientific studies[14] have suggested that climate change will bring changes in precipitation patterns (less snow and more rain), higher temperatures, vegetation expansion, and longer growing seasons, which are expected to result in warmer water temperatures and lower annual streamflows than current conditions. The EIR should account for expected reductions in stream flows, including the type of conditions that occurred in 2021 when runoff was almost a million acre-feet lower than expected, resulting in significant water supply management and planning challenges.

A CalSim 3 sensitivity analysis was conducted for the Draft EIR for 2040 conditions under climate change by incorporating the 2040 Median climate projection (Appendix 30A CalSim 3 Results Sensitivity to 2040 Climate Change and Sea Level Projections). Results from the 2040 Median climate projection show generally increasing precipitation patterns in all Central Valley watersheds except the Sacramento River at Shasta and decreasing river runoffs for all watersheds compared to historical conditions centered on 1995 (1981-2010). The 2040 Median projection may represent a more realistic

[13] Polansky, L., K. B. Newman, and L. Mitchell. 2021. Improving inference for nonlinear state-space models of animal population dynamics given biased sequential life stage data. Biometrics 77:352–361. DOI: 10.1111/biom.13267.
Smith, W. E., L. Polansky, and M. L. Nobriga. 2021. Disentangling risks to an endangered fish: using a state-space life cycle model to separate natural mortality from anthropogenic losses. Can. J. Fish. Aquat. Sci. 78: 1008–1029. dx.doi.org/10.1139/cjfas-2020-0251.

[14] Albano, C. M., J. T. Abatzoglou, D. J. McEvoy, J. L. Huntington, C. G. Morton, M. D. Dettinger, and T. J. Ott. 2022. A multidataset assessment of climatic drivers and uncertainties of recent trends in evaporative demand across the continental United States. Journal of Hydrometeorology 23: 505-519. https://doi.org/10.1175/JHM-D-21-0163.1.
Berghuijs, W. R., R. A. Woods, and M. Hrachowitz. 2014. A precipitation shift from snow towards rain leads to a decrease in streamflow. Nature Climate Change 4: 583-586. doi:10.1038/nclimate2246.
Goulden, M. L., and R. C. Bales. 2014. Mountain runoff vulnerability to increased evapotranspiration with vegetation expansion. PNAS 111: 14071-14075.
Milly, P. C. D., and K. A. Dunne. 2020. Colorado River flow dwindles as warming-driven loss of reflective snow energizes evaporation. Science. DOI: 10.1126/science.aay9187.
Udall, B., and J. Overpeck. 2017. The twenty-first century Colorado River hot drought and implications for the future, Water Resour. Res., 53, 2404–2418, doi:10.1002/2016WR019638.

assumption of future hydrologic conditions under climate change based on the available scientific literature that should also be evaluated.

Modeling and Analysis

The modeling and analysis in the Draft EIR is based on CalSim 3 simulations. While CalSim 3 may be an appropriate tool, it is a new model that has not been publicly reviewed, nor fully documented. Water Board staff recognize the challenges in documenting and validating such a complex model, but because the model and the assumptions are not thoroughly documented, it is difficult to fully review the validity of the modeling and assumptions. The Draft EIR should demonstrate that the model reasonably represents the system that is being analyzed. Specifically, CalSim 3 modeling assumptions should be more clearly stated for each alternative. The Draft EIR includes two revised appendices, 5A-B Attachments 3 and 5, that describe detailed assumptions and results for existing conditions and the no project alternatives. However, no such appendices contain assumptions and results for the proposed alternative or other alternatives. In addition to the detailed appendices for each alternative, the EIR should include a table that clearly compares assumptions for each alternative similar to what was provided during the California WaterFix Project water right proceeding.

The water year types in CalSim 3 do not match the historical water year types even though the model assumes historical hydrology. The resulting CalSim 3 water year types include more wetter year types and fewer drier year types than occurred over the simulation period historically. This affects how the results are presented throughout the Draft EIR and when regulatory requirements such as D-1641 requirements are imposed in the model. This portion of CalSim 3 should be fully documented, and a sensitivity analysis should be conducted on the existing conditions scenario that uses historical water year types to help reviewers understand the effect of using simulated water year types instead of historical water year types.

Closing

The Water Boards appreciate the opportunity to provide comments on the Draft EIR for the Project. By participating in the process in an advisory capacity, the Water Boards hope to ensure that a broad range of alternatives is evaluated, and the potential impacts of all the alternatives are fully disclosed. While the Water Boards can provide information that will help guide the Project toward a successful completion of the process, the Water Boards cannot make a prior commitment to the outcome of any regulatory approval by the Water Boards. The State Water Board acts in an adjudicative capacity when it acts on a water right application, change petition, or other water right approval that may be required for or requested in connection with a proposed project. The State Water Board must be an impartial decision-maker, avoiding bias, prejudice, or interest in any adjudicative proceedings conducted in accordance with the State Water Board's regulatory approvals. Accordingly, Water

Board staff will not act as advocates for the project or any particular alternatives during the Delta Conveyance Project processes.

In closing, the Water Boards appreciate the opportunity to continue to participate in an advisory capacity regarding the Water Boards' regulatory and informational requirements. If you have any questions, please contact me at Diane.Riddle@waterboards.ca.gov.

Attachments: Table 1 - Additional Water Board Comments on Draft EIR for the Delta Conveyance Project

State Water Board Comment Letter on the Notice of Preparation of Environmental Impact Report for the Delta Conveyance Project, dated 15 April 2020

cc: Central Valley Regional Water Quality Control Board (via email):
Patrick Pulupa
Adam Laputz
Janis Cooke
Stephanie Tadlock

State Clearinghouse Unit, Governor's Office of Planning and Research, Sacramento (via email)

TABLE 1: Additional Water Board Comments on Delta Conveyance Project Draft EIR

Chapter 3 - Description of the Proposed Project and Alternatives

Section/page/line/general	Comments
Table 3-14/page 3-149	The low-level pumping during the pulse protection period (October-June) is 900 cubic feet per second (cfs). The EIR should further describe how the 900 cfs would be allocated between the two north Delta intakes, since their locations and hydraulics would be different.
3.4.4	Material from the tunnel excavation is proposed to be tested, dried, stockpiled and either reused or permanently stored. In practice, any reuse conditions, restrictions and/or authorizations will likely be included in the Notice of Applicability, or Waste Discharge Requirements issued for the excavations and placement/stockpiling. The EIR should be modified, as appropriate, to reflect this information.
3.18/page 3-160	The adaptive management and monitoring plan for the Compensatory Mitigation Plan is not developed and a timeline for implementation alongside the plan for implementation of the proposed action is not clear and should be identified in the EIR. Further, timelines for the implementation of individual mitigation projects are also not identified and should be (Appendix 3F).
Appendix 3B/page 6	Sediment mercury thresholds were not referenced. The Water Boards suggest using more stringent requirements than hazardous waste thresholds, such as conducting investigations for site specific pre-industrial soil mercury concentrations.
Appendix 3B/page 28	The Draft EIR identifies a plan to reintroduce sediment into the Delta since the project "would entrain 4-6% of the sediment load" from the Sacramento River to the Delta that may negatively impact delta smelt. The sediment reintroduction plan is planned to be developed, peer reviewed, and approved by the fishery agencies and annual monitoring for sediment/turbidity is planned. The Central Valley Regional Water Quality Control Board should be a party to this plan to ensure sediment being reintroduced will not impair beneficial uses. If the proposed project will discharge wastewater with sediment loading and turbidity that could

	affect the quality of surface waters of the State, the proposed project may require coverage under an individual National Pollutant Discharge Elimination System (NPDES) permit.

Chapter 4 - Framework for the Environmental Analysis

Section/page/line/general	Comments
Appendix 5A/Section B/page B-63 and Appendix 4B/Section 4B.1	The CalSim 3 modeling assumes that the north Delta diversion (NDD) would only be used when there is a carriage water benefit and therefore prioritizes south Delta pumping all other times. However, this operational criterion is not defined as part of the proposed Project. The sensitivity analysis in Appendix 4B only analyzes the effect of prioritizing the NDD in December-June. If the NDD were prioritized for reasons other than a carriage water benefit (an export water quality benefit or increased diversion potential, for example, in July-November) the effect on water quality (not just electrical conductivity, EC) in the Delta would be greater than presented in the modeling analysis. To fully analyze the potential impacts on water quality in the Delta, a scenario that prioritizes NDD should also be evaluated in the EIR.
Appendix 4C/Section 4C.3 /page 4C-4	Alternative 5 under the Alternative Regulatory Scenario says that it "conservatively" assumes a condition where exports out of the NDD would be limited if excess Delta outflow is greater than 29,200 cfs. This does not appear to be a proposed operating constraint. The EIR should evaluate actual proposed operating constraints for the Project, as well as a reasonable range of alternatives as described in the main body of this comment letter.

Chapter 5 - Surface Water

Section/page/line/general	Comments
General	CalSim 3 documentation is not complete and does not include a thorough validation. The EIR should show that the hydrology, stream-groundwater interactions, reservoir

	operations, and Delta operations in the model are responding in a way that is similar to the historical record. Additionally, updates such as the water year type module need to be included in the model documentation.
General	CalSim 3 modeling assumptions should be clearly stated for each alternative. These assumptions should be placed in a table so that assumptions for each alternative can be easily compared.
General	The Calsim 3 calculation of water year types does not match historical year types, and CalSim 3 estimates more wetter years and fewer drier years for the modeled period, even though the model uses historical hydrology. This skews the CalSim results as presented in the report, as well as how CalSim 3 represents D-1641 and other flow requirements in the system. We suggest a validation and documentation of this part of CalSim 3, including a sensitivity analysis of how the shifting of year types affect the results. Even though the analysis uses CalSim 3 in a comparative sense, the model should still be representative of the system, and the alternatives being analyzed.
General	It appears that the relaxation of the Delta outflow standard in May and June if the Sacramento River Index is estimated to be below 8.1 million acre-feet (MAF) described in footnote 10 of Table 3 of D-1641 is not being implemented in CalSim 3. This results in higher outflow than would occur in the spring of some dry years. The modeling should be updated to be consistent with D-1641.
General	It appears that the spring Delta outflow (San Joaquin River inflow to export ratio (I:E)) requirement in the 2020 ITP is being applied to both the north Delta and south Delta diversion locations in the CalSim 3 analysis. However, in some years in May there are large increases in exports in Alternative 5 that cannot be explained. The EIR should explain the reason for these increases in exports, as well as whether the I:E provisions are proposed to apply to the north Delta diversions. If not, the modeling should reflect not including those constraints at the north Delta diversion facility.
General	It appears that the Artificial Neural Network (ANN) was not retrained for Alternatives 2a and 4a, which would seem to make the results less reliable for these scenarios, including with respect to changes in exports and Delta outflow. An evaluation of this

	issue should be included in the EIR, including sensitivity analyses or the ANN should be retrained for these scenarios.
Appendix 5A/Section B	The difference between the North Delta Outflow Index (B.3.4) and Net Delta Outflow (B.3.5) in Appendix 5A Modeling Technical Appendix – Hydrology and System Operation Modeling should be clarified. There are no descriptions of these hydrology parameters.
Appendix 5A/Section B-Attachment 4/page B-4	The EIR should provide numerical values in table form for Figure 5A-B4.2. Projected Changes in Average Temperature for Major Watersheds in the Sacramento and San Joaquin River Basins.
Appendix 5A/Section B-Attachment 4/page B-5	The EIR should provide numerical values in table form for Figure 5A-B4.3. Projected Changes in Precipitation for Major Watersheds in the Sacramento and San Joaquin River Basins.

Chapter 8 - Groundwater

Section/page/line/general	Comments
8.19	The Draft EIR evaluates changes in groundwater (GW) elevations using historical data from 1974-2015 to determine levels of significance on GW elevation from proposed Project operations. However, this analysis does not take into consideration current management actions underway through the Sustainable Groundwater Management Act (SGMA). Historical data pre-SGMA management has a lower baseline with a high rate of GW elevation change, i.e., lower groundwater elevations that fluctuate/change frequently. With SGMA implementation, the rate of GW elevation changes may be much lower, and the operation of Delta Conveyance may have a greater impact that should be evaluated in the EIR.
8A.4.1 (Three Stages of Calibration)	One of the objectives of model calibration is stated as: "achieve a reasonable water budget for soil moisture (a component of hydrologic cycle)." It is not clear how this objective is being achieved. The EIR should be revised and also identify whether there is any impact on unsaturated zone (moisture content and water vapor pressure), and

	whether that impact may lead to any negative hydrogeologic outcome (e.g., soil subsidence, contaminant mobilization, sea water intrusion into the aquifer, etc.).
Section 8A.4.3 (PEST Calibration of Parameters)	Calibration of Specific Yield (Sy) is important for a transient GW model, as it affects the GW table fluctuation rate. The EIR should specify whether this parameter was calibrated through Parameter Estimation (PEST).

Chapter 9 - Water Quality

Section/page/line/general	Comments
9.0	This Section states that construction needs to comply with the requirements of the Construction General Permit. Discharges related to project construction also need to comply with requirements of the Central Valley and San Francisco Bay Regional Water Quality Control Boards' Basin Plans and Bay-Delta Plan. The EIR should be revised accordingly.
9.1.4	The current 303(d) list is in the 2020-2022 Integrated Report, adopted by the State Water Board in January 2022. The reference for the 303(d) list should be corrected and Table 9-2 updated as needed.
9.1.5.2	The description of existing water quality conditions includes a description of dissolved oxygen (DO) conditions and associated Total Maximum Daily Loads (TMDLs) for Suisun Marsh and the Stockton Deep Water Ship Channel. The EIR should be updated to recognize existing DO impairments in the Delta that are not addressed by a TMDL or implementation actions. Potential exacerbation by the proposed Project of the DO impairments in all 303d-listed water ways should be investigated. Project-related changes in water flow velocity, water residence time, and proportions of source water with seasonally high chlorophyll resulting from the proposed Project could impact DO concentrations.
9.1.5.4	All references to the mercury TMDL should be updated to "Sacramento–San Joaquin Delta Methylmercury TMDL."

9.1.5.4/page 9-16/lines 3-4	The language on page 9-16, lines 3-4 is inaccurate and should be changed to: "At least 80% of the total mercury flux to the Delta can be attributed to the Sacramento Basin, which comprises tributary watersheds to the Sacramento River and Yolo Bypass."
9.1.5.4/page 9-16/lines 7-9	The text on page 9-16, lines 7-9 is inaccurate and should be changed to: "Cache Creek, and associated Cache Creek Settling Basin, is the major source of inorganic mercury loading to the Yolo Bypass, where mercury loading mostly occurs via transport of mercury-bound sediment (Central Valley Regional Water Quality Control Board 2010. Sacramento-San Joaquin Delta Methylmercury TMDL Staff Report, pg.197)."
9.1.5.4/page 9-16/lines 9-12	The sentence on page 9-16, lines 9-12 is inaccurate. The Delta Methylmercury TMDL Staff Report only states: "SF Bay identified Central Valley outflows via the Delta as one of the principal sources of total mercury to SF Bay…" The citation of Delta Methylmercury TMDL Staff Report should be removed and replaced with: "Mercury loading from the Delta primarily drives mercury concentrations in northern San Francisco Bay, Suisun Bay, and Suisun Marsh (San Francisco Bay Regional Water Quality Control Board 2018:49)."
9.1.5.4/page 9-16/lines 20-22	Text on page 9-16, lines 20-22 is inaccurate and should be changed to: "The flux of methylmercury from Delta open water and wetland sediments is estimated to contribute 36% of the waterborne methylmercury load in the Delta annually, based on an analysis of data from water years 2000 to 2003 (Central Valley Regional Water Quality Control Board 2010. Sacramento-San Joaquin Delta Methylmercury TMDL Staff Report, pg.88)."
9.1.5.4/page 9-16/lines 22-25	Text on page 9-16, lines 22-25 is inaccurate and should be changed to: "Based on data from water years 2000 to 2003, annual estimates determined tributary inflow sources contribute 58% of the methylmercury load in the Delta annually, and wastewater, agricultural lands, atmospheric deposition, and urban runoff contribute approximately 7% of the methylmercury load (Central Valley Regional Water Quality Control Board 2010. Sacramento-San Joaquin Delta Methylmercury TMDL Staff Report, pg.80)."

9.1.5.4/ page 9-16/lines 27-30	The EIR should be revised to include the following text in order to improve the description of the TMDL on page 9-16, lines 27-30: "The Sacramento-San Joaquin Delta Methylmercury TMDL, and associated Basin Plan Amendment, establishes methylmercury fish tissue objectives; load allocations for agricultural drainage, atmospheric wet deposition, open water, tributary inputs, wetlands, and nonpoint source dischargers; and waste load allocations to point source dischargers in the Delta."
9.1.5.5	The text indicates that the role of nutrients in expansion of aquatic macrophytes in the Delta is unknown. A useful reference on the Delta nutrients-aquatic macrophyte relationship that should be considered in the EIR is Berg and Sutula (2015 SCCWRP Technical Report #870). They found that rapid expansion of invasive macrophyte acreage did not correlate with nutrient concentrations, suggesting factors besides nutrients are contributing to the expansion of aquatic plant growth at the scale of the whole Delta.
9.1.5.5	The description of dissolved oxygen problems in Suisun Marsh should be updated to note that the Suisun Marsh DO TMDL was fully approved and became effective in 2019. See the San Francisco Bay Regional Water Board's webpage for the TMDL (Suisun Marsh TMDL (ca.gov)) and the San Francisco Bay Basin Plan, Chapter 7. The TMDL implementation Plan to eliminate impairments addresses marsh habitat maintenance and drainage schedules. Nutrients from the Delta are not a component of the Suisun Marsh DO TMDL.
9.2	The Applicable Laws, Regulations and Programs considered in the assessment of environmental impacts on water quality should include the Water Quality Control Plans for San Francisco Bay (Region 2 Basin Plan) and the Sacramento River and San Joaquin River Basins (Region 5 Basin Plan).
9.2	The Applicable Laws, Regulations and Programs should include the State's Antidegradation Policy. State Water Board Resolution No. 68-16, "Statement Of Policy With Respect To Maintaining High Quality Of Waters In California" ("Antidegradation

	Policy") requires that the quality of existing high-quality water be maintained unless any change will be consistent with the maximum benefit to the people of the state, will not unreasonably affect present or anticipated future beneficial uses of such water, and will not result in water quality less than that prescribed in water quality control plans or policies. The Antidegradation Policy further requires best practicable treatment or control of the discharge necessary to assure that pollution or nuisance will not occur and the highest water quality consistent with maximum benefit to the people of the state will be maintained. Any portion of the Delta Conveyance Project that will require a new single-action permit or approval of general permit coverage for a new action will require a full Anti-degradation Analysis to be completed prior to the permit being issued. This is in accordance with State Water Resources Control Board (State Board) Antidegradation Policy in State Board Resolution 68-16. There is currently no Antidegradation Analysis included in the Delta Conveyance Draft EIR. A full Antidegradation Analysis should be conducted prior to any Water Board permitting. It would be beneficial for DWR as well as regulatory agencies and stakeholders if DWR were to conduct the Antidegradation Analysis as part of the EIR.
9.3.2, and Appendices 5A-C, 9E	Some analyses of water quality impacts involved examination of various environmental factors (e.g., temperature, velocities and turbulence, water clarity, hydraulic residence time) that were modeled separately, as described in Chapter 5 appendices. The process of using the various model outputs within qualitative assessments was not clearly explained. Additional description of the process of using outputs of the various models and any decision points leading to the impact conclusions should be added to the EIR. The rationale for selecting different assessment locations for different models (e.g., temperature, hydraulic residence time, and source water fingerprinting) should also be included. Additional information is particularly important for understanding the impact decisions for nutrients, dissolved oxygen, and cyanobacteria impacts.

9.2	One of the thresholds of significance for an environmental impact determination is whether the project would further degrade by measurable levels on a long-term basis a parameter that is already listed as impaired on the 303(d) list. In the case of certain impairments, such as low dissolved oxygen and pesticides, environmental harm can occur when standards are not met or are further degraded for short periods of time. Thus, the criterion "on a long-term basis" is not appropriate for evaluating impacts for all 303(d)-listed impairments in the Delta and should be revisited.
9.3.3.2	The Draft EIR recognizes the need to collect, treat, and store all stormwater runoff and dewatering water for re-use on the site to minimize peak runoff rates. Also, if discharge to surface water bodies is needed, DWR will acquire NPDES permits issued by the Central Valley Regional Water Board. The EIR should include descriptions of how runoff and water and sediment from dewatering activities will be collected, treated, and stored. Chapter 3, Section 3.4.15.5, "Local Water Supply, Drainage, and Utilities" mentions runoff and dewatering management, but does not contain sufficient detail to understand the actions and potential volume(s).
9.3.3.2 and Appendix 3B	The Draft EIR commits to sediment control measures for holding and storing water from dewatering until turbid materials settle. Ponding of runoff or dewatering water can produce methylmercury, and from review of USACE dredging pond storage practices in the Delta, there was a greater increase of methylmercury production after day 3 of water storage. The EIR should include confirmation that dewatered water and runoff will be managed to minimize methylmercury and mercury release. Specifically, water from dewatering and capture of runoff that is discharged to surface water in the Delta must not exceed methylmercury concentrations set by the Delta Methylmercury TMDL. Acceptable concentrations for discharges from settling ponds in the Delta must be less than or equal to 0.06 ng/L in the Delta Methylmercury TMDL Boundary and must be less than or equal to methylmercury concentrations in the receiving water, whichever is the lowest concentration (Sacramento-San Joaquin Delta Methylmercury

	TMDL Staff Report page 70; Basin Plan page 4-105). For releases back into waters outside of the Delta Methylmercury TMDL boundary, ensure levels are not above the California Toxics Rule for total mercury.
9.3.3.2 Construction Impacts on Water Quality	If a proposed project includes construction dewatering and it is necessary to discharge the de-watered groundwater to waters of the United States, the proposed project will require coverage under a National Pollutant Discharge Elimination System (NPDES) permit. Dewatering discharges are typically considered a low or limited threat to water quality and may be covered under the General Order for *Limited Threat Discharges to Surface Water* (Limited Threat General Order). A complete Notice of Intent (NOI) must be submitted to the Central Valley Water Board to obtain coverage under the Limited Threat General Order, approximately 90 days prior to initiating discharge. Additionally, all dischargers seeking authorization to discharge under the Limited Threat General Order shall sample and analyze a representative sample of the wastewater, for the constituents contained in the appropriate column in Table I-1 of the Limited Threat General Order and submit results with the NOI. For other types of projects, such as those that discharge wastewater that could affect the quality of surface waters of the State, other than into a community sewer system, the proposed project will require coverage under an individual NPDES permit. A complete Report of Waste Discharge must be submitted with the Central Valley Water Board to obtain a NPDES Permit, approximately 270 days (9 months) prior to initiating discharge. For more information regarding the NPDES Permit and application process, visit the Central Valley Water Board website.
9.3.3.2	Storm water discharges associated with industrial sites must comply with the regulations contained in the Industrial Storm Water General Permit Order No. 2014-0057-DWQ. For more information on the Industrial Storm Water General Permit, visit the Central Valley Water Board website.

9.3.3.2	Dischargers whose projects disturb one or more acres of soil or where projects disturb less than one acre but are part of a larger common plan of development that in total disturbs one or more acres, are required to obtain coverage under the General Permit for Storm Water Discharges Associated with Construction and Land Disturbance Activities (Construction General Permit), Construction General Permit Order No. 2009-0009-DWQ. Construction activity subject to this permit includes clearing, grading, grubbing, disturbances to the ground, such as stockpiling, or excavation, but does not include regular maintenance activities performed to restore the original line, grade, or capacity of the facility. The Construction General Permit requires the development and implementation of a Storm Water Pollution Prevention Plan (SWPPP). For more information on the Construction General Permit, visit the State Water Resources Control Board website.
9.3.3.2	On April 2, 2019, the State Water Board adopted the *Procedures for the Discharges of Dredged or Fill Material to Waters of the State* (Procedures). The Procedures became effective May 28, 2020. Applicants proposing to discharge dredged or fill material are required to comply with the Procedures unless an exclusion applies. In accordance with Executive Order W-59-93, the Procedures ensure that the State and Regional Water Boards' regulation of dredge or fill activities will be conducted in a manner "to ensure no overall net loss and long-term net gain in the quantity, quality, and permanence of wetlands acreage and values…" These Procedures also include procedures for the submission, review, and approval of applications for activities that could result in the discharge of dredged or fill material to any waters of the state. All requests for water quality certification must comply with the Procedures.
9.3.3.2	Projects that involve work within a waterway are generally required to obtain water quality certification from the Water Board. All requests for water quality certification must comply with the USEPA's Clean Water Act Section 401 Certification Rule to be considered a valid and complete request. Applicants must submit a pre-filing meeting request thirty days before submitting a 401 Certification application. Coverage under a

	401 Certification must be obtained prior to any work that would impact waters. When the application is submitted, Water Boards staff will have 30 days to review the application and deem it complete or incomplete. If complete, the 401 Certification must be issued on or before the U.S. Army Corps of Engineers (USACE) established Reasonable Period of Time.
9.3.3.2	If dredging activities are anticipated for any construction portion of the proposed Project, the following documentation must be submitted in order to obtain approval under Waste Discharge Requirements: • A completed State Water Board Form 200 requesting dredging operation coverage. • Determination of Project Risk Category and a full description of the dredging and placement operation, dredge and placement site(s), and beneficial reuse. • Pre-Dredge Sediment Evaluation Report including analytical results of sampling approved in the Pre-Dredge Sampling and Analysis Plan to compare analytical results to basin plan and NPDES screening levels. • A Dredge Operation Plan, including a description of best management practices (BMPs) to be implemented at dredge site(s), dredge material placement site(s), and reuse sites to prevent the generation and potential release of pollutants to waters of the state. • The applicable fee for authorization under this Order based on Dredging Discharges in California Code of Regulations, title 23, section 2200(a)(3)(B). • Copies of permits or applications for activities related to dredging from other applicable state and/or federal agencies. • A pre-dredge sediment analysis must be submitted with an application (notice of intent to dredge). When the application is submitted, Water Boards staff will have 30 days to review the application and deem it complete or incomplete. Dredging activity must also comply with the *Procedures for the Discharges of Dredged or Fill Material to Waters of the State***.** Please see previous comment.
9.3.3.2 Impact WQ 6 Mercury	Monitoring data collected from new wetland habitats and comparison locations will be valuable for design of projects beyond the compensatory mitigation. Sediment,

	aqueous, and fish tissue mercury and methylmercury sampling should be included in MMMP efforts and sampling results should be submitted to CEDEN.
9.3.3.2	The EIR should confirm whether Mitigation Measure WQ-6, Develop and Implement a Mercury Management and Monitoring Plan, covers all types of wetland habitat that will be created as part of compensatory mitigation. MM WQ-6 is described as applying to new tidal wetland habitat. However, the compensatory mitigation plan "includes the creation of freshwater emergent perennial wetlands, seasonal wetlands, and tidal habitats" (page 9-113 line 20-21). As indicated by references cited in the Draft EIR, tidal wetlands are generally a sink of methylmercury. Other types of wetlands, such as seasonal wetlands, are considered a source of methylmercury.
9.3.3.2	The Mercury Management and Monitoring Plan language should be revised to include Delta waterways with the following recommended language: "viii. Control sediment mobilization into the tidal habitat and Delta waterways if particulates or sediment is determined to be a key source of mercury (California Department of Water Resources et al. 2020:7-1).
9.3.3.2	We appreciate the commitment to develop and implement methylmercury management approaches consistent with the Sacramento-San Joaquin Delta Methylmercury TMDL. To continue to meet Sacramento-San Joaquin Delta Methylmercury TMDL expectations, the Central Valley Water Board should review the MM WQ-6 Mercury Management and Monitoring Plan, Site-Specific Mercury Management Plans, and Site-Specific Monitoring and Adaptive Management Plans prior to finalization.
9.3.3.2 Impact WQ 7 Nutrients	The evaluation of potential effects on nutrients for Impact WQ-7 relied on total phosphorus (TP) and total nitrogen concentration (TN) data compiled for river and other inputs to the Delta. For the Sacramento and San Joaquin River datasets, averages of TN and TP concentration calculated over the entire 1975-2000 date range were used. It is unclear why the datasets for the main river inputs stop at 2000, since TN and TP concentrations continue to be measured monthly at DWR's Environmental

	Monitoring Program discrete sites (Sacramento River at Hood and San Joaquin River at Vernalis). Also, by grouping a very large date range for the river inputs, changes in trends over time (Beck et al 2018 Estuarine, Coastal and Shelf Science 212:11-22; Novick et al 2015. SFEI Contribution No. 785) are masked. The authors should review the nutrients analysis to determine if including more recent data and/or differentiating time periods by changes in nutrient concentration trends is warranted.
9.3.3.2 Impact WQ 9 Dissolved Oxygen	The assessment of project impacts on dissolved oxygen appropriately included the key environmental factors that affect dissolved oxygen (water temperature, channel velocity, and oxygen-demanding substances). However, the assessment did not adequately cover southern Delta channels that have known dissolved oxygen impairments. The assessment should be expanded to include the temporary barriers project area (overlaps dissolved oxygen impaired waterways). Expansion could include adding temperature and channel velocity assessment locations within impaired waterways and further examining the impact of increased proportion of San Joaquin River source water. The San Joaquin River is a source of phytoplankton and oxygen-demanding detritus as well as nutrients.
9.3.3.2 Impact WQ 14 Cyanobacteria	The impacts on cyanobacteria blooms were determined by assessing anticipated changes in drivers of cyanobacterial harmful algal blooms (CHABs) due to project operations at nine Delta locations. The CHAB assessment locations are further identified in Appendix 9E, page 5. While the assessment of potential CHAB increases at these locations is valuable, the locations are concentrated on the western and north central regions of the Delta and the mainstem San Joaquin River. There is only one location in the southern central portion (Victoria Canal) and none in the southern region of the Delta. Southern central and southern waterways have a predominantly San Joaquin River source fingerprint and are more likely than northern channels to have changes in source water nutrients and water residence time due to north Delta intake operation. Additionally, the south

	Delta channels are affected by the temporary agricultural barriers, which reduce tidal velocities up to ~50% when barriers are in place (DWR, 2021 Effects of Temporary Barriers Project on Dissolved Oxygen, report to the Central Valley Water Board). Eastern and Central Delta channels that connect to the San Joaquin River are also missing from the CHAB analysis. Examples of waterways that have had cyanobacteria blooms include Disappointment Slough, 14-mile Slough, and Turner Cut. It is important to examine how changes in water residence time or increases in proportion of Mokelumne River and eastside tributary waters will affect HAB growth. The EIR should include complete CHAB assessments for southern Delta channels (e.g., Old and Middle Rivers near Fabian Tract and Union Island, Grant Line Canal and channels surrounding Jones and Empire Tracts). Additionally, the CHAB assessment should be expanded to include small and medium-size channels in the Central Delta. We expect that DSM2 can effectively model the CHAB drivers of concern for the assessments (water residence time, temperature, clarity, nutrients, and channel velocity) in these additional locations. Water Board staff are willing to assist with locating additional CHAB supporting data if helpful. Without assessing potential for increasing CHABs across the entire Delta, it is difficult to determine the impacts of proposed Project operations.
9.3.4	The cumulative impacts should be revised to include DWR's salinity control barriers.
9.3.4 Cumulative Analysis	The Draft EIR states that the cumulative effects analysis for water quality in the study area considers past, present, and reasonably foreseeable future projects and programs being completed in combination with the effects of any one of the Project alternatives or the No Project Alternative. Table 9-54 lists the programs, projects and policies evaluated but does not contain the 2018 update to the Bay-Delta Plan's San Joaquin River flow and southern Delta salinity components of the Bay-Delta Plan and their upcoming implementation or the expected Sacramento/Delta updates and implementation of the Bay-Delta Plan.

9.3.4	The reference in Table 9-54 to Regional San. is incorrect. The biological nitrogen removal component of Regional San's Echo Water project is complete. The entire project will be complete in 2023. The EIR should be corrected accordingly.
9.3.4	The Salt and Nitrate Control Programs and the Control Program for Salt and Boron Discharges into the Lower San Joaquin River are listed as considered as part of cumulative impact analyses in Table 9-54. These analyses are discussed in Sections 9.3.4.1 and 9.3.4.2. However, these programs are not included in the general table listing all of the cumulative impact assumptions considered as part of the analysis of the proposed Project (Table 3C-2, Appendix 3 – Section 3C.3.3 Cumulative Impact Assumptions). The EIR should clarify that these programs were considered as part of the cumulative analyses in Chapter 9, Water Quality by putting them in Table 3C-2. If these programs were not considered as part of the cumulative impacts analyses in Chapter 9, the cumulative impact analysis should be revised to include them.
9.3.4 and Appendix 3C	The following projects and programs should be added to the cumulative inputs analysis as existing or reasonably foreseeable: • Water Quality Control Plan for the Sacramento River and San Joaquin River Basin • Water Quality Control Plan for the San Francisco Bay Basin • The 2018 update to the Bay-Delta Plan, including the Comprehensive Operations Plan and Monitoring Special Study for Bay Delta Plan South Delta Salinity Objectives (COP-MSS) • Central Valley Salt and Nitrate Control Program • California Freshwater and Estuarine Harmful Algal Bloom Program • San Francisco Estuary Blueprint • Central Valley Water Board's Tribal Beneficial Use Designations Project
9.3.4.2	The analysis of cumulative impacts on cyanobacterial harmful algal blooms (CHABs) should be expanded.

	The cumulative impacts analysis consists of a comparison of impacts of project alternatives in the context of current and reasonably foreseeable projects plus climate change. The analysis concludes that the project alternatives would not substantially alter water temperatures, water residence time, or other drivers of CHAB growth relative to existing conditions. The expected outcome of climate change, however, is to worsen the severity and frequency of CHABS beyond existing CHAB conditions. CHABs are expected to expand in frequency and severity due to climate change (e.g., Paerl and Huisman, 2009. Environmental Microbiology Reports 1(1) 27-37), including in the Delta (Berg and Sutula, 2015. SCCWRP Technical Report 869). The EIR should evaluate the proposed Project's contribution to the cumulative impacts of climate change on CHABs in the Delta. Specifically, the cumulative impacts analysis should include the following: • Impacts of project alternatives examined in the context of expected future CHAB conditions. In areas of the Delta where beneficial uses would already be adversely affected by CHABs, even marginal exacerbation of CHABs due to proposed Project operations may be significant and should be avoided or mitigated. • Description of whether and how project operations may need to be adjusted or adaptively managed to assist with managing CHABs conditions made worse by climate change.
9.3.3 Impacts and Mitigation Approaches (throughout the section)	The Draft EIR indicates for most water quality parameters that project alternatives would not cause more frequent exceedances of the Bay-Delta Water Quality Control Plan for (constituents) because proposed Project facilities would be operated to meet objectives as implemented through D-1641. The EIR should explain how the Project would impact current inability to meet D-1641 requirements during extended dry

	conditions (e.g., 2014, 2015, 2021, 2022). Further, not all water quality constituents of concern have specific water quality objectives, which should be acknowledged and addressed in the EIR.
Appendix 9B	Although two of the assessment locations for source water fingerprinting are labeled as representing the Southern Delta region (Old River at Hwy 4 and Victoria Canal), the assessment is missing analysis in channels that are east and south of these locations. The EIR should add assessment locations for source water flow percentages that represent Old and Middle River sections around Fabian Tract and Union Island and nearby channels with limited flushing, taking into account that hydrology in these locations differs from that in Old River north of the pumps and Victoria Canal.
Appendix 9H	Total mercury, methylmercury, and fish tissue methylmercury impacts were assessed by using the DSM2 model. The EIR should describe the details of how mercury impacts were modeled.
Appendix 9H	Some of the tables reported 0.00 mercury concentration but did not provide total (summed) project alternative impacts. That data should be presented in such a way to make the cumulative projected impact clear.
Chapter 9/page 16	The discussion of mercury loading should be updated as follows for accuracy: "An analysis of total mercury loading to the Delta during water years 1984 to 2003 determined the Sacramento River is the primary tributary source of mercury to the Delta in dry years, but the proportion of mercury loading from the Yolo Bypass increases in wet years to the extent that it is comparable to that of the Sacramento River (Central Valley Regional Water Quality Control Board 2010a:134)."
Chapter 9/page 16	The discussion of the Cache Creek Settling Basin should be updated as follows for accuracy: "Cache Creek, and associated Cache Creek Settling Basin, is the major source of inorganic mercury loading to the Yolo Bypass, where mercury loading mostly occurs via transport of mercury-bound sediment (Central Valley Regional Water Quality Control Board 2010a:197)."

Chapter 9/page 16	One of the citations to the last sentence of the first full paragraph is inaccurate. The information on page 197 does not support this sentence. The Delta Methylmercury TMDL Staff Report just states: "SF Bay identified Central Valley outflows via the Delta as one of the principal sources of total mercury to SF Bay…" The citation of the TMDL Staff Report should be removed and the following language added: "Mercury loading from the Delta primarily drives mercury concentrations in northern San Francisco Bay, Suisun Bay, and Suisun Marsh (San Francisco Bay Regional Water Quality Control Board 2018:49)."
Chapter 9/page 16	The discussion of methylmercury flux should be updated as follows for accuracy: "The flux of methylmercury from Delta open water and wetland sediments is estimated to contribute 36% of the waterborne methylmercury load in the Delta annually, based on an analysis of data from water years 2000 to 2003 (Central Valley Regional Water Quality Control Board 2010a:88)."
Chapter 9/page 16	The discussion of methylmercury contributions should be updated as follows for accuracy: "Based on data from water years 2000 to 2003, tributary inflow sources contribute an estimated 58% of the methylmercury load in the Delta annually, and wastewater, agricultural lands, atmospheric deposition, and urban runoff contribute approximately 6% of the methylmercury load (Central Valley Regional Water Quality Control Board 2010a:80)."
Chapter 9/page 16	All references to the methylmercury TMDL should be changed to "Sacramento–San Joaquin Delta Methylmercury TMDL."
Chapter 9/page 16	The discussion of the mercury TMDL should be updated as follows for accuracy: "The TMDL and associated Basin Plan Amendment establishes methylmercury fish tissue objectives; load allocations for agricultural drainage, atmospheric wet deposition, open water, tributary inputs, wetlands, and nonpoint source dischargers; and waste load allocations to point source dischargers in the Delta."
Chapter 9/page 113	The Draft EIR labels impacts of compensatory mitigation acreage on methylmercury production as potentially significant without mitigation; reduced to less than significant with implementation of a monitoring plan. Because the Delta is impaired due to

	mercury, there is no assimilative capacity and even a slight increase is unacceptable. The EIR should include detailed text about assimilative capacity in Delta subareas and state that project aqueous methylmercury monitoring thresholds should be set to 0.06 ng/L, but ideally should be less than 0.06 ng/L.
Chapter 9/page 115	The EIR identifies mercury water quality impacts due to compensatory mitigation from creating tidal habitats (i.e., tidal wetlands). In the Delta Mercury Control Program review, tidal wetlands are estimated to be a sink of methylmercury but other wetlands (seasonal) are a source. Creation of other wetland habitat types for compensatory mitigation should also be included in Mitigation Measure WQ-6 to address the potential mercury impact from the other wetland habitats.
Chapter 9/page 115	The Central Valley Regional Water Quality Control Board should review the Mercury Management and Monitoring Plan, Site-Specific Mercury Management Plans, and Site-Specific Monitoring and Adaptive Management Plans prior to finalization.
Chapter 9/page 118	The discussion of sediment mobilization should be updated to include Delta waterways as follows: "viii. Control sediment mobilization into the tidal habitat and Delta waterways if particulates or sediment is determined to be a key source of mercury (California Department of Water Resources et al. 2020:7-1).
9.1.4	The typographical error in table 9-3 should be corrected: "XDSe]"
9.3.3.2	The typographical error should be corrected: "over excavation" instead of "overexcitation"
9.3.3.2	A comparison of the on-site treatment and storage capacities versus the volume of water from dewatering (e.g., Delta Conveyance Design Construction Authority technical memo 056 CE-H), decant water from reusable tunnel material (RTM), and stormwater runoff should be provided to support the EIR conclusion that construction of project alternatives would not increase peak flow rates (discussed in section 3.4.15.5) and result in discharges that substantially degrade water quality or adversely affect any beneficial uses.

Chapter 12 - Fish and Aquatic Resources

Section/page/line/general	Comments
12.3.1.3	The Draft EIR assesses operational effects with both qualitative and quantitative methods. The Draft EIR uses a 5% difference as a threshold for significant impacts from the proposed Project. However, the EIR does not provide how the information derived from the qualitative and quantitative methods was combined and weighted to produce the final determination of "significant" or "less than significant" impacts. This should be explained.
12.3.3.2/Impact AQUA-1 Page 12-56	This section mentions that turbidity during in-water construction activities could exceed 25-75 nephelometric turbidity units (NTU). Both the Central Valley and San Francisco Bay Regional Water Board Basin Plans have turbidity water quality objectives based on background turbidity levels. This analysis should include a discussion of existing background turbidity levels at the construction sites to determine whether an increase to 25-75 NTU would potentially violate the Basin Plan (and therefore constitute a significant impact).
12.3.3.2; Impact AQUA-2, 3, 4, and 5 (Salmonids)	The Draft EIR identifies various factors for the near-field effects (entrainment, impingement, and predation) at the north Delta intakes that would affect migrating juvenile salmonids in Impact-AQUA 2 (pages 12-74 through 12-92). However, it does not provide any quantitative estimates of the near-field impacts on salmonid populations or explain how much of the near-field effects were integrated in the overall impact assessment. The Draft EIR concludes that the near-field effects on fish would be minimal or limited based on a qualitative assessment using data collected from different locations and/or different rivers. It would be reasonable for the EIR to incorporate a range of population-level impacts (e.g., 5% or 10% additional mortality) to account for the potential near-field effects on salmonids and other fish species migrating through or inhabiting areas near the north Delta intakes.

12.3.3.2/page 12-77	The Draft EIR identifies that juvenile salmonids primarily migrate in the thalweg or on the outside of bends, which would keep them away from the intakes and screens. However, the EIR acknowledges that sometimes juvenile salmon occupy the inside of bends when they are holding. The Project should include specific provisions for continual monitoring, evaluation, and adaptive management to ensure that entrainment, impingement, and other impacts do not occur from Project diversions.
12.3.3.2/ page 12-79/ Table 12-17	This table should be updated to provide clarity. The table shows 5.9% to 37.1 % of Sacramento River at Freeport flows being diverted at Intake C, but it is not clear what flow is being referred to. Further, Model Runs 5B, 5C, and 5D show that up to 29%, 36%, and 60% of river flows (mean daily flow of 18,000 cfs), respectively, would be diverted depending on the tidal conditions within a single day. The EIR should describe whether such conditions represent realistic operational outcomes; if it does, the impacts of operations under such highly varying hydrologic conditions and a mitigation strategy should be described in the EIR.
12.3.3.2/ pages 12-108 to 12-109/ Table 12-33	Significant negative impacts to riparian and wetland bench habitats are expected under the proposed project (Alternative 5) during winter- and spring-time in all year types on the Sacramento River below the north Delta intakes, including on Sutter and Steamboat Sloughs. This habitat type is important for native resident and migratory fish species to provide food and cover. This occurs during a critical time when populations are naturally stressed and need prime habitat and can significantly impact populations. The EIR should further evaluate these potential impacts.
12.3.3.2/ Tables 12-38, 12-39, 12-43	The IOS model shows (Table 12-38) a 9 to 11% reduction (Alternative 5) in the escapement of winter-run Chinook salmon. The OBAN model (Table 12-43) suggests winter-run Chinook salmon escapement could be reduced by up to 36% (Alternative 5 with 10% loss at the north Delta Intakes). Table 12-39 shows that the through-Delta survival of juvenile winter-run Chinook salmon would be significantly reduced during low water years (below normal, dry, and critically dry) when temperature management is challenging on the upper Sacramento and Egg To Fry survival is typically low (See 2021 JPE Letter from NMFS). Given the current status of winter-run

	Chinook salmon, the EIR should further analyze the project impacts during this sensitive life stage and provide mitigation for impacts.
12.3.3.2/ page 12-179 Line 32	The effects analysis of sediment entrainment resulting from proposed Project operation identifies a 4 to 7% expected reduction in sediment reaching the Delta. The conclusion is made that this is a less than significant impact and that modeled future increases in sediment load would be enough to offset these losses. The proposed Project should include mitigation measures to address losses of sediment if the expected increases do not occur or should identify that this could be a significant impact.
12.3.3.2/ page 12-208/ Table 12-157	Significant net decreases in White Sturgeon Year-Class strength are presented under all alternatives. The less than significant impact conclusion should be explained given this appears to represent a significant impact.
12.3.3.2/ page 12-220/ Lines 7-9	The analysis of starry-flounder states that the impacts are close to the threshold of significance (5%) and that there is uncertainty in such statistical relationships when assessing relatively small, operations-related differences. The Bay Otter Trawl Abundance Indices for starry flounder (Table 12-173) would be reduced by 5% and 6% in below normal and above normal water years, respectively, under the proposed Project (Alternative 5). However, the Draft EIR concludes the project impacts would be less than significant citing uncertainty and geographic distribution of the fish. This impact conclusion should be further supported.
Impact AQUA-2/Appendix 12B	The Draft EIR used the Winter-run Chinook Salmon Life Cycle Model and provided data in Chapter 12, but the description of the model is not provided in Appendix 12B. The EIR should be updated accordingly.

Chapter 16 - Recreation

Section/page/line/general	Comments

General	The analysis of recreation impacts of the proposed Project in the Draft EIR was limited to determining whether the impact of construction would cause deterioration of existing regional parks and recreational facilities by increasing their use, and whether the Project would require building new recreational facilities in ways that could harm the environment. There is minimal analysis of whether recreation will be obstructed in other ways, which should be included.
General	Chapter 16 of the Draft EIR does not discuss the potential recreation impacts (e.g., boating) occurring at the intake construction sites. The Final EIR should note the estimated surface area of water at the intake facilities that will be inaccessible to recreational boaters during construction, operation, and maintenance. Any potential changes to or hinderance of boat passage at the intakes should be identified.

Chapter 17 - Socioeconomics

Section/page/line/general	Comments
17.3.3.5	The Draft EIR notes that impacts on local tourism and recreation revenue are likely to be minimal, but also that construction near established recreational facilities will occur for up to 24 hours per day for a period of several years, disrupting recreation with undesirable visuals, loud noises, increased congestion, and restricted boating. Impacts on recreation-oriented activities should be assessed to determine if construction will disrupt these activities in ways other than making them inaccessible.
17.3.4	Recently passed AB 2011 is expected to decrease barriers to building multi-family housing and increase housing supply, particularly in regions undergoing economic transitions with underutilized commercial areas. This information should be included in Table 17-28 and the analysis in the EIR.

Chapter 18 - Aesthetics and Visual Resources

Section/page/line/general	Comments

General	Aesthetic impacts of the project are primarily considered from terrestrial perspectives. The EIR should evaluate potential scenic impacts on or in the river or explain why the project is unlikely to affect riverine views.

Chapter 19 - Cultural Resources

Section/page/line/general	Comments
General	While impacts on fish populations are analyzed in Chapter 12, the potential impacts on the ability of these fish populations to support cultural practices is not discussed. The EIR should analyze these potential impacts or explain why they will not exist.

Chapter 32 - Tribal Cultural Resources

Section/page/line/general	Comments
Chapter 32/page 32-45	The Draft EIR states: "Project impacts would remain significant and unavoidable for all project alternatives after implementation of Mitigation Measures TCR-1, TCR-2, and TCR-3, and TCR-4 because complete avoidance or protection is unlikely and operations and maintenance of the intakes and tunnels may still materially impair the Tribal experience of the spiritual qualities of the Delta Tribal Cultural Landscape (TCL) even with the efforts to repair or restore the Tribal experience." Ongoing consultation with tribes should occur during all planning and implementation stages to minimize overall and seasonal impacts on tribal Lifeways, such as in-water ceremonies and subsistence fishing activities.
Chapter 32/page 3	The analysis of potential impacts in the Draft EIR shows that less emphasis has been placed on assessing second-order consequences of the proposed Project which are more difficult to quantify, such as changes to the ability of indigenous and low-income Delta residents to use small-scale fishing to supplement their diet.

	Tribes and Delta communities rely on subsistence fishing throughout the year and require adequate fisheries and access to fishing locations. Construction and project operations should consider and limit, to the fullest extent possible, adverse effects on subsistence and Tribal subsistence fishing activities. Limiting impacts could include engaging in Tribal consultations early in planning processes, providing information about in-water construction and maintenance work in ways that reach subsistence anglers, and monitoring the effects of the project on fish species commonly caught for human consumption. For the latter two examples, the Environmental Commitments to provide notification of construction and maintenance activities (EC-16) and for construction best management practices for biological resources (EC-14) could be expanded to address communication and fisheries relied upon by subsistence anglers and Tribes.

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December 16, 2022

Marcus Yee
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DRAFT ENVIRONMENTAL IMPACT REPORT (DEIR) FOR THE DELTA CONVEYANCE PROJECT SCH# 2020010227

Dear Mr. Marcus Yee:

The California Department of Fish and Wildlife (CDFW) received and reviewed the Notice of Availability of a Public Draft EIR (DEIR) from the Department of Water Resources (DWR) for the Delta Conveyance Project (DCP) pursuant the California Environmental Quality Act (CEQA) statute and guidelines.[1]

Thank you for the opportunity to provide comments and recommendations regarding those activities involved in the DCP that may affect California fish and wildlife. Likewise, we appreciate the opportunity to provide comments regarding those aspects of the DCP for which CDFW, by law, may need to exercise its own regulatory authority under the Fish and Game Code. CDFW appreciates that with most large projects there may be a continuing effort to analyze impacts and revise the various project alternatives. CDFW remains available for coordination for those purposes.

CDFW ROLE

CDFW is California's **Trustee Agency** for fish and wildlife resources and holds those resources in trust by statute for all the people of the State. (Fish & G. Code, §§ 711.7, subd. (a) & 1802; Pub. Resources Code, § 21070; CEQA Guidelines § 15386, subd. (a).) CDFW, in its trustee capacity, has jurisdiction over the conservation, protection, and management of fish, wildlife, native plants, and habitat necessary for biologically sustainable populations of those species. (Id., § 1802.) Similarly for purposes of CEQA, CDFW is charged by law to provide, as available, biological expertise during public

[1] CEQA is codified in the California Public Resources Code in section 21000 et seq. The "CEQA Guidelines" are found in Title 14 of the California Code of Regulations, commencing with section 15000.

agency environmental review efforts, focusing specifically on Projects and related activities that have the potential to adversely affect fish and wildlife resources.

CDFW is also submitting comments as a **Responsible Agency** under CEQA. (Pub. Resources Code, § 21069; CEQA Guidelines, § 15381.) CDFW expects that it may need to exercise regulatory authority as provided by the Fish and Game Code. The Project may be subject to CDFW's lake and streambed alteration regulatory authority (Fish & G. Code, § 1600 et seq.) or the Native Plant Protection Act (Fish & G. Code, § 1900 et seq.). Likewise, to the extent implementation of the Project as proposed may result in "take" as defined by State law of any species protected under the California Endangered Species Act (CESA) (Fish & G. Code, § 2050 et seq.), related authorization as provided by the Fish and Game Code will be required. CDFW also administers the Natural Community Conservation Program and other provisions of the Fish and Game Code that afford protection to California's fish and wildlife resources.

PROJECT DESCRIPTION SUMMARY

Proponent: Department of Water Resources

Project Overview:
The DCP involves the construction, operation, and maintenance of new State Water Project (SWP) water conveyance facilities located in the Sacramento-San Joaquin Delta (Delta) that would be operated to meet the following objectives: 1) respond to sea level rise and other reasonably foreseeable consequences of climate change; 2) minimize water delivery disruption due to Delta seismic risk; 3) improve water supply reliability; and 4) provide operational flexibility to the SWP.

The preferred Alternative 5 Bethany Reservoir Alignment (Proposed Project) comprises two new intake facilities located in the north Delta, along the Sacramento River, designed with a conveyance capacity of up to 6,000 cfs. Diverted water would move through a single tunnel on an eastern alignment through Lower Roberts Island, terminating at the Bethany Complex, located in the south Delta near Mountain House (Figure 1). The proposed Bethany Complex is located south of Clifton Court Forebay and would include a Bethany Reservoir Pumping Plant, surge basin, aqueduct, and tunnel that conveys flows to a new Bethany Reservoir Discharge Structure on the shore of the existing Bethany Reservoir. Intake components would include cylindrical tee fish screens, intake structures, sedimentation basins, sediment drying lagoons, flow control structures, tunnel inlet, and other inlet structures.

The DEIR includes analysis of two additional DCP alignments, central and eastern. Under these alternatives to the Proposed Project, the single tunnel would convey water

from the new north Delta intakes through either the central or eastern alignments to existing SWP conveyance facilities and potentially to existing Central Valley Project (CVP) facilities through a new pumping plant and Southern Forebay on Byron Tract and other appurtenant facilities in the south Delta (Southern Complex), adjacent to the Clifton Court Forebay.

The Proposed Project or alternatives would operate the new conveyance facilities in conjunction with existing SWP south Delta export facilities at Clifton Court Forebay, creating a dual conveyance system. Water could be diverted from the new diversion facilities in the north Delta, the existing SWP south Delta export facilities, or both.

Location:
The Proposed Project area for the purposes of CEQA comprises areas in the SWP and CVP system upstream of the Delta, the Sacramento-San Joaquin Delta (i.e., the statutory Delta), and Suisun Marsh. The Proposed Project's area includes temporary and permanent construction areas and compensatory mitigation areas as well as areas outside the Proposed Project footprint (Figure 1) affected by the Proposed Project operations including waterbodies.

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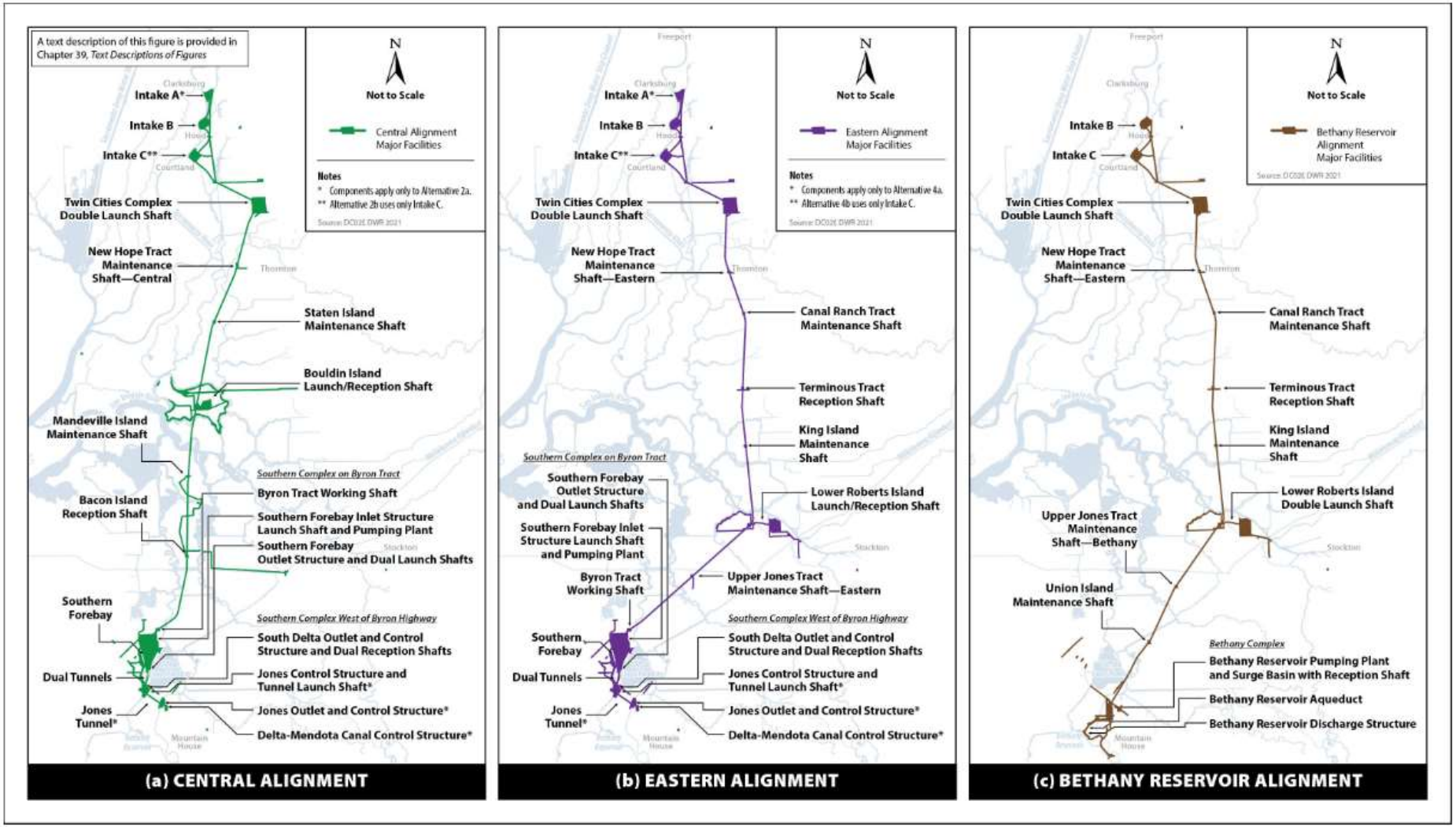

Figure 1. Proposed Project (Alternative 5 Bethany Reservoir Alignment) and Alternative Alignments and facilities. Figure from the Executive Summary of the DEIR p. ES-23.

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COMMENTS AND RECOMMENDATIONS

CDFW offers the following comments and recommendations to assist DWR, as lead agency, in adequately identifying and, where appropriate, mitigating the DCP's significant, or potentially significant, direct, and indirect impacts on fish and wildlife (biological) resources and identifying alternatives that would avoid or minimize adverse impacts.

IMPACTS TO COVERED SPECIES

The DEIR concludes that the Proposed Project with mitigation would result less-than-significant impacts to all species. Of particular interest to CDFW are the following aquatic species findings: winter-run Chinook salmon, spring-run Chinook salmon, Delta smelt, and longfin smelt. In some cases, additional analyses are necessary to fully consider potential Project impacts to these species; in other cases, analyses were conducted and demonstrate impacts that were determined less-than-significant within the DEIR but remain of concern to CDFW.

Proposed Project impacts that the DEIR appears to describe include:

- Substantially reducing Delta outflow, particularly in critical water years when aquatic resources are already limited and species survival is low,
- Reducing the frequency and duration of important pulse flows through the Delta, and
- Reducing the quality of aquatic habitat in the Delta that is critical to juvenile salmonid rearing and through-Delta survival and Delta smelt and longfin smelt recruitment and survival.

Details regarding CDFW's comments and concerns about these impacts are provided below along with CDFW's recommendations intended to help inform future DCP analysis, permits, and environmental documentation. Additionally, where appropriate, we include suggestions for improved mitigation strategies aimed at avoiding, minimizing and or compensating for impacts to fish and wildlife resources. CDFW offers these comments with the intention of ensuring that the EIR includes enough detail to enable those who did not participate in its preparation to understand, and to consider meaningfully, the issues raised by the Proposed Project and ensure its adequacy as an informational document.

Project Description and Alternatives

Need for Additional Operational Alternatives

The DEIR does not consider any alternatives with different project operational criteria, nor does it include an alternative that balances existing SWP diversions between south and north Delta export facilities to resemble the natural flow pattern into and through the

Delta. Although the DEIR evaluates different overall capacities (e.g., varying tunnel capacities for the Eastern and Central Alignment alternatives), this does not provide a range of operational rules within such capacities that could be designed to minimize impacts more effectively to species. CDFW notes that the Delta Plan includes recommendation WR R12b, that improved conveyance facilities consider a reasonable range of flow criteria and other operational criteria to satisfy requirements of State and federal fish and wildlife agencies to protect, restore, and enhance the Delta ecosystem (Delta Stewardship Council 2013).

Although the physical alternatives presented in the DEIR provide alternatives to potentially avoid or minimize terrestrial species impacts, DCP operations are expected to have the most substantial impacts on aquatic species. A range of operational scenarios is needed to compare impacts, develop meaningful mitigation, including actions to avoid or minimize impacts and reduce the need for compensatory mitigation, fully evaluate system-wide implications of alternative operational approaches, and ensure EIR durability should conditions change.

CDFW recommends including additional CEQA alternatives in the EIR that depict and evaluate different operational scenarios. Specifically, CDFW recommends the EIR include analysis and evaluation of additional operational alternatives that 1) apply pulse protections at the North Delta Diversions (NDD) based on real-time CESA- and ESA-listed fish monitoring of juvenile presence and movement, 2) include a decision tree for shifting SWP operations from Banks Pumping Plant to the NDD, 3) include a clear commitment to minimizing effects on spring outflow as a result of diversions included in the Proposed Project, and 4) operate to protect spring pulse flows as well as maintain compliance with D-1641 water quality objectives (i.e., without reliance on Temporary Urgency Change Petitions and by maintaining compliance to standards above those projected for the Proposed Project in Tables 4B-5 through 4B-6 of the DEIR).

CDFW also recommends analysis of an alternative using the above operational criteria, but with a physical alignment through Banks Pumping Plant as opposed to through the Bethany Reservoir, ensuring long-term consistency in minimum real-time diversion rates and improving our ability to understand the range of potential diversion rates from the facility when constructed. Finally, CDFW requests that the EIR include additional alternatives whereby the Proposed Project utilizes 1) north Delta preferential pumping and 2) south Delta preferentially pumping to help elucidate impacts to fish and wildlife species dependent on the Project's pumping preference.

No Project Alternative and Cumulative Impact Analysis

The DEIR Appendix 3C describes the programs, projects, and policies considered for Existing Conditions, No Project Alternative, and Cumulative Impact Analysis. Section 3C.2.2 states the "*No Project Alternative allows for DWR and other decision makers to*

use the DEIR to compare the impacts of approving the Delta Conveyance Project with the future conditions of not approving the Project in year 2040" (p.3C-3). It goes on to provide criteria for inclusion in the No Project Alternative such as those programs, projects, and policies included in the Existing Conditions as well as projects that would occur *in lieu* of the Proposed Project with clearly defined management and/or operational plans, including facilities under construction as of January 15, 2020; facilities and programs that received approvals and permits in 2020; or that have completed environmental review, received approvals and permits, or foreseeably will be approved and permitted by 2040 (p. 3C-3 through 3C-8). Yet, Table 3C-2 identifies multiple foreseeable projects which meet the above criteria but were excluded for consideration in the No Project Alternative. Some of these projects include: the Del Puerto Canyon Reservoir, Los Vaqueros Reservoir Expansion Project, Sites Reservoir Project, and the Bay-Delta Water Quality Control Plan Update to the 2006 Bay-Delta Water Quality Control Plan.

The Proposed Project will not be operational until many years in the future, when circumstances under which the Proposed Project operates will likely have changed. The No Project Alternative serves as an unusually important informational tool in understanding the breadth of potential impacts to species and their habitats resulting from operations proposed. Therefore, CDFW recommends all foreseeable projects be included in the No Project Alternative as these projects have been shown to meet the DEIR criteria for inclusion and will likely be constructed and operational by 2040, when the Proposed Project is assumed to be operational if it is approved.

Similarly, CEQA Guidelines, § 15130 requires consideration of the Proposed Project's cumulative impacts together with other projects causing related impacts. When utilizing a list of such related projects, the nature of environmental resources under evaluation, the location of a project, and its type, may be of importance, including where impacts are specialized.

The DEIR does not include the potential for cumulative impacts that could arise should reasonably foreseeable projects, such as Sites Reservoir Project or the Los Vaqueros Expansion Project, be built and operated ahead of the Proposed Project. Although listed in Table 3C-2 as included within the cumulative analysis, CDFW was able to locate only relatively general qualitative discussion, and no modeling or specific analysis that evaluated the potential cumulative impacts from the interactions of these projects and the Proposed Project.

To illustrate the interconnectedness of these related projects with the Proposed Project, CDFW provides three examples. First, without a comprehensive Cumulative Impact Analysis, the amount of water available for export at the NDD is unknown and impacts to species and Delta outflow because of Project operations cannot be assessed.

Second, operation of these new and/or expanded foreseeable large-scale water projects is likely to affect the pulse protections as described in the DEIR. Because the Proposed Project ties salmonid-related pulse protections to large flow events, it is probable that operation of Sites Reservoir Project would reduce those flow events, lessening the likelihood the Proposed Project will trigger pulse protections. Third, these projects cumulatively not only cause the most significant changes to surface water during the driest years when impacts to fish and wildlife, system-wide and from the Proposed Project, are likely to be the most severe, but would also diminish flows in wetter years, potentially shifting them drier in terms of flow, and likely decrease the frequency, duration, and/or magnitude of high flow benefits such as floodplain inundation and habitat rejuvenation.

Given the interconnected and complex dynamics of the Sacramento-San Joaquin Delta, it is critical to fully understand how such large projects would cumulatively affect the watershed and aquatic species. Therefore, CDFW recommends a more extensive and quantitative cumulative analysis analyzing and describing such interactions be conducted and included in the EIR.

Baseline Assumption of 2020 SWP ITP/ 2019 NMFS and USFWS BiOps

The DEIR uses the 2019 NMFS and USFWS Biological Opinions (BiOps) on the long-term operations of the CVP and SWP as well as the 2020 SWP Incidental Take Permit (ITP) for the long-term operation of the SWP in the Delta to establish the Existing Conditions and No Project Alternative scenarios, stating that reinitiation of consultation is underway but the issuance of new BiOps and SWP ITP is not anticipated for several years. It is foreseeable that the ongoing re-consultation process will require substantial changes to both CVP and SWP operations, currently not reflected in the 2019 BiOps and 2020 SWP ITP. Thus, the No Project Alternative as presented in the DEIR is likely not an accurate depiction of future conditions (2040) absent the Proposed Project. The Existing Conditions scenario is also not an accurate depiction of current conditions given ongoing litigation resulting in a court-ordered Interim Operations Plan for water year 2022, and ongoing proceedings related to operations in future years and until reinitiation is complete. This uncertainty in current conditions potentially hinders readers' understanding of potential Project impacts that may arise from changes to surface water operations and aquatic species conditions, when compared to the reasonably foreseeable future conditions without the Proposed Project. In addition, because multiple responsible agencies must rely on the EIR for discretionary decision making, modifications to CVP and SWP operations that occur during the Project approval process could complicate the CEQA processes for these responsible agencies.

CDFW recommends acknowledging the additional uncertainty regarding Existing Conditions and the No Project Alternative, given reasonably foreseeable changes to future operations of the CVP and SWP that are likely to arise out of the re-consultation

process, and propose a more comprehensive and cautious mitigation strategy reflective of the uncertainty, and responsive to the greatest potential impacts identified from operations of the Proposed Project to CESA- and ESA-listed species, to ensure those impacts are brought down to less than significant.

Operations

Spring Outflow Protections

The proposed spring outflow protections identified in Chapter 3 Table 3-14 of the DEIR do not include protections for outflow from the Sacramento River. The DEIR currently relies on the 2020 SWP ITP Condition of Approval 8.17 Export Curtailments for Spring Outflow to provide outflow protections to aquatic species. However, while spring outflow requirement is an existing regulatory requirement for the SWP (as noted on p. 3-151), the 2020 SWP ITP Condition of Approval 8.17 does not include NDD in the export term nor does the DEIR clearly commit to including the NDD into the export term of Condition of Approval 8.17. Furthermore, CDFW developed Condition of Approval 8.17 as a minimization measure for ongoing operations of existing SWP infrastructure in the south Delta, based on a relationship to the San Joaquin River inflow measured at Vernalis. That relationship serves as an operational mechanism to reduce Delta outflow-related impacts to aquatic species, caused by south Delta exports of the SWP. Given the location on the Sacramento River, and unique operations of the proposed NDD coupled with increased total annual SWP exports under the Proposed Project, CDFW requests the EIR commit to maintaining spring outflow based on the combined flow from both the Sacramento and San Joaquin rivers through the Delta.

OMR Flexibility During Delta Excess Conditions

Chapter 3, Table 3-14 includes proposed new criteria for the NDD operations, as well as existing south Delta criteria, such as OMR Flexibility as permitted under the 2020 SWP ITP (Condition of Approval 8.7 OMR Flexibility During Delta Excess Conditions) and the 2019 USFWS and NMFS BiOps. Under the Proposed Project, the NDD are designed to export water in winter and spring months during excess conditions as defined by DWR and the U.S. Bureau of Reclamation (Reclamation). The DEIR does not adequately explain how OMR Flexibility, as permitted in the south Delta, interacts with NDD under excess conditions. As written in the DEIR, it is possible that DWR may operate under OMR Flexibility in the south Delta at the same time pulse protections are implemented in the north Delta; thereby negating the benefits of a pulse protection period by maintaining south Delta exports at high levels that can increase juvenile and adult anadromous fish entrainment into the south Delta. CDFW requests that the EIR include additional descriptions of how south Delta OMR Flexibility will operate in conjunction with NDD pulse protections including assurances to coordinate operations when fish

protections are being implemented at the NDD to minimize impacts to migrating anadromous fish in the Delta.

SWP and CVP Export Capacity and Deliveries

The Proposed Project, in conjunction with SWP south Delta exports, includes a physical export capacity of up to 10,300 cfs per DWR's water right, without the physical limitations of the Banks Pumping Plant or the U.S. Army Corps of Engineers' limitations on Clifton Court Forebay diversions from Old River and West Canal. As presented in Chapter 6, Table 6-0, the Proposed Project, on average annually, will divert 543 TAF more than what is diverted under Existing Conditions and 4 TAF more than Alternatives 1 and 3. And of greater concern to species potentially stressed by decreased flows and limited habitat connectivity, is that in dry and critical years the Proposed Project will divert an average of 316 TAF more than Existing Conditions. Table 6-0 also shows an increase in CVP total deliveries under the Proposed Project resulting from an average increase of 46 TAF in CVP exports and increased wheeling. Increased exports reduce Delta outflow which in turn impacts CESA- and ESA-listed species with known abundance and/or survival outflow relationships, and impacts ecosystem function. Additionally, proposed wheeling operations between SWP and CVP under the dual operation scenarios are not clearly described in the DEIR, making it difficult to understand the potential impacts of these operations to flow, or subsequent consequences, if any, to species and their habitat. CDFW recommends the EIR include an analysis of the potential wheeling operations including the total exports and associated OMR flows and Delta outflow for the Proposed Project and each alternative.

Preferential Pumping

The DEIR does not include detail describing operations of the proposed NDD and how they will operate in conjunction with south Delta facilities. The somewhat vague description of proposed operations coupled with the generalized descriptions or exclusion of associated modeling in the DEIR allow for a wide range of Project operations, with varying consequences for fish and wildlife resources. This uncertainty hinders CDFW's ability to effectively understand the Project description and analyze potential Project impacts.

For example, 1) there is little detail as to how the SWP minimum health and safety diversion rate would be implemented. It is not clear whether proposed NDD maintenance minimum exports would be included as a part of the total SWP health and safety minimum exports in the south Delta or would be in addition to those. 2) The DEIR does not describe how water transfers may utilize the NDD. Because the Proposed Project is characterized as not integrated with the south Delta SWP facilities, CDFW assumes a) that the SWP will continue to export its identified proportional share of minimum health and safety exports identified in DWR's existing long-term operations for

the SWP (600 cfs, with 1500 cfs total between SWP and CVP), and b) that maintenance minimums for the NDD would be in addition to the south Delta minimums. This would result in SWP export minimums in excess of 600 cfs. CDFW recommends additional detail be added to the EIR clarifying the Proposed Project's operations so that potential impacts can be fully evaluated. Specifically, the EIR should describe what minimum health and safety diversion rates would be implemented by the Proposed Project, how water transfers may be utilized, and what SWP export minimums the Proposed Project anticipates considering both NDD and south Delta diversions.

Simulated Project operations in the DEIR do not depict the maximum amount of water that can be diverted through the NDD under the operational rules identified for the Proposed Project. A sensitivity analysis in Appendix 4B prioritizes SWP exports from the NDD from December through June, but modeling in June through November limits NDD exports below the allowable limits. Without modeling the maximum diversion possible from the NDD under the proposed operational criteria in all months and water year types, the potential impacts of the Proposed Project cannot be fully understood. CDFW recommends that maximum NDD exports under the operational criteria should be modeled and evaluated in the EIR. Additional information describing how the proposed NDD will operate in conjunction with the existing south Delta export facilities should be provided by water year type and month so that the description of operations can be compared with the life history stages of CESA- and ESA-listed fish species and consider potential impacts.

NDD Pulse Protection and Bypass Criteria

Flow-based Triggers for Salmonid Pulse Protections

The Proposed Project's Wilkins Slough flow criteria to initiate and offramp fish-pulse protections, rather than real-time fish presence monitoring, are not compatible with other proposed large scale diversion projects in the Sacramento-San Joaquin Delta ecosystem (2020 SWP ITP, 2019 NMFS and USFWS BiOps). The DEIR relies heavily on the findings of del Rosario et al. (2013) that showed a strong correlation between flow at Wilkins Slough (between 300-500 $m^3 s^{-1}$) and the first pulse of winter-run Chinook salmon presence at the Knights Landing rotary screw trap (5% of cumulative catch) based on water years 1999 through 2007. However, this relationship has not been substantiated in the recent historical record under water operations management defined in the 2008 USFWS BiOp and 2009 NMFS BiOp or under the current management strategies of the 2019 USFWS and NMFS BiOps and 2020 SWP ITP. Based on preliminary analyses presented to CDFW by DWR, CDFW is concerned that the proposed pulse protections triggered by flow, rather than fish presence, do not align with peak fish migration movements through the Sacramento River.

CDFW requests the EIR rely on fish presence in upstream monitoring stations along the Sacramento River to initiate and offramp pulse protections. Because new, large diversions upstream of Wilkins Slough would affect implementation of flow-based criteria, CDFW also recommends that the EIR include a comprehensive quantitative analysis of cumulative impacts including the Sites Reservoir Project as well as commitment to a coordinated approach with the Sites Reservoir Project operations to ensure that the biological rationale for each project's pulse protection is realized.

Frequency and Transition Criteria

The proposed pulse protection approach only allows for a second pulse protection if an initial pulse protection occurs prior to December 1st. If an early season (prior to December 1st) pulse does not trigger, only one pulse protection period would be provided by the Proposed Project prior to June 30th. Limiting pulse protections to a maximum of two periods disproportionately favors early migrating juvenile anadromous fish, does not effectively protect the diversity of migration strategies for juvenile winter-run Chinook salmon, and often does not provide protections for juvenile spring-run Chinook salmon later in the season.

By conditioning a second (i.e., later) pulse protection on the successful implementation of an early season event, the Proposed Project effectively reduces protections offered to Chinook salmon as their migratory season progresses. Specifically, bypass flow protections transition from level 1 (more stringent) to level 3 (less stringent) throughout the season with pulse protection events designed to reset bypass criteria (i.e., move from less stringent bypass criteria back to more stringent). Because pulse protections are reliant on flows upstream of the NDD, it is unclear how frequent and at what times of year pulse protections are likely to occur. By linking bypass criteria to pulse protections, it is likely that bypass flows later in the year will be reduced, compounding the potential Project impacts on spring-run Chinook salmon and other late migrating anadromous fish that will potentially only experience higher levels of diversions at the NDD (e.g., Levels 2 and 3). As a result, CDFW anticipates more impacts (as protections are reduced) to CESA- and ESA-listed species later in the season.

CDFW recommends the EIR include more protective operational criteria at the NDD that minimize take of, and impacts to, both juvenile winter-run and spring-run Chinook salmon throughout their migration season. Specifically, CDFW suggests including the following changes: 1) increasing the number of pulse protections to ensure that they span the entire migration season when winter and spring-run Chinook salmon juveniles migrate past the NDD, 2) committing to a minimum number of days per pulse protection period, and 3) including down-ramping criteria for bypass flows once pulse protections have ceased for the season.

Real-Time Operations and Adaptive Management

Chapter 3, Sections 3.17 and 3.18 of the DEIR include brief discussions of the role of real-time monitoring and adaptive management in a) addressing uncertainty in operational impacts of the NDD, and b) refining operational criteria to minimize impacts to aquatic resources. However, the DEIR currently lacks a detailed description of the process used to make refinements to operational criteria, and instead relies on flow-based operational criteria without any reference to the link between real-time fish monitoring data and proposed operations. Without establishment of performance criteria and a clear description of how criteria will be amended, it is unclear from the DEIR how real-time operations will be developed and implemented and how they will ensure less-than-significant impacts to aquatic resources, including CESA- and ESA-listed species. In the absence of such details, or evaluation in the EIR of operational alternatives that incorporate greater avoidance measures, it is difficult for CDFW or other readers to understand how impacts will be avoided through future real-time operational changes.

CDFW requests that the EIR include a complete Adaptative Management Plan based on established biological goals and objectives that utilize best available science to evaluate progress towards those objectives. The approach should include a clear decision-making structure through which any changes in approach to minimizing or mitigating impacts to species would ensure that biological objectives are met.

CalSim 3 Modeling Framework

As stated in Appendix 5A A.7, "*the use of CalSim 3 for the Draft EIR is the first application of the new model for environmental review purposes"* (p. A-3). Prior analyses for large scale diversion projects in the Sacramento-San Joaquin Delta ecosystem have relied on CalSim II, which went through a peer review process (Close et al. 2003). At the time the DEIR was released, CalSim 3 documentation was still in draft form, with the complete documentation released on November 15, 2022. Outputs from CalSim 3 are being used as inputs to many of the other models used to evaluate the Proposed Project (e.g., DSM2, HEC-5Q, LTGEN, SWP Power, DeltaGW). These models are subsequently used as inputs to biological models (e.g., SALMOD, Martin and Anderson models, SCHISM) which support the DEIR's findings of significance. As such, CDFW requests documentation of any rules and assumptions (e.g., 3,000 cfs south Delta water quality limitation) or updates (e.g., CAM Forecast, ANN) made within CalSim 3 as well as validation figures associated with CalSim 3 outputs to better understand 1) strengths and weakness of the updated model and associated model components, 2) areas of divergence between CalSim 3 outputs and known comparative historical data, 3) the utility of the model's outputs for subsequent biological impact assessment, and 4) the relative level of compounding uncertainty associated with specific outputs/ projections.

For CDFW and others to understand CalSim 3's limitations, model documentation and validation is necessary. While documentation has now been released (November 2022), it does not include thorough description and validation of key components like the Artificial Neural Networks (ANNs) and Forecasting routine. CDFW recommends DWR release more thorough documentation for CalSim 3 to facilitate transparent review and understanding of this keystone tool and its utility. For example, the ANNs which control flow-salinity relationships and carriage water benefits should be validated against historical operations when salinity was controlling. Such a calibration would inform how the water cost of salinity operations compares to historical operations. Other major model components like dynamic forecasting, groundwater returns, and reservoir operations should be documented and validated independently of the overall Calsim 3 model and provided for the EIR. Without thorough documentation, it is not possible to understand the model's limitations and to interpret results correctly.

Artificial Neural Networks

As described in Appendix 5A, Section B.3.5 and Section C.6.3, ANNs are used in CalSim 3 to approximate DSM2 salinity results and set flow-salinity relationships used in CalSim 3 to meet regulatory requirements. The ANNs have a complex training process involving CalSim 3 and DSM2, but the results of this training process are not presented. A validation report of the ANNs, comparing to DSM2 and to historical salinity, is necessary to enable users of CalSim 3 (and dependent models) to understand the errors associated with the predictions from the ANNs. Appendix 5A Section C states that the ANNs were trained with 6,000 cfs at the NDD with the Suisun Marsh Salinity Control Gates (SMSCG) operating throughout the year (p.C-15). However, Alternatives 2a and 4a both have up to 7,500 cfs diversions. Therefore, the results used to train the ANNs do not cover the full range of the diversion flow rates proposed, potentially leading to inaccurate results. Additionally, it is CDFW's understanding that SMSCG are not to be operated year-round, although the 2020 SWP ITP does include requirements in above normal, below normal, and dry years to increase the frequency of operations during the July through September period. Therefore, CDFW recommends the EIR include better documentation of proposed operational scenarios as well as a validation report for the ANNs, a critical component of CalSim 3, so that the uncertainty surrounding salinity control operations can be better understood.

Forecasting

As stated in Appendix 5A, Section B.3.7, "*CalSim 3 includes a dynamic forecasting routine to mimic DWR's forecasting procedures*" (p. B-13). The procedures (updating monthly) may be mimicked, but CDFW's review indicates that CalSim 3 does not consistently mimic the results of Bulletin 120 forecasting well. The Sacramento Valley water year index and San Joaquin Valley water year index, which are incorporated into CalSim 3 and set for the final time by CalSim 3's mimicking of the median May forecast,

result in incorrect water year type classifications almost twice as often as Bulletin 120. The DEIR therefore relies on CalSim 3 water year types that are skewed toward wetter-than-actual Sacramento Valley water year type schemes. For example, 1) from 1955 to 2022 (68 years), the Bulletin 120 May Median Forecast of the Sacramento Valley water year index was different from the actual runoff water year type six times (9%), three times wetter and three times drier than the actual runoff index. 2) CalSim 3 May Sacramento Valley water year type differs from historical in 18 out of 94 years (19%), with 14 of those being wetter and four of them being drier than historical runoff. 3) The May 90% Exceedance Forecast of the Sacramento River Index (SRI) triggers an off-ramp of May and June D-1641 requirements if it is below 8.1 MAF. Since 1978, the May 90% SRI forecast has been below the 8.1 MAF threshold four times, but in CalSim 3 all four of those years have a value greater than 8.1 MAF.

The wet bias of the Sacramento Valley water year index results in CalSim 3 over-predicting the environmental water requirements and releases, depicting better conditions for aquatic species than would realistically occur. Consequently, CDFW recommends the EIR use a water year type forecast routine that better mimics reality, a reduced variance version of the existing routine, historical, perfect foresight, or some combination thereof.

Temporary Urgency Change Order Considerations

The DEIR does not include Temporary Urgency Change Order relaxations in its CalSim 3 modeling (p. B-66). DWR and Reclamation have submitted Temporary Urgency Change Petitions (TUCPs) to the State Water Resources Control Board in water years 2021 and 2022 as well as in 2014 and 2015, requesting modifications to outflow requirements and other fish and wildlife-related criteria. TUCPs are one of the tools relied on in the drought toolkit. In light of this, CDFW recommends the EIR include a sensitivity analysis that evaluates operations of the Proposed Project, and associated impacts, during multi-year droughts when TUCPs might be requested.

Climate Change Modeling

Review of the 2040 Central Tendency (CT) climate CalSim model indicates the driest 10 water years in the record have an average of 2% more water (8 river index) under the 2040 CT climate scenario. The Sacramento Valley water year index, which should be more sensitive to snowpack, also moves to wetter water year types in the 2040 CT climate modeling with eleven years becoming wetter (May Forecast) and only two years becoming drier. The DEIR acknowledges reduced snowpack as a consequence of climate change (see e.g., p. 30-12), but it is not clear that the 2040 CT forecast routine properly accounts for reduced snowpack or other likely effects of climate change. For example, based on the 2040 CT climate CalSim model, it appears that both the Sacramento Valley and San Joaquin Valley water year indices shift toward wetter water

year types under the climate change scenario. CDFW recommends the EIR employ a new climate change analysis depicting an increase in frequency, duration, and/or severity of droughts and reduced snowpack, consistent with the narrative provided in Chapter 30.

Aquatic Biological Resources

CESA- and ESA-listed aquatic species in the Delta are at record low abundance following years of sharp population declines with uncertainty regarding their resiliency and recovery as prolonged drought exacerbates conditions in the Delta. CDFW requests the EIR link declining trends in species abundance and the current status of each species clearly with the analyses of anticipated impacts, including the 5% threshold of significance established for modeling results. CDFW requests the EIR include additional justification for the use of the 5% threshold across all modeled results, with an analysis of the potential increased effects associated with compounding impacts on multiple life stages of each species.

CalSim 3 uses a monthly time step to generate monthly averaged flow data that can be used subsequently as inputs to aquatic biological models. Operations of the NDD are most likely to change on a sub-monthly time step to target specific flow events. Project impacts associated with operations would likewise occur on a sub-monthly time step; therefore, the use of average monthly flow data is unlikely to capture the relative peak timings of flows and fish migration of the more vulnerable life stages. Similarly, the use of summary statistics as inputs and grouping of results can dampen the level of modeled effects fish may experience at a smaller time scale which may underestimate the actual impact of modeled operations on fish survival.

CDFW recommends that the EIR include results of individual years on the extreme ends of the wet and critical water year types, to provide a better understanding of the full range in flow and storage expected under the Proposed Project. CDFW recommends that the EIR analyze and discuss the potential impacts from the Proposed Project operations under successive dry and critical years, as there is the potential that the Proposed Project may exacerbate drought-related impacts to species and warrant the need for additional mitigation measures.

Winter-run and Spring-run Chinook Salmon

The NMFS Viability Assessment (NMFS 2022) identifies winter-run and spring-run (except Butte Creek population) Chinook salmon as having a high risk of extinction due to factors related to redundancy, resiliency, current population size and recent declines, and hatchery influence. Under 2040 conditions the Proposed Project operations are likely to affect the ongoing resiliency and ability of fish species to recover from periods of low abundance or stress induced by drought conditions, which may lead to a

destabilizing effect on fish populations. The modeling results provided in Chapter 12 and the associated appendices are concerning given the current status and declining trends with winter-run and spring-run Chinook salmon.

Chapter 12 of the DEIR concludes that impacts to winter-run and spring-run Chinook salmon are less- than-significant with mitigation; however, CDFW is concerned that the DEIR does not provide adequate mitigation to address impacts associated with a reduction in Sacramento River outflow and increased reverse flows at Georgiana Slough. Instead, the DEIR identifies an undetermined quantity of mitigation to offset impacts on winter- and spring-run Chinook salmon. CDFW strongly recommends that that the EIR include mitigation measures that will fully offset the increase in reverse flows at Georgiana Slough and provide increased juvenile rearing habitat both upstream and downstream of the proposed NDD.

Juvenile Salmonid Delta Routing

Chapter 12 DSM2 modeling results show reduced velocities downstream of NDD intakes (Table 12-28) and increased reverse flows at Georgiana Slough (Table 12-29) under the Proposed Project. Ongoing research shows that reductions in Sacramento River inflows can increase the frequency of reverse flows at Georgiana Slough and increase juvenile salmonid entrainment through Georgiana Slough (Hance et al. 2021; Perry et al. 2018 & 2010). Juveniles that enter Georgiana Slough have lower survival, greater migration duration, and higher risk of entrainment into the CVP and SWP export facilities than fish that remain in the mainstem Sacramento River (Newman and Brandes 2010; Perry et al. 2010). As river flow entering the Delta decreases, the tidal transition zone (or zone with bidirectional flow) can shift upstream, which leads to longer travel times and longer travel distances for juvenile salmonids advected upstream on flood tides (Moser et al. 1991). Increasing the travel time, travel distance, and frequency of reverse flows can disorient fish and lead to increased predator encounters (Perry et al. 2018; NMFS 2019). To further evaluate the impacts associated with increased reverse flows at this junction, CDFW requests the EIR include a junction analysis (e.g., STARS, Perry et al. (2018) spreadsheet tool) to better understand how reduced Sacramento River flows will impact juvenile route selection through the Delta so that potentially significant impacts to salmonids caused by the Proposed Project can be appropriately minimized or mitigated.

Additionally, increased reverse flows at Georgiana Slough under the Proposed Project may impact the efficacy of the Georgiana Slough Salmonid Migratory Barrier, which is required as a minimization measure in the 2020 SWP ITP to reduce entrainment of salmonids into the interior Delta (Condition of Approval 8.9.1). CDFW requests the EIR include ELAM and particle tracking modeling to better evaluate the potential impacts of increased reverse flows resulting from Proposed Project operations on the operation

and effectiveness (e.g., changes in juvenile survival and routing) of the Georgiana Slough Salmonid Migratory Barrier.

Juvenile Salmonid Through-Delta Survival

Chapter 12, Appendix 12B, and Appendix 12C provide through-Delta modeling results for juvenile Chinook salmon using the Perry et al. (2018) spreadsheet model, Delta Passage Model, and IOS model. The Perry et al. (2018) modeling results show a reduction in juvenile survival across each month and are supported by the Delta Passage Model results for winter-run and spring-run Chinook salmon and the IOS model results for winter-run Chinook salmon. Under the Proposed Project, through-Delta survival is estimated to decrease for all juveniles migrating downstream due to reduced velocities and increased reverse flows that can result in longer travel duration, longer exposure to poor conditions in the Delta, and increased entrainment into the interior Delta (Perry et al. 2018). Due to the difficulty of tagging small individuals, flow-survival relationships incorporated into these models rely predominantly on data from acoustic-tagging studies of large (>140 mm) Chinook salmon smolts; therefore, through-Delta survival estimates should primarily be used to inform smolt survival estimates and not be relied upon to represent rearing survival (Simenstad et al. 2017). Juvenile salmon less than 80 mm are more likely to rear in the Delta for extended periods of time rather than emigrate quickly from the Delta (Moyle 2002) and likely experience greater, prolonged impacts of reduced Sacramento River inflows south of the NDDs. Thus, the modeling results may underestimate the potential impacts of the Proposed Project on through-Delta juvenile salmonid survival.

Based on the results presented in the DEIR and given the likelihood that the models used are underestimating impacts of the Proposed Project on though-Delta juvenile salmonid survival, CDFW recommends the EIR identify the potentially significant impacts of the Proposed Project for winter-run and spring-run juvenile Chinook salmon and include an appropriate mitigation strategy to ensure those impacts are brought down to less than significant levels.

Juvenile Salmonid South Delta Entrainment

As noted above, under lower Sacramento River inflows, juvenile salmonids may move through Georgiana Slough more frequently, exposing them to lower survival routes in the interior Delta. Chapter 12, Tables 12-25, 12-26, 12-49, and 12-50 include entrainment results from the Salvage-Density Method that predict a reduction in entrainment of juvenile winter-run and spring-run Chinook salmon at the SWP export facility and a net increase in entrainment at the CVP export facility. The Salvage-Density Method does not incorporate the risk of increased routing of salmon into the interior Delta due to reduced flows downstream of NDD intakes; therefore, it does not reflect the potential increase in juvenile salmon exposure to export operations through increased

presence in the interior Delta. The Salvage Density Method also does not evaluate the risks of reduced Sacramento River flow (or any outflow conditions) on salvage in the south Delta. Therefore, the entrainment results presented for SWP and CVP export facilities may underestimate the level of juvenile salmonid entrainment under the Proposed Project operations. CDFW recommends the EIR include further analysis to assess potential Project impacts to routing of salmonids into the interior Delta as well as development of a robust mitigation strategy to offset the increased entrainment at the CVP resulting from the Proposed Project.

Winter-run Life-Cycle Modeling

The life-cycle modeling results for winter-run Chinook salmon are not consistent across the models presented in Chapter 12. IOS modeling results (Table 12-38) indicate an 8-11% decrease in female escapement under the Proposed Project across water year types, further supported by the OBAN modeling results (Table 12-43) that show a 12% decrease in total escapement (assuming no near-field mortality at the NDD intakes). In contrast, the Winter-run Chinook Salmon Life Cycle Model results (Table 12-43a) suggest an increase in spawner abundance by 5.19% under the Proposed Project. CDFW considers the life-cycle modeling results for winter-run Chinook salmon to be a critical aspect of the impact analysis, and to-date does not understand the mechanisms that are leading to these conflicting results. CDFW requests that the EIR include complete model documentation for the version of the Winter-run Chinook Salmon Life Cycle Model, including ePTMvII, used to produce Table 12-43a and a complete explanation of why these results differ from IOS and OBAN modeling results so that CDFW and other readers can better understand the significance of the Project impacts to the species.

Adult Salmonid Straying

The DEIR does not include a quantitative analysis regarding adult salmonid straying, but instead relies on the assumption that straying rates of adult hatchery-origin salmon are low when juveniles are released in river rather than released in the Bay during drought conditions. CDFW requests that the EIR include a flow change analysis for Sacramento River flows at Freeport during the period of adult upstream migration to better understand potential straying rates for adult salmon and how those could be affected by the Proposed Project.

Delta Smelt

Delta Smelt Reduced Spawning Habitat

Construction of the NDD is expected to limit access to Delta smelt spawning habitat by creating a passage barrier within the Sacramento River. Chapter 12 provides a series of assumptions related to Delta smelt such as current spawning locations and swimming

ability that are inconsistent with currently available data. For example, Delta smelt likely reach upstream spawning locations on the Sacramento River, such as those near the Garcia Bend boat ramp, by using low velocity habitat within the channel margins of the river (IEP 2022). Once constructed, the NDD would force Delta smelt further out into the channel where they are unlikely to swim against higher water velocities in all but the driest of years, thereby limiting Delta smelt's access to upstream spawning habitats. The DEIR assumes that Delta smelt will be able to swim past the NDD by using dry, low flow periods as representative flow in its analysis coupled with the assumption of stronger swimming ability compared to what current lab studies and conceptual models suggest (i.e., IEP-MAST 2015; Swanson et al. 1998). Because of this, the DEIR concludes that access to habitat upstream of the NDD would not be limited. CDFW disagrees with this conclusion on the basis that Delta smelt currently use upstream habitat and are not known to be a strong swimming fish, especially under typical flow conditions. Therefore, CDFW recommends that the EIR assume a poor swimming ability for Delta smelt and a reduced ability to swim past the NDD, consistent with current understanding of the species. Additionally, the EIR should quantify the loss of shallow sandy beach habitat upstream of the NDD for use as a basis for quantifying compensatory mitigation for Delta smelt due to construction of the NDD to mitigate the potentially significant Project impacts to the species.

Delta Smelt Experimental Releases

The DEIR does not incorporate experimental release of Delta smelt (CDFW 2021) within any analysis or as part of the baseline condition. The current approach adopted by the DEIR does not recognize the potential for experimental releases to affect Delta smelt distribution and abundance within the Delta. As such, analyses that rely on recent historic presence and draw conclusions based on such data under-represent the effect experimental releases may have and by extension, under-represent the impacts of the Proposed Project to the species. For example, the DEIR identifies a declining population trend of Delta smelt and therefore concludes that few smelt would be exposed to potential near-field effects of the NDD intakes. CDFW disagrees with this conclusion as experimental releases of Delta smelt could increase the number of individuals within the Delta and therefore increase the exposure of the NDD effects to the species. Because of this, the EIR should include assumptions about Delta smelt experimental release and its effect on Delta smelt abundance when evaluating the potential significance of the Project on the species and developing minimization or mitigation measures.

Longfin Smelt

Analysis provided in Chapter 12 of the DEIR shows substantial population level impacts to longfin smelt during all water year types due to the substantial reduction in spring outflows resulting from the Proposed Project (Table 12-144). Additionally, the DEIR

analyses show a greater than 50% chance that longfin smelt abundance will decrease from Existing Conditions in any given year (Table 12-145). The DEIR provides a modest amount of habitat restoration as mitigation for such impacts to longfin smelt and concludes that such impacts are less than significant for the species. CDFW is concerned that the Proposed Project will impact the population trajectory, and that such impacts warrant additional mitigation. CDFW strongly recommends that the EIR include feasible alternative operational approaches to minimize this impact, and mitigation measures to ensure any impact to longfin smelt caused by decreased spring outflow is less than significant. Specifically, measures should accommodate monthly forecasted storage and provide outflow objectives during the months when longfin smelt abundance has been shown to be linked with outflow, including March, April, and May.

Compensatory Mitigation

The Compensatory Mitigation Plan (CMP) in Appendix 3F proposes channel margin habitat be constructed on Bouldin Island (Table 3F-4) to offset construction related impacts to aquatic resources, including winter-run and spring-run Chinook salmon. Although this restoration would be beneficial to the ecosystem, it would not provide the most biologically meaningful benefit to the CESA-listed species that are impacted by the Proposed Project. CDFW requests the EIR prioritize areas that are within the main migratory pathway of Sacramento Basin CESA-listed species that would be impacted by the construction of the NDD, to effectively ensure less-than-significant impacts to those species.

The CMP also proposes a conceptual plan for tidal restoration to offset hydrodynamic impacts due to NDD, such as reverse flows at Georgiana Slough and reduced bench inundated habitat. However, the DEIR does not include any specifics regarding the siting of the restoration, or the acreage needed to offset impacts to salmonids. CDFW and other readers therefore lack important information to understand and consider the efficacy of tidal restoration in mitigating the hydrodynamic impacts of the NDD as well as the approach to evaluating the conceptual idea after the Proposed Project is constructed. The CMP's proposal also does not evaluate how tidal restoration proposed under the Proposed Project will interact with ongoing EcoRestore projects located in the Delta and existing North Bay Aqueduct operations. CDFW recommends the EIR contain a clear CMP that includes both mitigation for construction related impacts as well as operation related impacts, with sufficient detail and performance standards to avoid deferred mitigation.

Appendix 13C, Table 13C-9 identifies permanent, long-term temporary, and temporary habitat loss for terrestrial species under the Proposed Project. Chapter 12, Tables 12-11 and 12-12 identify permanent and temporary impacts to aquatic species under the Proposed Project. However, the CMP in Appendix 3F does not mirror the impacts

associated with Chapter 12 and Appendix 13C and does not fully describe which species and their habitats will receive mitigation. CDFW requests that the EIR's CMP clearly identify which habitats mitigate for each species, how much acreage and at what mitigation ratio species-specific mitigation will occur within initial mitigation sites and mitigation banking, and under what timeline mitigation will occur. CDFW recommends the EIR commit to a 10% stay-ahead requirement for habitat mitigation, consistent with historical agreements and based on previous large-scale water infrastructure projects. CDFW also requests the EIR commit to mitigating any loss of species habitat during implementation of the CMP itself.

The CMP includes a discussion of performance standards that will provide the basis for DWR's annual monitoring and evaluation of each mitigation site. The proposed performance standards rely on floristic, physical, and hydrologic components of the habitat without consideration of special-status species occupancy. CDFW requests the EIR consider occupancy as a performance standard and include occupancy monitoring to determine habitat use and subsequently to substantiate the effectiveness of compensatory mitigation and assumed reduction of potentially significant impacts to targeted species.

For both aquatic and terrestrial mitigation, CDFW requests that mitigation lands be conserved and managed in perpetuity under a CDFW-approved conservation easement and managed in perpetuity through secure management funding with an approved land manager.

I-5 Ponds

Appendix 3F states that the I-5 Ponds are not hydraulically connected to each other. Lands may not be considered suitable habitat sufficient for mitigation if targeted species are not able to access the habitat intended for their use. CDFW recommends the CMP commit to demonstrating occupancy of habitats created. Specifically, to allow for giant garter snake dispersal and occupancy, CDFW recommends the EIR commit to hydraulically connecting the I-5 Ponds to existing giant garter snake occupied habitat as well as providing continuous connectivity within the I-5 Ponds.

For all proposed compensatory mitigation, CDFW recommends that the CMP provide additional discussion of feasibility of potential mitigation actions, including considerations to avoid conflict or competition with already-conserved lands, sites targeted to meet existing compliance obligations, and grant-funded activities with funding restrictions.

Additional Comments

Consistent with CDFW's trustee role, the attached comments in Appendix A address all fish and wildlife resource areas and includes additional comments to those provided in the above letter. While the attached comments are extensive, CDFW understands DWR is seeking all possible input and CDFW strove to be thorough in the review of the DEIR in order to be of the greatest assistance.

RECOMMENDATIONS

CDFW appreciates DWR's continued effort to address the impacts of the Proposed Project on the State's biological resources. CDFW offers the comments and recommendations in the letter and attached Appendix A to assist DWR in its role as lead agency in adequately identifying and mitigating the Proposed Project's significant, or potentially significant, direct, and indirect impacts on fish and wildlife resources. The comments and recommendations are also offered to aid DWR in identifying a reasonable range of alternatives that would avoid or minimize adverse impacts and to help ensure the EIR's adequacy as an informational document.

Based on the information provided, CDFW currently does not see sufficient substantiation for the DEIR's determination of the following Project impacts to be less than significant with mitigation: AQUA-1: Effects of Construction of Water Conveyance Facilities on Fish and Aquatic Species, Aqua-2: Effects of Operations and Maintenance of Water Conveyance Facilities on Sacramento River Winter-Run Chinook Salmon, Aqua-3: Effects of Operations and Maintenance of Water Conveyance Facilities on Central Valley Spring-Run Chinook Salmon, Aqua-6: Effects of Operations and Maintenance of Water Conveyance Facilities on Delta Smelt, and Aqua-7: Effects of Operations and Maintenance of Water Conveyance Facilities on Longfin Smelt.

CDFW recommends the EIR is updated to provide quantitative analyses, discussed in these comments, to inform significance determinations for the Proposed Project (before mitigation), to inform development of alternatives and other means to avoid impacts, and the scope of mitigation actions. Quantitative analyses with accompanying documentation of the analysis methodology, assumptions, and decision processes are needed for CDFW and others to understand the basis for analytical conclusions reported, and to foster open and transparent discussion pertaining to the inherent uncertainty within the results and determinations presented. CDFW looks forward to continuing to work with DWR to refine the Proposed Project and associated mitigation measures.

ENVIRONMENTAL DATA

CEQA requires that information developed in environmental impact reports and negative declarations be incorporated into a database which may be used to make subsequent or supplemental environmental determinations (Pub. Resources Code, § 21003, subd. (e)). Accordingly, please report any special status species and natural communities detected during Project surveys to the California Natural Diversity Database (CNDDB). The CNNDB field survey form can be found at the following link: http://www.dfg.ca.gov/biogeodata/cnddb/pdfs/CNDDB_FieldSurveyForm.pdf. The completed form can be mailed electronically to CNDDB at the following email address:CNDDB@wildlife.ca.gov. The types of information reported to CNDDB can be found at the following link: http://www.dfg.ca.gov/biogeodata/cnddb/plants_and_animals.asp.

FILING FEES

The Project, as proposed, would have an impact on fish and/or wildlife, and assessment of filing fees is necessary. Fees are payable upon filing of the Notice of Determination by the Lead Agency and serve to help defray the cost of environmental review by CDFW. Payment of the fee is required in order for the underlying project approval to be operative, vested, and final. (Cal. Code Regs, tit. 14, § 753.5; Fish & G. Code, § 711.4; Pub. Resources Code, § 21089.)

CONCLUSION

Pursuant to Public Resources Code §21092 and §21092.2, CDFW requests written notification of proposed actions and pending decisions regarding the Proposed Project. Written notifications should be directed to: California Department of Fish and Wildlife P.O. Box 944209, Sacramento, CA 94244-2090. CDFW appreciates the opportunity to comment on the DEIR to assist in identifying and mitigating Proposed Project impacts on biological resources. CDFW personnel are available for consultation regarding biological resources and strategies to minimize and/or mitigate impacts. Questions regarding this letter or further coordination should be directed to Paige Uttley, Acting Environmental Program Manager, at Paige.Uttley@wildlife.ca.gov.

Sincerely,

DocuSigned by:
Brooke Jacobs
63D88D861032425...

Brooke Jacobs
Water Branch Chief

Enclosures: Appendix A- Additional Comments and Recommendations Table
Appendix B- References

ec: State Clearinghouse, state.clearinghouse@opr.ca.gov

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Appendix A: Additional Comments and Recommendations

Chapter or Appendix and Section/ Figure	Page	Comment: Issue	Comment: Recommendation
Chapter 3- 3.4.1.2 Sedimentation Basins and Drying Lagoons	3-24	The DEIR states that sediment will be removed from NDD water prior to conveyance through the proposed tunnel. Settling ponds will be dredged once a year but the Proposed Project does not plan to return that sediment back to the system. Instead, the DEIR states that dried sediment would be removed by truck for disposal at a permitted disposal site or used for beneficial use off-site. Many fish species, including Delta and longfin smelt, are reliant on sediment transport instream for predator avoidance and for larvae to locate food items. Maintaining consistent levels of sediment in river based on Existing Conditions will also reduce erosive energy downstream of the NDD.	CDFW recommends the Proposed Project return the sediment diverted with Sacramento River water back to the river after dredging settling ponds at the intakes. CDFW looks forward to working out the details pertaining to sediment return with DWR to avoid any significant biological or other environmental impacts. For example, smaller sediment returns on a more frequent basis may be the best means to avoid impacting sediment transport and increasing erosion forces and will aid in providing habitat suitable for fish that rely on turbidity for predator avoidance and feeding.
Chapter 3- 3.4.1.2 Sedimentation Basins and Drying Lagoons	3-24	The DEIR states that the fill and drain/dry sequence for sediment basins and drying lagoons would take about 7 to 8 days, which would approximately match the dredged material filling rate so continuous operation would be possible (p. 3-24). However, the removal of sediment, although continuous, is not considered an impact of the Proposed Project.	CDFW recommends that the process of removing and disposing of dried sediment is evaluated as a potential biological resources impact in the EIR, with discussion of any minimization measures and/or mitigation added as appropriate.
Chapter 3- 3.4.6 Southern Complex West of Byron Highway	3-42	The DEIR states that gate operations at CCF and the new Southern Forebay (as proposed under all alternatives except the Proposed Project) will be operated in one of two modes-single or dual. It is unclear what would control operations of the gates and under which conditions one mode would be selected over the other.	CDFW requests that additional information on gate operation at the proposed Southern Forebay be added to the EIR for clarity, including any factors (e.g., biological, hydrodynamic, etc.) that impact gate operations.

Chapter or Appendix and Section/ Figure	Page	Comment: Issue	Comment: Recommendation
Chapter 3- 3.4.10 Electrical Facilities	3-48	The DEIR states power for construction and operation of the conveyance facilities would use existing power lines to the extent possible, but the location or required load of some facilities would require either new aboveground power towers with lines or, depending on site-specific parameters, underground conduit to serve those specific areas (p. 3-48). Powerlines can create inadvertent risk to a multitude of avian species, and collisions with powerlines often lead to injuries or mortality.	CDFW recommends the EIR evaluate where aboveground powerlines may be built as part of the Proposed Project and analyze related risks to species and commit to using the guidelines set forth by the Avian Power Line Interaction Committee (APLIC 2006 and 2012; APLIC and USFWS 2005) to minimize avian related injuries and mortalities due to contact with the newly constructed powerlines.
Chapter 3- 3.7 Alternative 2a-Central Alignment, 3.11 Alternative 4a-Eastern Alignment	3-80; 3-104	Section 3.2 of the DEIR describes the CEQA requirements for Project Alternatives 2a and 4a. However, it is unclear how the construction of a third intake on the Sacramento River that increases diversion capacity to 7,500 cfs would avoid or substantially lessen potentially significant Proposed Project impacts.	CDFW recommends the EIR include an analysis and description of how the new intake proposed for both the central and eastern alignment (Alternatives 2a and 4a) will avoid or substantially lessen potentially significant Proposed Project impacts and/or include minimization and mitigation measures as necessary.
Chapter 3- 3.14 Alternative 5-Bethany Reservoir Alignment, 6,000 cfs, Intakes B and C (Proposed Project)	3-116	The DEIR includes mention of construction and geotech through the Bethany Conservation Easement. However, the DEIR does not discuss, or analyze, the potential conflict (under all alternatives) resulting from the Project alignment across conserved lands, including the Cosumnes River Preserve, Woodbridge Ecological Preserve, and Bethany Reservoir Conservation Easement. The DEIR does not evaluate an alternative route for the Bethany Reservoir Aqueduct siting in a manner that could reduce impacts to the Bethany Reservoir Conservation Easement by following existing roadways and other highly disturbed areas and/or one that will avoid impacts to conserved lands similar to the alignments identified in the Delta Conveyance Project Final Draft Engineering Project Report (Delta Conveyance Design and Construction Authority 2022; Figure 10).	CDFW requests that the EIR include a comprehensive evaluation of conservation lands impacted by the Proposed Project (both temporary and permanent impacts) and alternatives. The evaluation should include identification of the number of acres to be impacted by each alignment including access areas, the biological quality and value of those acres, and the property owner and/or grantee if possible. Additionally, a discussion of the Project's potential to obtain in-kind mitigation should be included with appropriate lands identified.

Chapter or Appendix and Section/ Figure	Page	Comment: Issue	Comment: Recommendation
Chapter 3- 3.14.1.4 Bethany Reservoir Discharge Structure	3-125	The proposed Bethany Reservoir discharge structure would be located on a narrow strip of land between the Bethany Conservation Easement and Bethany Reservoir. The DEIR currently proposes a 10-foot-wide buffer to separate the disturbance area from the conservation easement.	CDFW requests the EIR include a larger buffer between the disturbance area and the conservation easement to limit impacts on the conservation easement, including impacts associated with edge effects.
Chapter 3- 3.15.2.1 Investigations at Facility Locations	3-136	The DEIR states that soil borings, overwater soil borings, and CPTs would be conducted within the construction boundaries; however, it is unclear what these boundaries are within the Project area.	CDFW requests that the EIR include a clear description of where the construction boundaries for soil borings, over water borings and cone penetration tests lay so that potential impacts can be assessed accordingly.
Chapter 3- 3.15.2.2 Geotechnical Pilot Studies for Settlement	3-137	For the Geotechnical Pilot Study, the DEIR states that test fill sites will either be placed within construction boundaries of the Proposed Project or next to a shaft pad site. It is not clear how large these fill sites will be, particularly if they are not located within the shaft pad site.	CDFW requests that a size estimation of test fill, at each study location, be added to the EIR so that an evaluation of potential Project impacts can occur.
Chapter 3- 3.15.2.5 Vibratory Testing of Dynamic Properties	3-138	The DEIR states that vibratory testing of dynamic properties of peat would be conducted in the Delta for validation of peat soil response during earthquakes. To better understand the impacts the vibratory testing will have on fish and wildlife (e.g., nesting birds, burrowing animals) a more detailed description of when tests will occur, and the length and frequency of each test is needed.	The EIR should include a more detailed description of when vibratory testing will take place, how frequently testing is need, and how long each test will be.
Chapter 3- 3.16.1.1 Approaching and Sweeping Velocity Requirements 3.17.2.1 Real-Time Decision-Making Framework	3-142; 3-158	The DEIR includes sweeping and approach velocities consistent with criteria for both Delta smelt and juvenile salmonids. However, it is unclear based on the DEIR if the approach and sweeping velocities will be recorded in real-time and what DWR's decision making process will be to shift criteria or relax criteria (as mentioned on page 3-158).	CDFW requests the EIR include a commitment to ensuring changes to the criteria would maintain or improve upon the existing level of protection. CDFW also requests that the EIR follow updated guidance from NMFS (2022) regarding fish screen criteria with assurances that criteria will be maintained across the length of the screens and that the design sweeping velocities will never be less than the design approach velocity.

Chapter or Appendix and Section/ Figure	Page	Comment: Issue	Comment: Recommendation
Chapter 3- 3.16.1.2 Bypass Flow Requirements	3-142	It is unclear based on the DEIR if the proposed bypass flow requirements would be subject to re-evaluation to consider sea level rise, and climate change impacts during the pre- and post-construction phase of the Project. In addition, it is unclear whether bypass flow re-evaluations would occur at any point during the operation of the Project.	CDFW recommends adding milestone language or criteria in the EIR that clearly denotes when bypass flow requirements are to be re-evaluated. Furthermore, a commitment should be included to ensure that changes to the criteria would only be made to maintain or improve upon the existing level of protection.
Chapter 3- 3.16.1.3 Pulse Protection	3-143	It is unclear based on the DEIR if pulse protections would occur in dry or critical years if Sacramento River flows are too low to be met to trigger an action. Furthermore, it is unclear if the pulse protections will be coordinated with pulse protection associated with the proposed Sites Reservoir Project.	CDFW requests that the EIR contain an analysis on the frequency of when both DCP and Sites Reservoir proposed pulse protections would occur across all water year types and include a discussion for when and how often pulse protections would be initiated in water years when flow criteria cannot be met. CDFW also recommends that the EIR include a comprehensive quantitative analysis of cumulative impacts including the Sites Reservoir Project to analyze whether the biological rationale for each project's pulse protection is realized.
Chapter 3- 3.16.2.3 Rio Vista Minimum Instream Flow Criteria	3-144	The DEIR indicates that the Proposed Project will operate in conjunction with the south Delta exports at Banks Pumping Plant to meet existing D-1641 requirements. However, the DEIR lacks analyses and discussions on how the Bay-Delta Water Quality Control Plan amendments for water quality criteria and flow objectives will be considered for future modeling and operational criteria at the SWP facilities.	CDFW requests the EIR include a thorough discussion of the Bay-Delta Water Quality Control Plan amendments to water quality criteria and flow objectives and how DWR will address these updates to criteria with proposed operations at the NDD and existing operations in the south Delta at Banks Pumping Plant.
Chapter 3- 3.16.2.4 Delta Outflow Criteria	3-145	The DEIR does not accurately reflect the 2020 SWP ITP Condition of Approval 9.1.3.1 Summer-Fall Action Plan, regarding Suisun Marsh Salinity Control Gates (SMSCG) operations.	CDFW requests that the language in the EIR acknowledge that SMSCG operation in dry years are not conditioned on the 100 TAF for Delta outflow, and that the 100 TAF is additive to the summer-fall requirements in the 2020 SWP ITP in AN and BN water year types and in D years that follow W or AN.

Chapter or Appendix and Section/ Figure	Page	Comment: Issue	Comment: Recommendation
Chapter 3- 3.16.3 Integration of North Delta Intakes with South Delta Facilities	3-145	The DEIR states that intakes would be used to capture excess flows when the south Delta exports are limited and unable to capture these flows.	Please provide examples of potential circumstances when south Delta exports would be limited but diversions from the north would be possible.
Chapter 3- 3.16.3 Integration of North Delta Intakes with South Delta Facilities	3-145	The DEIR states that south Delta exports and the NDD would be balanced and adjusted to meet the State Water Board D-1641 salinity requirements at the western Delta stations on the Sacramento and San Joaquin rivers.	CDFW requests that the EIR provide additional information on the proposed balancing strategy, particularly on its frequency. Furthermore, the EIR should include more information on operational strategies for scenarios when compliance can only be met at one Delta station, or if compliance cannot be met at any station.
Chapter 3- 3.16.4 Use of North Delta Intakes for Wheeling	3-147	The DEIR does not analyze water transfers at its fullest export capacity stating it is not currently achieved now and therefore is unlikely to change in the future. CDFW disagrees that this is sufficient reason for the analysis to be omitted. The Project should assess potential impacts which could be increased because of increased water transfer.	CDFW requests that water transfers be analyzed at the maximum allowable amounts (Appendix 3H) in CalSim to determine potential impacts with additional information explaining how the DCP will reduce the amount of carriage water required for moving water transfers across the Delta.
Chapter 3- Table 3-14. Delta Conveyance Project Preliminary Proposed Operations Criteria	3-150	The DEIR does not include operational criteria for the December through June period that defines how water will be diverted by NDD and the south Delta during Condition of Approval (COA) 8.17 (Export Curtailments for Spring Outflow) of the 2020 SWP ITP or during COA 8.18 (Potential to Redeploy up to 150 TAF for Delta Outflow) and COA 8.19 (Additional 100 TAF for Delta Outflow).	CDFW requests that the EIR include additional information on how export operations at the north and south Delta would interact with the current spring export curtailments (ITP COA 8.17) to ensure redeployed water is not exported after it is released from upstream reservoirs (COA 8.18 and COA 8.19).
Chapter 3- Table 3-14. Delta Conveyance Project Preliminary Proposed Operations Criteria	3-151	On October 1, 2021, USBR requested reinitiation of consultation on the 2019 NMFS and USFWS BiOps. Given the construction period presented in the DEIR, the 2019 BiOps are likely to be replaced before the Proposed Project becomes operational. The Bay-Delta WQCP update is also in process and would presumably result in changes to D-1641 prior to the operational phase of the Proposed Project.	CDFW recommends that the EIR explain the process the Proposed Project would follow to incorporate and adhere to updated standards during the permitting and construction phases of the Proposed Project.
Chapter 3- Table 3-14. Delta Conveyance Project Preliminary Proposed Operations Criteria	3-151	The DEIR does not state whether NDD diversion rates and other real-time hydraulic monitoring data (e.g., sweeping velocities, bypass flows) will be made publicly available in real time.	CDFW requests that real-time hydraulic monitoring at the NDD be made publicly available on CDEC, or similar data-sharing platform.

Chapter or Appendix and Section/ Figure	Page	Comment: Issue	Comment: Recommendation
Chapter 3- Table 3-15. Proposed North Delta Diversion Bypass Flow and Pulse Protection Requirements 3.16.1.3 Pulse Protection	3-152 3-143	Table 3-15 of the DEIR and Section 3.16.1.3 of the DEIR do not include consistent language regarding off ramping pulse protections. Table 3-15 indicates that pulse protections can offramp if Sacramento River flow at Wilkins Slough returns to pre-pulse flow level, as defined as flow on the first day of a 5-day flow increase. Section 3.16.1.3 indicates that pulse protections can offramp if Sacramento River flow at Wilkins Slough returns to pre-pulse flow level, as defined as flow on first day of pulse period.	CDFW requests the EIR more clearly explain the criteria used to offramp the pulse protection period. Specifically, explain which day is the first day of the pulse protection period and how that relates to the 5-day average used to onset the pulse protection.
Chapter 3- Table 3-15. Proposed North Delta Diversion Bypass Flow and Pulse Protection Requirements	3-152	The DEIR does not provide biological justification for bypass flow criteria or a description of how the criteria were developed as a minimization measure for NDD.	CDFW requests the EIR provide clarification on how the bypass flow criteria were developed and biological justification for these criteria supporting them as a minimization measure for NDD.
Appendix 3B- 3B.1.11 EC-10: Marine Vessels	3B-19	The DEIR does not include procedures for invasive species inspections on marine vessels.	CDFW recommends invasive species inspections before vessels are deployed, especially if the vessels do not originate from the Delta.
Appendix 3B- 3B.1.15 EC-14: Construction Best Management Practices for Biological Resources	3B-26	The DEIR states rodenticides and herbicides will be used in accordance with the manufacturer recommended uses. Rodenticides are not supported by CDFW as a form of pest management due to the risk of secondary poisoning.	CDFW requests that rodenticides not be used and removed as a method of rodent control in the EIR, especially in areas of suitable habitat for special-status species.
Appendix 3C- 3C.3.2.3.1 No Project Alternative Assumptions for Water Rights	3C-9	The DEIR states the No Project Alternative assumes there would be no changes to senior water rights in the Sacramento and San Joaquin River watersheds by 2025 through use of facilities currently available or under construction (p. 3C-9). However, the DEIR uses the two No Project Alterative timeframes of 2020 and 2040, neither of which align with 2025. For 2020, any Water Rights assessed should be included in existing conditions. For 2040, any Water Right changes associated with foreseeable projects should be included.	CDFW recommends potential Water Right changes be evaluated through 2040 and included as appropriate. There are multiple, foreseeable projects currently petitioning the Water Board for water right changes (e.g., Sites Reservoir is petitioning for new Water Rights). These foreseeable changes to water diversion rates, locations, and/or quantities should be included in the No Project Alternative 2040.

Chapter or Appendix and Section/ Figure	Page	Comment: Issue	Comment: Recommendation
Appendix 3C- Table 3C-2 Descriptions of Programs, Projects, and Policies Considered for Existing Conditions, No Project Alternative, and Cumulative Impact Analysis	3C-17	Del Puerto Canyon Reservoir will be an 800-acre reservoir storing up to 82,000 AF. Water will be diverted into the reservoir from the Delta-Mendota Canal. This project was approved in late 2020. Therefore, it is unclear why this project is not included in the No Project Alternative.	CDFW recommends the No Project Alternative include the Delta Puerto Canyon reservoir and its proposed operations.
Appendix 3C- Table 3C-2 Descriptions of Programs, Projects, and Policies Considered for Existing Conditions, No Project Alternative, and Cumulative Impact Analysis	3C-43	The DEIR lists the Yolo Bypass Salmonid Habitat Restoration and Fish Passage Project as included in Existing Conditions as well as included the project in the Cumulative Impact Analysis but excluded it from the No Project Alternative. It is unclear why the fish passage project is not included in the No Project Alternative.	CDFW recommends including the Yolo Bypass Salmonid Habitat Restoration and Fish Passage Project in the No Project Alternative.
Appendix 3C- Table 3C-2 Descriptions of Programs, Projects, and Policies Considered for Existing Conditions, No Project Alternative, and Cumulative Impact Analysis	3C-44	The Los Vaqueros Reservoir Expansion Project will increase the reservoir capacity to 275,000 AF from 160,000 AF, add a new 470 cfs connection to South Bay water agencies, and include construction of a new diversion at Old River with capacity of 170 cfs. Additionally, the reservoir project proposes doubling Contra Costa Water District's current diversion quantities from the Delta. The expansion is currently being permitted and expected to be completed by 2040. Therefore, it is unclear why it was not included in the No Project Alternative.	CDFW recommends including the Los Vaqueros Reservoir Expansion project and proposed operations in the No Project Alternative.
Appendix 3C- Table 3C-2 Descriptions of Programs, Projects, and Policies Considered for Existing Conditions, No Project Alternative, and Cumulative Impact Analysis	3C-66	The Bay-Delta Water Quality Control Plan Update to the 2006 Bay-Delta WQCP currently has amendments in process. Therefore, it is unclear why it is not considered in the No Project Alternative.	CDFW recommends the Bay-Delta Water Quality Control Plan Update be included in the No Project Alternative. This would also provide a useful comparison to the Alternate Regulatory Scenario presented in Appendix 4C.

Chapter or Appendix and Section/ Figure	Page	Comment: Issue	Comment: Recommendation
Appendix 3C- Table 3C-2 Descriptions of Programs, Projects, and Policies Considered for Existing Conditions, No Project Alternative, and Cumulative Impact Analysis	3C-74	Reclamation and DWR jointly manage San Luis Reservoir for the purpose of storing and reregulating CVP and SWP water from the Delta. In 2000, the CALFED Programmatic Record of Decision identified the need to resolve the low point problem to potentially increase use of water from San Luis Reservoir by up to 200,000 acre-feet. A public draft feasibility report was released April 2019 and an EIS/EIR was released in 2020; therefore, it is unclear why this project is not included in the No Project Alternative.	CDFW Recommends the San Luis Low Point Improvement Project be added to the No Project Alternative.
Appendix 3F- 3F.1 Introduction	3F-1	Appendix 13C, Table 13C-9 identifies permanent, long-term temporary, and temporary habitat loss for terrestrial species under the Proposed Project. Chapter 12, Tables 12-11 and 12-12 identify permanent and temporary impacts to aquatic species under the Proposed Project. However, the CMP in Appendix 3F does not mirror the impacts associated with Chapter 12 and Appendix 13C and is vague and often contradictory in terms of which species and their habitats will receive mitigation.	CDFW requests that the EIR's CMP identifies which habitats mitigate for each species, how much acreage and at what mitigation ratio species specific mitigation will occur within initial mitigation sites and mitigation banking, and under what timeline mitigation will occur. At minimum, CDFW recommends the EIR commit to a mitigation strategy that avoids temporal impacts to species. CDFW also recommends the EIR commit to mitigating any loss of species habitat during implementation of the CMP itself.
Appendix 3F- 3F.3.2.1 Hierarchal Approach	3F-12	The DEIR includes the following step in the hierarchical approach to mitigation: "permittee-responsible mitigation through off-site and/or out-of-kind mitigation." It is unclear what "out-of-kind mitigation" means and therefore it is unclear if it will be appropriate for mitigating impacts associated with construction and operation of the Proposed Project.	CDFW requests the EIR provide clarification on the meaning of "out-of-kind mitigation" demonstrating its appropriateness or include a commitment to mitigation under an appropriate hierarchical approach.
Appendix 3F- Table 3F-4. Summary of Compensatory Mitigation for Special-Status Species Habitat Created or Enhanced at Initial Mitigation Sites	3F-18	Table 3F-4 of the DEIR indicates there will be a net loss of foraging habitat for burrowing owl, Swainson's hawk, and greater sandhill crane as well as nesting habitat for burrowing owl. However, the DEIR does not include any mitigation for the loss of these habitat types.	CDFW requests that EIR include appropriate mitigation for the loss of habitat through the conversion of habitat and commit to mitigating for habitat loss impacts caused by the implementation of its mitigation actions.

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Appendix 3F- Table 3F-4. Summary of Compensatory Mitigation for Special-Status Species Habitat Created or Enhanced at Initial Mitigation Sites	3F-18	Table 3F-4 of the DEIR proposes channel margin habitat be constructed on Bouldin Island to offset construction related impacts to fisheries resources, including winter-run and spring-run Chinook salmon. However, Bouldin Island is located outside the main migratory route for winter-run and spring-run Chinook salmon that utilize the Sacramento River. Sacramento basin CESA listed species enter the Mokelumne River either through entrainment through Georgiana Slough or through "reverse" outmigration through the San Joaquin River. Both routes are known to have reduced survival based on telemetry data. CDFW suggests review of telemetry studies to better understand salmon use of this area.	Although this restoration would be beneficial to the ecosystem, CDFW requests the EIR prioritize areas that are within the main migratory pathway of Sacramento Basin CESA-listed species that would be impacted by the construction of the NDD. CDFW also requests the EIR clearly identify which Covered Species are included under fisheries as identified in Table 3D-4. CDFW has different considerations regarding mitigation for smelt versus salmonids.
Appendix 3F- 3F.4.1.3 Bouldin Island Mitigation Sites	3F-21	The DEIR states that enhancements and construction activities on Bouldin Island would begin once Metropolitan Water District gives their support for the projects. This implies that all enhancement activities proposed to occur on Bouldin Island do not currently have approval by the landowner and may not be a viable site for mitigation.	As with all mitigation, CDFW recommends that the EIR clearly explain the feasibility of mitigation, relying only on mitigation measures that can feasibly be implemented.
Appendix 3F- 3F.4.1.3.2 Site Selection Criteria and Baseline Conditions	3F-25	The DEIR states that a delineation of potentially jurisdictional wetlands and other waters were mapped from aerial imagery for Bouldin Island. Standard delineation is a more accurate way of mapping habitat types.	As the Proposed Project relies on Bouldin island to achieve much of the mitigation required, CDFW recommends the EIR include standard delineation of habitat on Bouldin Island to assess existing features more accurately on the island in planning mitigation.
Appendix 3F- 3F.4.1.3.3 Site Design and Development	3F-30	The DEIR states that "Removal of any nonnative trees would be performed outside the bird nesting season (p. 3F-30)." However, no additional information is provided pertaining to a process for which the value of nonnatives is assessed. Often, old growth nonnatives (e.g., eucalyptus) provide low quality, suitable habitat in areas where habitat is lacking. Removing the trees does not replace the habitat features provided by nonnatives if they are playing an ecologically significant role.	CDFW requests more information regarding the removal of nonnative trees be added to the EIR including a process for evaluation of habitat significance to the surrounding area.

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Appendix 3F- 3F.4.1.3.6 Construction Schedule	3F-34	The DEIR states habitat restoration-related construction would likely occur over a period of 2–4 years given the scale of the mitigation site. Therefore, these mitigation sites will not provide habitat, and replace habitat lost, until after they establish mature vegetation with maintained hydrologic connection.	CDFW recommends transplanting some mature trees in riparian areas to provide some habitat benefits in a shorter time scale. Please also see comments about ensuring that habitat mitigation occurs on a timescale relative to Proposed Project construction impacts that is sufficient to avoid temporal impacts to species.
Appendix 3F- 3F.4.1.4 DWR I-5 Ponds	3F-34	The DEIR identifies the I-5 Ponds (Ponds 6, 7, and 8) as an initial mitigation site for several special-status species habitats, including giant garter snake (Table 3F-1). Currently, all three ponds are managed by CDFW as Class C Wildlife Areas open to the public for hunting and fishing.	CDFW recommends the EIR describe how habitat enhancement and creation will impact existing land use while also enhancing species' conditions above existing conditions.
Appendix 3F- 3F.4.1.4.2 Site Selection Criteria and Baseline Conditions	3F-35	The DEIR states that creating and enhancing wetland habitat at the I-5 Ponds will promote population viability and genetic connectivity among otherwise isolated populations of giant garter snake in the Delta. There is no existing information in the DEIR regarding surveys within the I-5 Ponds documenting current presence or absence of giant garter snakes at the sites. The DEIR also lacks information on how existing populations outside of the mitigation sites will be connected to the I-5 Ponds to allow for giant garter snake dispersal and habitat use. For lands to be considered suitable habitat sufficient for mitigation credit, those species being mitigated for must not only be able to access the habitat intended for their use, but DWR should be able to demonstrate their occupancy.	CDFW requests the EIR include information on current occupancy of the I-5 Ponds by giant garter snake and other special-status species. To allow for giant garter snake dispersal and occupancy, CDFW recommends the EIR commit to hydraulically connecting the I-5 Ponds to existing giant garter snake occupied habitat as well as provide continuous connectivity within the I-5 Ponds.
Appendix 3F- 3F.4.1.4.3 Site Design and Development	3F-51	The DEIR states restoration would result in a net gain of freshwater marsh and open water (pond or depression), and a loss of riparian and grassland. However, there is no discussion of the degree existing suitable habitat for special-status species will be removed to provide a full understanding of the impact and confirmation of 'net' improvement.	CDFW requests the EIR include further discussion regarding the removal of existing suitable habitat and how this might be minimized or avoided further.

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Appendix 3F- 3F.4.2.1.1 Wetlands and Other Waters	3F-55	The DEIR states that impact on tidal habitats may also be compensated through wetland creation credits at an approved bank. However, it is unclear how tidal habitats can be compensated through vernal pool or alkaline wetlands that are not tidally influenced.	CDFW requests the EIR clarify how tidal habitats can be compensated through vernal pool or alkaline wetlands that are not tidally influenced or commit to in kind compensation.
Appendix 3F- 3F.4.2.2 Site Protection Instruments	3F-56	While the DEIR states the Compensatory Mitigation Plan (CMP) would be required to offset the impacts to tricolored blackbird nesting and foraging habitat, it states that no mitigation is specifically proposed for foraging habitat impacted by construction activities. While mitigation projects proposed to offset impacts to other resources may provide for suitable tricolored blackbird habitat, the lack of commitment to tricolored blackbird foraging habitat mitigation is questionable given that habitat loss in the Delta is a limiting factor for the species, particularly due to constant land use changes and deterioration of habitat. Reduced presence of tricolored blackbird in the Delta reflects the ongoing need to provide habitat protection and improvements.	CDFW recommends the EIR include mitigation for tricolored blackbird foraging habitat loss. Specifically, CDFW recommends the EIR mitigate for both nonbreeding and breeding foraging habitat in addition to nonbreeding roosting habitat at a ratio of 1:1 for breeding and nonbreeding foraging, 2:1 for roosting, and 3:1 for nesting. Mitigation should be applied to both temporary and permanent impacts caused by the Proposed Project.
Appendix 3F- 3F.4.3.1 Programmatic Approach	3F-56	The CMP of the DEIR proposes a conceptual plan for tidal restoration to offset hydrodynamic impacts due to NDD, such as reverse flows at Georgiana Slough and reduced bench inundated habitat. However, the DEIR does not include specifics regarding the siting of the restoration, or the acreage needed to offset impacts to salmonids. Without these details and associated modeling CDFW has concerns about the efficacy of tidal restoration in mitigating the hydrodynamic impacts of the NDD as well as the approach to evaluating the conceptual idea after the Proposed Project is constructed. It is also unclear how tidal restoration proposed under the Proposed Project will interact with ongoing EcoRestore projects located in the Delta and existing North Bay Aqueduct operations.	CDFW requests the EIR include modeling to demonstrate how the proposed conceptual plan for tidal restoration could influence hydrodynamics and beneficially affect routing and survival in the north Delta. CDFW also recommends the EIR contain a clear CMP that includes both mitigation for construction related impacts as well as operation related impacts to avoid deferred mitigation.

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Appendix 3F- 3F.7.1 Performance Standards	3-74	The DEIR includes a discussion of performance standards that will provide the basis for DWR's annual monitoring and evaluation of each mitigation site. The proposed performance standards rely on floristic, physical, and hydrologic components of the habitat without consideration of special-status species occupancy.	CDFW recommends the EIR consider occupancy as a performance standard and include occupancy monitoring to determine habitat use.
Appendix 4B- 4B.1.2.4 Delta Simulation Model 2 (Residence Time)	4B-17	Alternative 5 should include the assumption that diversions from the North Delta are prioritized over south Delta diversions instead of including this analysis as a sensitivity analysis. This operation (within operational flexibility) demonstrates the maximum change from current conditions allowable by the proposed operating criteria. Additionally, we suggest that diversions from north Delta be prioritized in every month, not just December through June as done in this Appendix. July through November also needs to be evaluated with maximized north delta diversions to assess the impacts of CHABs, and other potential effects.	CDFW requests Alternative 5 is adjusted to prioritize the North Delta Diversion, in all months, to evaluate the maximum impact of the Proposed Project within the range of operational flexibility included in the Project Description.
Appendix 4C- 4C.3 Alternative Regulatory Scenario Description and Modeling Results	4C-4	This assumption (limiting the north delta diversion's use to only when Delta outflow exceeds 29,000 cfs) is a significant change in operations, which makes it no longer directly comparable back to Alternative 5. The depiction of Project operations in the model should not be conservative or on the low end of the flexible operating range. The Project operations need to be modeled with the maximum allowed diversions, to assess the maximum impacts.	CDFW Recommends removing the conservative assumption, limiting the north delta diversion to be used only when Delta Outflow exceeds 29,000 cfs, to better depict potential project impacts.
Chapter 5- General Comment	Multiple	The reservoir storage and flow data presented in Chapter 5, Surface Water, is displayed as long-term averages and/or monthly long-term averages. This potentially provides an incomplete understanding of the impacts of the project, as the most acute impacts to fish and wildlife occur under extreme conditions and not when conditions are approximating the average. Additionally, the DEIR does not contain a discussion of the more extreme changes to reservoir storage and flow that could occur under conditions with the project. This is problematic as the Calsim 3 results provided in	CDFW recommends that the EIR provide an analysis that shows the variability in reservoir storage and flow that can be expected under conditions with the Proposed Project, when compared with existing conditions and the No Project Alternative. This includes providing data that show the greatest changes in reservoir storage and flow that might be expected under conditions with the Project. Additionally, detailed discussion should be provided to explain what is causing these changes, including information that details any

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		Appendix 5A, Section B, show that even when looking at averaged flow data, conditions with the project, at times, reduce and/or alter flow on the Sacramento River, far north of the project's diversions, during periods of time that could detrimentally affect fish and wildlife. No explanation is provided to account for these changes in flow, nor is any commentary provided acknowledging the potential impacts that could arise from these changes.	changes to the operation of other reservoirs in the system.
Chapter 5- 5.3.1 Methods for Analysis	5-11	The DEIR's analysis of changes to surface water does not include a quantitative assessment of potential cumulative impacts that could arise should reasonably foreseeable future projects, such as Sites Reservoir, the Los Vaqueros Expansion Project, and Harvest Water Project be built and operated ahead of DCP. Sites Reservoir could significantly alter flows on the Sacramento River, during the same time periods as DCP. Sites Reservoir, the Los Vaqueros Expansion Project, and Harvest Water Project could contribute to a reduction in Delta outflow, during periods of time that DCP also reduces Delta outflow. Additionally, these projects could cumulatively have the most significant changes to surface water, during the driest years, when impacts to fish and wildlife are likely to be the most severe.	CDFW recommends that the EIR provide a quantitative assessment of the cumulative effects to surface water, along with the corresponding impacts to fish and wildlife, of having reasonably foreseeable future projects, such as Sites Reservoir, the Los Vaqueros Expansion Project, and Harvest Water Project operate concurrently with DCP.
Chapter 5- Changes to Sacramento River Basin Flows	5-29	Graphical comparisons showing percent changes in long-term monthly average flows under the project alternatives relative to existing conditions are provided. However, it would also be useful to see a graphical comparison of the alternatives relative to the No Project Alternative, to compare potential impacts of the alternatives against future conditions without the project. Additionally, it is difficult to visually discern differences between the different alternatives, as they are displayed as overlapping lines on the same graphs. While the percent differences between the alternatives often only vary slightly, there are times when under some alternatives flows increase at given location, where for other alternatives they decrease. These differences between the alternatives occur at	CDFW recommends that graphical comparisons for the long-term monthly average flows under the project alternatives relative to the No Project Alternative be included in the chapter. Additionally, CDFW recommends revising the included graphical comparisons for long-term monthly average flow under the project alternatives relative to existing conditions, so that visually the differences between the alternatives can be compared more easily.

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		times that could have an impact on fish and wildlife. Thus, it would be helpful to be able to compare the differences better visually between the alternatives.	
Appendix 5A, Section B- Attachment 5- General Comment	Multiple	The data provided in Appendix 5A, Section B indicates that under with project conditions, flows on the Sacramento River at various locations upstream of the project diversions often decrease when compared with the No Project Alternative. For example, Table 5A-B5.2.5.4-D, shows averaged monthly flows, by water year type, at Wilkins Slough, under Alternative 5 (2040) minus the No Project Alternative. Flows under the Proposed Project are shown to decrease, at times, in all water year types, when compared to the No Project Alternative (2040). Of particular concern are decreases shown during below normal, dry, and critically dry years that occur at various times in the months of February through September. These decreases in flow could detrimentally affect fish and wildlife in several ways, including decreasing out-migrating juvenile salmonid survival, reducing juvenile salmonid rearing habitat, reducing floodplain inundation, and increasing water temperatures. Additionally, the DEIR does not include a quantitative assessment of reasonably foreseeable future water storage projects, such as Sites Reservoir, in its analysis, as this project would also be reducing flows on the Sacramento River during the same period.	CDFW recommends including an evaluation and discussion of the causes of the decreases in flow on the Sacramento River above the project's diversions. The EIR should closely assess the project's potential impacts to fish and wildlife during the times, when under with project conditions, changes to flow on the Sacramento River are the greatest. The EIR should also consider in its analysis the cumulative impact to flow on the Sacramento River that might occur if reasonably foreseeable future projects like Sites Reservoir operate concurrently. The detailed discussion should address how these impacts are being captured in the analysis and how they are being mitigated.
Appendix 5A, Section B- Attachment 5- General Comment	Multiple	The data provided in Appendix 5A, Section B indicates that under with-Project conditions, flows on the Sacramento River at various locations upstream of the Proposed Project diversions, as well as the Feather River at various locations upstream of the Proposed Project diversions, often decrease when compared with the No Project Alternative (2040). For example, Table 5A-B5.2.5.5-D, shows averaged monthly flows, by water year type, at Wilkins Slough, under the Proposed Project (2040) minus the No Project Alternative (2040). Flows are shown to decrease at times, in all water year types under with-	CDFW recommends including an evaluation and discussion of the causes of the modeled decreases in flow on the Sacramento and Feather rivers above the Proposed Project's diversions, including an explanation of why those impacts may or may not be limited by existing requirements. Specifically, the EIR should assess the Proposed Project's potential impacts to fish and wildlife during the times when changes to flow on the Sacramento River are the greatest under with-Project conditions. This analysis should also be completed for impacts to flows on the Feather River with assessment of the Proposed Project's potential impacts to salmonids when

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		Project conditions. Of particular concern are decreases shown during below normal, dry, and critical water years that occur at various times in the months of February through September. Table 5A-B5.2.14.5-D shows averaged monthly flows, by water year type, on the Feather River below Thermalito Afterbay Release, under the Proposed Project (2040) minus the No Project Alternative (2040). This table shows monthly averaged flows decreasing, under with-Project conditions, in the months of February through April and June, in dry and critical water years. Decreases in flow could detrimentally affect fish and wildlife by decreasing out-migrating juvenile salmonid survival, reducing juvenile salmonid rearing habitat, reducing the frequency and inundation of floodplain habitat, and increasing water temperatures. Additionally, because the data are presented as monthly averaged flows, it is likely that the more pronounced decreases in flow, along with their resulting impacts to fish and wildlife are not being adequately assessed or mitigated. This is further compounded by the fact that the DEIR does not include reasonably foreseeable future water storage projects, such as Sites Reservoir which would also be reducing flows on the Sacramento River during the same period.	changes to flow on the Feather River are the greatest.
Appendix 5A, Section B- B.10.1 Climate Change Under Existing Conditions	B-65	The DEIR states "while there has been no obvious trend in total water year runoff into the Sacramento and San Joaquin Rivers, there have been changes in the timing of that runoff. The fraction of snowmelt runoff between April and July relative to total year-round water runoff has declined over the past century" (p.B-65). This statement acknowledges that the existing conditions model is not depicting current hydrology nor hydrology that is expected to occur.	Without needing climate or rainfall-runoff modeling, DWR could modify the historical hydrology to reflect current conditions with respect to fraction of runoff occurring April to July (snowmelt). The snowpack ratio could be de-trended to current conditions, without changing annual runoff volumes (snowmelt runoff would shift to Oct-March runoff). Little to no adjustments would be made to recent years. This could be done as sensitivity analysis or used for the primary CEQA analysis and would not be

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			much different from using 2020-level land use, groundwater, or level of demand as the baseline.
Appendix 5A, Section B- Table 5A-B5.2.3.5-D, Sacramento River at Keswick Monthly Flow, Difference in Monthly Flow. (Revised Public Draft Appendix 5A- Attachment 5)	B-107	The data presented in revised Appendix 5A, Section B show that during periods when salmonids are spawning in the Sacramento River, flows at times, under with project conditions, have the potential to sharply differ in volume from one month to the next. For example, Table 5A-B5.2.3.5-D, shows averaged monthly flows by water year type at Keswick, under Alternative 5 (2040) minus the No Project Alternative (2040). Flows under Alternative 5 would, on average, in critically dry years, be 232 cfs higher in January and 789 cfs lower in February, when compared with conditions under the No Project Alternative. Sharp changes in flow from one month to the next have the potential to increase the risk of redd dewatering, particularly in drier years. The degree of risk is difficult to assess as the data is presented as monthly average flows. However, the data as presented indicates that there is the potential that Project operations could, at times, result in redd dewatering, particularly in drier years.	CDFW recommends the EIR assess the potential risk of redd dewatering on the Sacramento River considering the proposed Project's operations and any other requirements currently in place.
Appendix 5A, Section B- Attachment 5	B-185	The data provided for Fremont Weir spills indicate that there is the potential for spills to the Yolo Bypass to decrease, particularly in the January-February period, under with project conditions.	The EIR should analyze the project's effect on spills to the Yolo Bypass including the cumulative impacts of reasonably foreseeable future projects.
Appendix 5A, Section B- Attachment 5- General Comment	Multiple	The DEIR does not provide any data or analysis of the Project's potential impact to the Sutter Bypass. Sutter Bypass receives water from Tisdale and Colusa Weirs, which overtop, during high flow events on the Sacramento River. Under with project conditions, modelling indicates that flows on the Sacramento River are, at times, reduced upstream of the Project, during months when spills to the Sutter Bypass are likely to occur. This has the potential to reduce the occurrence and/or volume of spills to the Sutter Bypass, which could detrimentally impact fish and wildlife.	CDFW recommends that the EIR analyze potential changes to the occurrence and volume of spills to the Sutter Bypass, along with potential corresponding impacts to fish and wildlife, both project-specific, and cumulatively with other reasonably foreseeable projects or activities.

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Appendix 5A, Section D- Figure 5A-D1.1.7 through Figure 5A-D1.1.18, Figure 5A-D1.1.37-A through Figure 5A-D1.1.37-D, and Figure 5A-D1.1.38 through Figure 5A-D1.1.49	D-20 - D- 26 and D-45 - D–48	Multiple sets of figures were used to show the same model results. Figure 5A-D1.1.7 through Figure 5A-D1.1.18 show the same results as Figure 5A-D1.1.37-A through Figure 5A-D1.1.37-D, with only the x-axis reversed, and it is not clear whether these figures are for the full simulation period or a specific water year type. In addition, the information in these figures is included in Figure 5A-D1.1.38 through Figure 5A-D1.1.49. The comment also applies to figures for other model output locations.	CDFW requests re-organization of the figures to present model results concisely.
Appendix 5A, Section D- D.2.2.4 Simulation of Selective Withdrawal	D-7	The DEIR states the location of temperature compliance is at the Red Bluff Diversion Dam as required in Water Board Order 90-5. However, an approved annual Temperature Management Plan may designate a different location for temperature compliance, which may be at Clear Creek or some other locations.	CDFW recommends that the EIR acknowledge that the location for temperature compliance can be set based on Shasta storage volume and the Biological Opinion in place which includes Shasta reservoir operations.
Appendix 5A, Section D- Figures 5A-D1.1.7 through 5A-D1.1.18 and Figures 5A-D1.1.37-A through 5A-D1.1.37-D	D-20 - D- 26 and D-45 - D–48	Figures 5A-D1.1.7 through 5A-D1.1.18 show the same average monthly water temperature results for the American River above the confluence as Figures 5A-D1.1.37-A through 5A-D1.1.37-D. It is not clear whether these sets of figures are for the full simulation period or a specific water year type.	CDFW recommends model results are confirmed and corrected where appropriate in all tables and figures presented.
Appendix 5A, Section D- Figure 5A-D2.14.2 through Figure 5A-D2.14.5	D-785 - D-787	There appears to be an error in Figure 5A-D2.14.2 through 5A-D2.14.5 Sacramento River Below Keswick, Monthly Average Temperature (degree Fahrenheit). The October temperature for the No Project Alternative is lower than the Jan-Feb temperature. It looks like the curve for the No Project Alternative was shifted. All other model output locations have the same issue.	CDFW recommends revising these figures and updating them with corrected data for the No Project Alternative as needed.
Appendix 5A, Section D- Table 5A-D2.29.1-B Trinity River Above Lewiston, Monthly Average Temperature, No Project Alternative	D-1655	Table 5A-D2.29.1-B shows that at Trinity River above Lewiston, the modeled No Project Alternative monthly average temperature is lower in May than in February for the full simulation period, wet water years, below normal and dry water years. The modeled average temperature is lower in May than in January for wet water years. In addition, the modeled average temperature is lower in May than in March-April for all	CDFW recommends that the EIR review and if necessary, correct the model results reported in this table. If the numbers in this table match model results, the model assumptions and input data should be re-evaluated and fully described.

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		water years. It is not clear how the modeled May average temperature can be so low.	
Appendix 5A, Section E- Model Structure	E-2	SALMOD only calculates juvenile production each year as the cumulative survival of a predetermined set of eggs through the smolt life stage. There are several sources of mortality during these early life stages that vary based on flow and water temperature. SALMOD is not a true-life cycle model because it treats production results of each year independently such that outcomes do not accumulate year over year.	CDFW recommends using full life cycle models to evaluate impacts on listed salmonids.
Appendix 5A, Section E- Base Mortality	E-4	Recent observations of thiamine deficiency in winter- and spring-run Chinook salmon have led to significant mortality.	CDFW recommends reviewing and potentially modifying the base mortality calculations to incorporate the most recent estimates applied to winter- and spring-run Chinook salmon.
Appendix 5A, Section E- Modeled Salmon Species	E-7	Between Keswick and RBDD, during the spring, all four runs do occupy the space above RBDD. Although seasonal timing may indicate minimal overlap in competing life histories, distinct modeling runs may not be accurately characterizing the available habitat, for example, spring-run emigrating from natal tributaries will overlap with rearing and emigrating fall-run. Not including fall-run juveniles in the spring-run modeling runs may provide a false estimate of available habitat to spring-run.	CDFW recommends running the model with multiple Chinook runs combined.
Appendix 5A, Section E- Computational Units	E-10	Does the SALMOD model still assume operations for RBDD? In 2013 the dam was decommissioned, and the gates were held in the open position. The inundation pool (Lake Red Bluff) previously created by the dam no longer exists in the previous form.	CDFW recommends updating this component to existing conditions if not already applied.
Chapter 6-6.3.2.1 No Project Alternative	6-48	If there are extended outages at the Delta diversion facilities in the event of an earthquake and levee failure, it is unclear to what extent alternate supplies may be insufficient and how much of impact that will have on the delivery reliability.	CDFW recommends providing further details on the likelihood of earthquake and levee failure risks and resulting impacts to water supply.
Chapter 6-6.3.2.1 No Project Alternative	6-48	The DEIR states SGMA may limit groundwater pumping which would increase pressure on surface water supplies, but it does not attempt to quantify a level of impact reduced groundwater pumping might have on surface water supplies or demand.	CDFW recommends the EIR further elaborate on the potential cumulative impact of the Proposed Project in combination with SGMA.

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		Additionally, reduced groundwater pumping in some basins may positively affect surface flows because of groundwater basin recovery and surface water - groundwater interactions.	
Chapter 6-6.3.2.2 Project Alternatives	6-48	The DEIR states the Project will provide water supply reliability by adding additional diversions that can be used in the event of a levee failure in the Delta- which otherwise may cause diversions in the south Delta to cease. However, the DEIR does not speak to reliability improvements for the whole system. Therefore, it is unclear if the Project improves reliability during a seismic event to only apply some regions, including south of Delta, or to the entire system.	CDFW requests that the EIR add further explanation as to whether the reliability improvements will be for the whole system or only limited to some portion(s) of the system. Further information should be provided linking specific areas and facilities that would benefit to Project construction and or operational components.
Chapter 8 – 8.0 Summary Comparison of Alternatives	8-1	The DEIR in its assessment of potential groundwater-related impacts did not include the cumulative effects of Project operations a quantitative assessment of combined operations of reasonably foreseeable future projects, such as Sites Reservoir, the Los Vaqueros Expansion Project, and the Harvest Water Project in combination with the Proposed Project.	CDFW recommends that the EIR include a quantitative assessment of the cumulative effects of the Project on groundwater along with operations of reasonably foreseeable future projects, such as Sites Reservoir, the Los Vaqueros Expansion Project, and Harvest Water Project when analyzing potential groundwater-related impacts.
Chapter 8 – 8.1.3 Delta Region Groundwater; Figure 8-2	8-7	As shown in Figure 8-2, in addition to the Solano, South American, Tracy, Eastern San Joaquin, and Cosumnes Subbasins, portions of the Delta are underlain by the Yolo and East Contra Costa Subbasins.	CDFW recommends that the EIR identify each subbasin which underlies a portion of the Legal Delta as depicted in Figure 8-2. The subsequent discussions of groundwater quality (Section 8.1.3.2) and groundwater production and use (8.1.3.3) should discuss existing conditions in these subbasins.
Chapter 8 – 8.3.1 Methods for Analysis	8-13	The DEIR does not assess impacts on Groundwater Dependent Ecosystems (GDEs) within the study area and does not consider the sustainable management criteria thresholds that are identified in the Groundwater Sustainability Plans (GSPs) for the subbasins that underlie the study area. Potential declines in groundwater levels and altered interconnected surface water flows have the potential to reduce available shallow groundwater or disconnect GDEs from groundwater resources. Temporary disruption can stress GDEs, and sustained absence of	CDFW recommends that the EIR identify GDEs within the study area and assess the potential impacts to GDEs because of Project construction and operation that may result from changes in groundwater levels and interconnected surface waters.

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		shallow groundwater may lead to permanent GDE degradation or mortality.	
Chapter 8 - 8.3.1.2 Approach for Analysis	8-16	Limited groundwater-related impacts, within the DeltaGW Model domain, is not necessarily evidence that Project operations will have little to no groundwater-related impacts outside of the model domain. Project operations have different effects outside of the model domain and the groundwater basins in those areas are not the same as those inside of the model domain. Project operations alter surface water flows outside of the DeltaGW Model domain and there is the potential that those alterations will have groundwater-related impacts.	CDFW recommends that the EIR extend its quantitative analysis of potential groundwater-related impacts to encompass all areas where Project operations have the potential to alter conditions that could result in groundwater-related impacts.
Chapter 8 – 8.3.1.2 Approach for Analysis	8-19	The DEIR identifies thresholds for significance that include changes in stream gains or losses in interconnected stream reaches, changes in groundwater elevation, reduction in groundwater levels affecting supply wells, changes to long-term groundwater storage, and degradation of groundwater quality. The DEIR does not consider the sustainable management criteria thresholds that are identified in the groundwater sustainability plans (GSPs) for the subbasins that underlie the study area. In the GSPs for basins in critical overdraft and the remaining high and medium priority subbasins, submitted to DWR in January 2020 and January 2022, respectively, the plans have identified sustainable management criteria (SMC) thresholds related to changes to groundwater levels, groundwater storage, interconnected surface waters, and groundwater quality that would constitute locally determined significant and unreasonable, and undesirable results for all beneficial users of groundwater. The DEIR does not consider these locally defined significance criteria in its definition thresholds of significance for Project impacts. It is unclear how the study area GSPs' SMCs relate or compare to the DEIR's thresholds of significance and whether there is the potential for Project operations to limit groundwater sustainability agencies' ability to	CDFW recommends the EIR include a discussion of the relevant sustainable management criteria identified in GSPs submitted to DWR for the subbasins that underlie the study area. The EIR should include an assessment that demonstrates that the Project's thresholds for significance are at least as protective of groundwater users, including environmental users such as GDEs, as the locally determined SMCs in GSPs that were designed to avoid significant and unreasonable undesirable results.

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		meet their subbasin groundwater sustainability goals as defined in GSPs.	
Chapter 8 – 8.3.2.1 No Project Alternative	8-23	In its assessment of potential groundwater-related impacts, the DEIR did not explicitly consider SGMA implementation and associated groundwater management thresholds identified in groundwater sustainability plans (GSPs) for the subbasins underlying the study area. For the 2040 No Project Alternative, the DEIR asserts that there may be demand reduction or supply augmentation under SGMA that may reduce reported declines in groundwater levels; however, the DEIR does not identify or discuss the measurable objectives or minimum thresholds identified in GSPs which can be reasonably foreseen to occur by 2040. Some subbasin GSPs set measurable objectives or minimum thresholds at or below historic low groundwater levels. Without explicit identification of SGMA management criteria and comparison of SGMA groundwater thresholds to the reported groundwater level declines in the No Project Alternative, it is unsubstantiated to state that SGMA implementation may reduce groundwater declines. Additionally, it is possible that cumulative Project operations with SGMA implementation may cause potentially significant groundwater-related impacts.	CDFW recommends the EIR explicitly consider SGMA in its analysis of potential groundwater-related impacts in the 2040 No Project Alternative, as well as in the analysis of Project operations alternatives. The EIR should identify the relevant sustainable management criteria (SMC) thresholds in study area GSPs and assess potential cumulative impacts of Project operations with SGMA implementation.
Chapter 9- General Modeling Comment	Multiple	The DEIR does not address if the baseline conditions considered in the model include TUCPs or how Project exports impact the need for additional TUCPs in the future.	CDFW recommends analyzing Proposed Project operations during drought sequence in which a TUCP would be submitted to modify d-1641 standards as a sensitivity run in an appendix to the EIR to better understand Proposed Project operations under these conditions and associated impacts.
Chapter 9- 9.1.5.11 Cyanobacteria Harmful Algae Blooms	9-26	Benthic invertebrates are also impacted by toxins. CHABs can also have other negative impacts in addition to toxins. Blooms can alter water quality conditions. During a bloom pH can increase to above 9 shifting ammonium (non-toxic) to ammonia (toxic) to fish. Once the bloom recedes and starts to	CDFW recommends benthic invertebrates are added to as species impacted by toxins in the section describing negative water impacts of how blooms (pH, nutrients, dissolved oxygen).

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		decompose then dissolved oxygen levels can decline leading to hypoxia also killing fish, benthic invertebrates and other aquatic organisms that rely on dissolved oxygen	
Chapter 9- 9.1.5.11 Cyanobacteria Harmful Algae Blooms	9-28	The DEIR states hydrodynamic conditions of rivers in watersheds upstream of the Delta are not conducive to cyanobacteria bloom formation due to high velocity, high turbulence and mixing, and low residence times. However, CHABs have been found in a variety of aquatic environments in California. For example, benthic CHAB's, which have been present in the Eel River and DWR's Yolo Bypass Fish Monitoring Program also has observed Microcystis index scales in their data.	The EIR should include an analysis of the Project's potential to influence CHABs upstream of the Delta or provide discussion, including references, as to why this analysis is not needed.
Chapter 9- 9.1.5.11 Cyanobacteria Harmful Algae Blooms	9-28	The DEIR states large reservoirs upstream of the Delta are typically characterized by low nutrient concentrations, where other phytoplankton outcompete cyanobacteria. However, other cyanobacteria can occur in low nutrient water systems, such as the neurotoxin β-N-methylamino-l-alanine (BMAAa). Cyanobacteria are resilient and tend to outcompete other phytoplankton, so it is unclear if this statement is fully supported.	CDFW recommends the EIR provide references and further context to justify this conclusion or adjust analysis as needed.
Chapter 9- Bay Delta Water Quality Objectives	9-94	Exceedances based on water year type and month should be shown.	CDFW recommends that the EIR include more information on exceedances by month and water year type for last 10 years relative to the frequency Bay-Delta WQCP objectives are exceeded. Furthermore, clarification on real-time operations referenced are needed. Is this intended to reference currently proposed Project operations, or operations to be developed with fisheries regulatory agencies?

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Chapter 9- Impact WQ -7: Effects on Nutrients Resulting from Facility Operations and Maintenance	9-124	Throughout the chapter, the discussion of the source water fraction exported through CVP or SWP is unclear. For example, the DEIR states "The long-term average Sacramento River water fraction were modeled to increase by up to 5.5% in March while San Joaquin River water would decrease up to 4.5% and agricultural drainage waters would decrease by up to 0.7% in March, as a long-term average" (p. 124). It is unclear why there will be increases in source water from the Sacramento River through the CVP given that there will be less Sacramento River inflow into the Delta due to NDDs. CDFW assumes this increase is associated with wheeling between CVP and SWP; however, it is not clear based on proposed operations how wheeling will occur between the two facilities. It is also unclear why the highest increase in the fraction of source water occurs in March compared to other months.	CDFW recommends the EIR provide further explanation on the source water fraction exported through CVP or SWP and provide modeling to support analysis and conclusions. This analysis effects the level of potential Project impacts to water quality as well as other aquatic resources.
Chapter 9- Impact WQ-9: Effects of Dissolved Oxygen resulting from Facility Operations and Maintenance	9-131	The DEIR concludes "differences in Delta inflows that would occur under the project alternatives relative to existing conditions would not result in water temperature differences [that] would lead to lower dissolved oxygen concentrations" (p. 131). However, it is unclear if water temperatures were calculated by water year type or month. The scale of analysis could have an impact on the results presented.	CDFW recommends the EIR include a better description of the temperature analysis conducted. Specifically, water temperature impacts from the Project should be assessed at a minimum on a monthly time step but ideally daily. Extreme changes in water temperature could have detrimental effects to aquatic systems.
Chapter 12- Table 12-0, AQUA - 7	12-6	Text indicates entrainment results for the south Delta and the North Bay Aqueduct were combined. The facilities' entrainment results should not be combined. They are located far apart in the Project Area and are likely influenced by different hydrologic factors.	CDFW requests that the EIR separate entrainment results for south Delta and North Bay Aqueduct facilities.
Chapter 12-12.1 Environmental Setting	12-7	The DEIR does not discuss upstream (upstream of the Delta) environmental setting or stressors. Since the Project will impact aquatic resources, such as anadromous fish species, a discussion of the upstream habitat is critical to understand the impacts of the Project and impacts associated with upstream conditions.	CDFW recommends that the EIR include a section on upstream habitat (upstream of the Delta) within the Environmental Setting section to provide context for the analysis of impacts associated with upstream operations.

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Chapter 12- Table 12-1	12-8	Tule Perch, Pacific Herring, and Prickly Sculpin are species that produce young that rear in the Delta or Suisun Bay/Marsh and may be impacted by the Proposed Project construction and operations. These species are not currently included in Table 12-1 Fish and Aquatic Species of Management Concern Potentially Affected by the Project Alternatives.	CDFW recommends the EIR include Tule Perch, Pacific Herring, and Prickly Sculpin in Table 12-1, and include these species in its impact analysis.
Chapter 12-12.1.4.2, Delta, Aquatic Habitat	12-10	The DEIR states water temperatures in summer approach or exceed the upper thermal tolerances (e.g., 20°C to 25°C) for cold water fish species such as salmonids and Delta-dependent species such as Delta smelt. Longfin smelt also experience thermal stress at 20°C and should be included in any subsequent analysis and discussion.	CDFW recommends including Longfin Smelt to the examples of "delta-dependent species" and adding reference to Jeffries et al. (2016).
Chapter 12- 12.1.4.2, Delta, Aquatic Habitat	12-10	Current language in the DEIR leaves out Suisun and North Delta conditions when referencing high water temperatures contributing to low Delta smelt survival. High water temperatures in these regions may negatively impact the species and should be considered.	CDFW recommends including the recent FLOAT report as a reference. As temperature is increasingly becoming an estuary-wide issue subsequent analysis should consider Suisun and North Delta and not just the south Delta and San Joaquin River when assessing potential impacts.
Chapter 12- 12.1.4.2, Delta, Aquatic Habitat	12-11	CDFW is concerned about the conclusions drawn from the reference Murphy and Weiland (2019) and would like to continue to work with DWR to better understand the importance of including this material, in this context. Much of the Delta smelt population occupies the low salinity zone during the fall, with some individuals occurring in fresher habitats and some in more saline habitats (Hobbs et al. 2019; Eakin et al. 2020). The fact that some fish occur in fresher or more saline habitats (outside the LSZ) does not lessen, nor negate the need to continue to focus on habitat suitability within the Low Salinity Zone during the summer and fall.	CDFW recommends including Eakin et al. (2020) and Hobbs et al. (2019) to this discussion of fall X2 and juvenile Delta Smelt abundance/survival.

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Chapter 12- 12.1.4.2, Delta, Turbidity	12-14	The DEIR states "Recent modeling examining future climate scenarios, however, predicts significant increases in large flow events and sediment loading to the Delta from the Sacramento River over the next century for two representative greenhouse gas concentration pathways, which could increase turbidity"(p.11). The sentence seems to indicate that the predicted significant increases in large flow events and sediment loading that resulted from two representative greenhouse gas concentration pathways would increase turbidity. Is this meant to indicate that increased turbidity from climate change effects on flow and sediment loading would offset impacts to turbidity from the Proposed Project?	CDFW recommends the EIR clarify if this statement is intended to indicate that increased turbidity associated with high flow events would offset impacts to turbidity because of the Proposed Project. In its impacts analysis, CDFW recommends that the EIR clearly explain whether the Proposed Project's impacts related to turbidity are significant.
Chapter 12- 12.1.4.2, Delta, Turbidity	12-14	The DEIR states that 3550 cubic yards per day of sediment releases were needed to increase turbidity by 10 nephelometric turbidity units (NTU) between Emmaton and Mallard Island during May through September (p.14). However, it is unclear if the study concluded that sediment supplementation is feasible. Additionally, there is no information as to how many days of sediment releases would be needed to reach 10 NTU. Furthermore, the current language does not describe how the volume would compare to the to the expected volume settling in basins adjacent to the proposed North Delta export intake structures, nor does it include the volume of the drying lagoons in this section. Feasibility of turbidity supplementation in other regions has also not been addressed.	CDFW recommends the EIR: 1) include information on the number of days of sediment releases that would be needed to reach 10 NTU, 2) clarify how this volume compares to expected volume settling in the basins adjacent to proposed North Delta export intake structures, 3) include the volume provided by the drying lagoons described in Chapter 3, and 4) provide discussion whether turbidity supplementation in other regions is feasible.
Chapter 12- 12.1.4.2, Delta, Contaminants	12-16	The DEIR does not address risks to diving ducks, sturgeon, and splittail due to biomagnification of selenium before consuming *Potamocorbula*.	CDFW recommends that the EIR state that diving ducks, sturgeon, and Sacramento splittail are at greatest risk of selenium toxicity due to both selenium presence in nonnative benthic bivalves and biomagnification of selenium by *Potamocorbula*.

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Chapter 12- 12.1.4.2, Delta and North Delta Fish Passage and Entrainment	12-17	The DEIR does not indicate whether there will be changes to Barker Slough operations as part of the Proposed Project. Changes to Barker Slough operations could result in impacts to aquatic resources.	CDFW recommends that the EIR analyze impacts associated with any anticipated changes to Barker Slough operations as part of the Proposed Project.
Chapter 12- 12.1.4.2 Habitat Conditions and Environmental Stressors in Delta and Suisun Bay/Marsh	12-17	The DEIR states "Consequently, reduced Sacramento River inflow increases the frequency of reverse flows at this junction, thereby increasing the proportion of fish that are entrained into the interior Delta, where mortality is high" (p.17). In the statement, it is unclear if "frequency" is referring to the number of flow reversals or the magnitude and duration.	CDFW requests the EIR clarify the meaning of "frequency" discussed in this sentence. Specifically, does "frequency" refer to the number of flow reversals or the magnitude and duration of flow? This detail impacts how the information is interpreted for development of mitigation measures.
Chapter 12- 12.1.4.2, Delta, Fish Passage, and Entrainment, Central and South Delta Fish Passage and Entrainment	12-18	The text used in this sentence may downplay the effect of filling Clifton Court Forebay (CCF) during flood tides on Delta hydrology and may leave readers with the impression that fish may not be drawn toward Project facilities. Specifically, the SWP harnesses the power of flood tides to fill CCF. While it is true that tidal fluctuation causes reverse flows across the Delta, the SWP exacerbates this effect via filling of CCF on the flood tides.	CDFW recommends emphasizing a stronger effect on delta hydrology than what is conveyed here (i.e., changing language to "which draws fish" rather than "some fish").
Chapter 12- 12.1.4.2 Habitat Conditions and Environmental Stressors in Delta and Suisun Bay, Central and South Delta Fish Passage and Entrainment	12-22	The habitat information provided in Section 12.1.4 of the DEIR provides supporting evidence primarily for federally and state endangered and threatened species and does not provide sufficient habitat information relevant to non-endangered or threatened species.	CDFW recommends that the EIR include research and supporting evidence of non-endangered or threatened species to fully understand baseline habitat conditions for all aquatic species analyzed in the EIR.
Chapter 12- Table 12-2, Aquatic Habitat Sampling Platform: Platform Utility and Delta Implementation Studies	12-32	CDFW notes that the Sampling Platform can sample without “handling” the fish if the cameras are on, and the trailing net is open to allow fish to pass through. However, the act of guiding fish into a narrowing channel to be photographed can still have an impact.	CDFW recommends that the EIR acknowledge that the act of funneling fish into a narrow channel could still cause impacts to fish.
Chapter 12- 12.1.4.2, Yolo Bypass, Aquatic Habitat	12-35	The DEIR does not include a discussion about the frequency and duration of Yolo Bypass inundation, or at what river stage the Sacramento River is required to overtop Fremont Weir.	CDFW recommends including information on the frequency in which the Yolo Bypass is inundated, the average duration of inundation, and the river stage of the Sacramento River required to overtop Fremont Weir.

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Chapter 12- Table 12-3. Methods for Analysis of Potential Effects on Fish and Aquatic Resources	12-41	The DEIR analysis for fish and aquatic resources focuses on the analysis of smelt and salmonids. It only includes X2-abundance regression, underwater construction noise, and salvage-density analyses for other special-status fish and aquatic species.	CDFW recommends that the EIR include species specific analyses to identify Project operational impacts and fully analyze Project impacts to non-special-status fish and aquatic species. Specifically, analyses should identify migratory, entrainment, and indirect impacts (water quality, water temperature) to non-smelt and salmonid species.
Chapter 12- 12.3.3.1, predictable actions by others	12-47	The DEIR discussion in section 12.3.3.1 excludes consideration of interactions between the locations chosen for water diversions and operation effects. Intakes located within protected embayment might be proximal to important spawning or larval rearing habitat(s); similarly, intakes located at the convergence of two currents would be more likely to encounter more eggs and larvae than if located elsewhere.	CDFW recommends the EIR include a discussion of how intake location may affect operation effects so that these effects can be fully analyzed, and minimization approaches considered.
Chapter 12-12.3.3.2 Impacts of the Project Alternatives on Fish and Aquatic Resources, Impact Aqua-1	12-48	Impact Aqua-1 does not fully explore the sources of impacts to starry flounder, CA bay shrimp, and Central CA roach. Starry flounder might be directly impacted by the Proposed Project because some juveniles migrate to and upstream of the Proposed NDD and have been caught in the sport fishery at Miller Park. Starry flounder and CA bay shrimp also have a known outflow-abundance relationship (Kimmer 2002) and thus would be expected to be impacted by the Proposed Project because of reduced Delta outflows.	CDFW recommends that the EIR fully explain, with citations, the Project impacts to starry flounder, CA bay shrimp, and Central CA roach.
Chapter 12-12.3.3.2 Impacts of the Project Alternatives on Fish and Aquatic Resources, Tables 12-6 through 12-9	12-51	Tables 12-6 through 12-9 separate acoustic impacts by intake and are difficult to compare between DEIR alternatives, because each alternative includes multiple intakes.	CDFW recommends that the EIR include a discussion that considers total impacts associated with each alterative, then compares each alternative to the others to better illustrate large scale differences among alternatives in addition to the discussion of impacts related to individual intakes.
Chapter 12- Impact AQUA-1: Effects of Construction of Water Conveyance Facilities on Fish and Aquatic Species, Construction	12-56	The impacts of methylation of mercury, as sediment is disturbed, is not included in the DEIR as a construction impact.	CDFW recommends that the EIR include the methylation of mercury within Impact AQUA-1 and assess the potential impacts from the methylation of mercury.

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Chapter 12- Impact AQUA-1: Effects of Construction of Water Conveyance Facilities on Fish and Aquatic Species, Construction	12-57	Depending on the timing of withdrawals, changes to surface waters because of construction, may impact native fish.	CDFW recommends that the EIR evaluate the timing of withdrawals of surface water for construction to identify whether the EIR alternatives will impact native fish.
Chapter 12- Impact AQUA-1: Effects of Construction of Water Conveyance Facilities on Fish and Aquatic Species, Construction	12-58	The increased water temperature section does not discuss whether removed trees will be restored post-construction. Large riparian vegetation provide shade and help reduce water temperatures along channel margins.	CDFW requests that the EIR include a discussion or reference for restoration of riparian habitats post-construction within this section.
Chapter 12- Impact AQUA-1: Effects of Construction of Water Conveyance Facilities on Fish and Aquatic Species, Construction	12-59	It is unclear what is meant by “temporary” channel margin impacts. In the above section on increased water temperature, there is discussion about the removal of riparian habitat. This would not be considered “temporary” as the riparian habitat is unlikely to restore itself once construction is completed, and even if restored, will take some time to achieve pre-Project conditions.	CDFW requests that the EIR clarify what would be considered "temporary" in this context.
Chapter 12- Impact AQUA-1: Effects of Construction of Water Conveyance Facilities on Fish and Aquatic Species	12-62	The conclusion presented for Impact AQUA-1 provides insufficient detail to ascertain how it relates to the thresholds of significance, the specific impact mechanisms, and to “focal” species. Additionally, it is difficult to tell how impacts differ between the alternatives.	CDFW recommends that the EIR include a chart or other means to better disclose for the reader the scale or scope of the construction impacts of the Project, under the different alternatives.
Chapter 12- Impact AQUA-1: Effects of Construction of Water Conveyance Facilities and Fish and Aquatic Species, CEQA Conclusion	12-62	The DEIR states "The in-water work period varies depending on location/activity but is generally from June to October" (p.62). This in-water work window does not sufficiently address Chinook salmon races occurring in the Sacramento River Basin. Fall-run Chinook adults occur in the Sacramento River starting in July. Winter-run juveniles can emigrate through the lower Sacramento River generally starting in October, but as early as September.	CDFW recommends that the EIR acknowledge the potential for impacts to Chinook salmon races within the in-water work window and provide an analysis and mitigation plan for those potential impacts.
Chapter 12- Mitigation Measure AQUA-1a: Develop and Implement an Underwater Sound Control and Abatement Plan	12-63	The definitions for sound pressure level thresholds vary through the DEIR and some of the terms are not well described for the reviewer.	CDFW recommends that the sound pressure level thresholds be consistent throughout the EIR and explained in detail.

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Chapter 12- Mitigation Measure AQUA-1a: Develop and Implement an Underwater Sound Control and Abatement Plan	12-63	The DEIR defers the development of specific enforceable minimization measures to decrease pile driving impacts to a later date. As a result, it is unclear how protective these actions will be.	CDFW recommends that the EIR include specific enforceable measures to ensure the Project will not have significant impacts to special-state species. CDFW recommends including the following measures (1) specifying that the monitoring will be conducted by a NMFS/USFWS/CDFW approved fisheries monitor that is trained in fish behavior/biology/presence and timing concerns. If distress or injury result, CDFW suggests that the incident be reported to CDFW; (2) scheduling work for seasonal periods to avoid more sensitive life stages (i.e., eggs, larvae, and downstream migrating juveniles) that have no or limited capacity to avoid work areas; and (3) conduct monitoring that will detect signs of distress for fish.
Chapter 12- Mitigation Measure AQUA-1b: Develop and Implement a Barge Operations Plan	12-64	The DEIR defers the development of specific enforceable minimization measures to decrease barge impacts to a later date, making it unclear how protective these actions will be.	CDFW recommends that the EIR includes specific enforceable measures to ensure the Project will not have significant impacts to special-status species. CDFW recommends the EIR include the following measures (1) daily inspection and cleaning of barges to prevent the spread of invasive aquatic species; (2) if invasive aquatic vegetation is established near the construction site, DWR shall implement invasive plant control methods to prevent the spread of invasive aquatic plants during construction; (3) implementation of a process and timeline to avoid blockage if barges breakdown.
Chapter 12- Mitigation Measure AQUA-1b: Develop and Implement a Barge Operations Plan, All Project Alternatives, Performance Measures, Bank Erosion and Riparian Vegetation Loss	12-67	The DEIR indicates that barge work may cause erosion to the streambank and potentially significant impacts to the streambank and riparian habitat; however, the DEIR does not propose mitigation to decrease the impact to less than significant.	CDFW recommends that the EIR fully analyze the potential impacts and propose appropriate mitigation of those impacts, if found to be significant.
Chapter 12- Mitigation Measure AQUA-1c: Develop and Implement a Fish Rescue and Salvage Plan, Seining and Dip netting	12-70	The DEIR does not discuss development of site-specific plans with appropriate techniques to remove fish from work areas prior to seining and dip netting.	CDFW requests that prior to conducting seining and dip netting, that DWR develop a site-specific plan in consultation with CDFW and federal fisheries agencies to identify appropriate techniques to remove fish from work areas.

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Chapter 12- Mitigation Measure AQUA-1c: Develop and Implement a Fish Rescue and Salvage Plan, Electrofishing	12-70	The DEIR Mitigation Measure AQUA-1c does not commit to developing a dewatering and contingency plan minimization measures to protect aquatic resources during dewatering and fish rescue and salvage operations.	CDFW recommends the EIR include a dewatering and contingency plan that addresses measures to protect aquatic resources during dewatering and fish rescue and salvage operations. Measures should include having a designed fisheries biologist onsite and installing a fish screen, not to exceed 3/32 inches measured diagonally, around temporary water diversion pumps, consistent with NMFS (2017) and NMFS (2022) criteria for screen openings.
Chapter 12- Impact AQUA-1: Effects of Construction of Water Conveyance Facilities on Fish and Aquatic Species, Mitigation Impacts, Compensatory Mitigation	12-72	Mitigation Measure AQUA-1, compensatory mitigation impact summary does not include riparian and marshland habitat.	CDFW recommends that the EIR Mitigation Measure AQUA-1, compensatory mitigation summary include a discussion of the riparian and marshland habitat that is being proposed as mitigation for construction impacts.
Chapter 12- Impact AQUA-1: Effects of Construction of Water Conveyance Facilities on Fish and Aquatic Species, Mitigation Impacts, Compensatory Mitigation	12-73	The DEIR does not provide information regarding potential mitigation sites or types of sites that will be selected to implement the proposed mitigation.	CDFW recommends that the EIR include information regarding potential sites or types of sites selected for the proposed mitigation. This is important to providing an understanding of the feasibility of proposed mitigation measures.
Chapter 12- 12.3.3.2, Impact AQUA-2; Near-Field Effects	12-74	The DEIR lacks information regarding near-field effects of operations of the NDD on biofouling/debris loading as well as increased in-water structures (screens, refugia habitat, debris booms and pilings, increased artificial lighting, and increased SAV and FAV), all of which can increase predation risk by providing predator holding habitat.	CDFW recommends the EIR include analyses of the near-field effects of operations of the North Delta Diversion on biofouling/debris loading as well as increased in-water structures to better account for increased predation risk.
Chapter 12- 12.3.3.2, Impact AQUA-2; Near-Field Effects, North Delta Exports	12-74	The DEIR does not fully consider variation in the number of migrating individuals that would be passing the north Delta intakes. In 30-40% of years, when the Yolo Bypass is not inundated, the entire juvenile migrating winter-run Chinook salmon population would pass the NDD. It is likely that under climate change conditions, a larger proportion of the population of juveniles will be exposed to the NDD due to a reduction in Yolo Bypass inundation.	CDFW recommends the EIR clearly state the exposure risk of juvenile Chinook salmon at the NDD in terms of the proportion of the population exposed each year. CDFW recommends the EIR provide adequate mitigation for the migration of juvenile winter-run Chinook Salmon that remain in the mainstem of the Sacramento River and pass by the north Delta intakes.

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Chapter 12-12.3.3.2, Impact AQUA-2; Near-Field Effects	12-74	The DEIR does not include a discussion of potential changes in predator abundances and rates of predation on native fish populations as a part of the near-field effects of the NDD.	CDFW recommends the EIR include an analysis of increased predator abundance and rates of predation on native fishes near the NDD, and that predation risk be considered when refining operational criteria and NDD intake design to minimize near-field effects of the NDD.
Chapter 12- 12.3.3.2, Impact AQUA-2; Near-Field Effects; Tables 12-14 through Table 12-16	12-75 12-76	The DEIR does not include sufficient discussion to enable the reader to understand the implications of the results in Tables 12-14 through 12-16. It is not clear how to interpret results in relation to water surface elevation. For example, does Table 12-15 imply that when flows exceed 50% of the average (50% column), the screens will be in the upper water column 100% of the time (each month)? Is the idea that during higher flows, fish will be even higher than the screens and therefore less impacted by screen exposure? Table 12-16 is also difficult to interpret. For example, why can the screen at Intake C be in the lower position more frequently than at Intakes A or B?	CDFW recommends providing more information on how to interpret the results from Tables 12-14 through 12-16 so that CDFW and other users of the EIR can better understand the Proposed Project NDD intake configurations and consequent impacts.
Chapter 12-12.3.3.2, Impact AQUA-2; Near-Field Effects	12-78	The DEIR does not clarify the relationship between sweeping velocity and the critical streakline concept. It is unclear whether a fish that is on the intake side of the streakline would be able to navigate to the other side, or whether the approach velocity would be stronger than the sweeping velocity due to the flow of water being towards the intakes.	CDFW recommends that the EIR include more discussion of the relationship between sweeping velocity and the critical streakline concept. Additional detail should be provided to explain whether it is possible for a fish that is on the intake side of the streakline to be able to navigate to the other side.
Chapter 12- 12.3.3.2, Impact AQUA-2; Near-Field Effects	12-78	The DEIR potentially underestimates screen exposure time for juvenile Chinook salmon. Estimated fish exposure totaling 37.5 minutes should be considered with caution given that this assumes fish move downstream with flow (e.g., do not resist flow). This assumption does not apply well to juvenile Chinook salmon, which are known to resist downstream movement by facing into the direction of flow (Swanson et al. 2004). This behavior can result in a longer transit time than downstream flow, meaning that the estimated 37.5 minutes might be an underestimate of fish exposure.	CDFW recommends that the EIR, when discussing screen passage time, consider the direction which juvenile Chinook salmon swim when migrating. Fish exposure totaling 37.5 minutes should be considered as potentially underestimating passage time.

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Chapter 12- 12.3.3.2, Impact AQUA-2; Near-Field Effects; Table 12-17	12-79	Table 12-17 includes several confusing elements:1) The "Diversion Flow by Intake (cfs)" column does not clearly identify total maximum diversions under the intake combinations identified. For example, instead of saying 6,000 cfs for B&C combined, it says 3,000 cfs for B&C. This wording could confuse readers not familiar with the Project, implying total diversions only add up to 3,000 cfs. 2) The "Notes" column does not reflect the diversion rate modeled under the associated Freeport Flow.3) Information regarding the differences between assumptions for the model runs 5B, 5C, and 5D is important context, but is not provided.	CDFW recommends splitting the column "Diversion Flow by Intake (cfs)" in Table 12-17 to show intakes B and C each with means of 3,000 cfs (or 1,000 cfs) for each intake, for a total of 6,000 cfs (or 2,000 cfs) diversion flow. CDFW also recommends including the differences between the modeling scenarios 5B, 5C, and 5D and discussing why they were not modeled at different diversion rates like the other Freeport Flow scenarios. Finally, CDFW recommends including additional model results for tidally varying flows to better understand how tides influence operations at the NDD.
Chapter 12- 12.3.3.2, Impact AQUA-2; Near-Field Effects; Tables 12-18 through 12-22	12-80 through 12-86	The DEIR does not provide sufficient information to interpret the results found in Tables 12-18 through 12-22. Table 12-22 implies that the greatest frequency of NDD operations would occur during low Freeport flow conditions. Table 12-22 also shows different NDD diversion scenarios under different Freeport flows and has a scenario of 0 cfs for NDD diversion.	CDFW recommends that the EIR provide more information to support Tables 12-18 through 12-22, including a discussion on how to interpret the data presented. Results presented in Table 12-22 could be interpreted to imply that the Proposed Project will operate more frequently under low flow conditions, which is inconsistent with other information in the DEIR about planned operations. It is unclear why under higher Freeport flow conditions, the NDD rarely operate, even during summer months. CDFW requests additional explanation to interpret these results considering the description of operations in Chapter 3 that states the NDD will divert in the winter months during excess conditions. Additionally, CDFW requests that the EIR include a discussion of when the NDD would be expected to divert no more than 0 cfs.
Chapter 12- 12.3.3.2, Impact AQUA-2; Operations and Maintenance - All Project Alternatives, Near-Field Effects, North Delta Exports	12-89	The DEIR states "Fisheries studies would be undertaken to provide information on predatory fish and predation rate at the north Delta intakes once they are operational, to inform the refinement of future operations and adaptive management (p. 89)." However, baseline conditions also need to be evaluated prior to construction as well as post construction (prior to operations and with operations).	CDFW recommends that the EIR include an evaluation of baseline conditions or commitment to establishing baseline prior to construction and post construction (prior to operations) in addition to post construction (with operations).

Chapter or Appendix and Section/ Figure	Page	Comment: Issue	Comment: Recommendation
Chapter 12- 12.3.3.2, Impact AQUA-2; Operations and Maintenance - All Project Alternatives, Near-Field Effects, North Delta Exports, Entrainment, and Impingement	12-90	The DEIR is missing an analysis on bow wave effects; a potential hydrologic effect caused by the displacement of some water around cylindrical t-screens, as diversions pull water into the intakes.	CDFW recommends the EIR include an analysis on the bow wave effect during proposed operations to better understand the hydrodynamic effect of the proposed NDD intake structures.
Chapter 12- 12.3.3.2, Impact AQUA-2; Operations and Maintenance - All Project Alternatives, Near-Field Effects, North Delta Exports, Predation	12-91	The DEIR references Demetras et al. (2013) when discussing potential juvenile salmonid predators in the Sacramento River near the proposed intake locations. However, the maximum diversion capacities of the two facilities in Demetras et al. (2013) are 70 and 100 cfs, much lower than the proposed 3,000-7,500 cfs NDD. Additionally, the environmental characteristics in the study differ (e.g., water depth and predator type) from those of the Proposed Project. The proposed NDD have higher water temperatures than the locations studied under Demetras et al. (2013). As water temperatures increase, the metabolic rate and activity level of predators increase, which can increase the level of predation at a site. Based on these factors, the analysis in the DEIR appears to underestimate the potential for predatory fish to gather near in-water manmade structures by comparing the NDD to smaller scale diversions.	CDFW recommends including a more thorough discussion of the differences between the NDD and the two facilities studied in Demetras et al. (2013), as these differences should be considered when applying them to the NDD.CDFW recommends the EIR commit to conducting pre- and post-construction studies near the intakes to assess the abundance of predatory fish near the in-water manmade structures. There is no diversion of comparable scale and size in the Delta. Thus, a study of the effect of large diversions on predator attraction is warranted.
Chapter 12- 12.3.3.2, Impact AQUA-2; Operations and Maintenance - All Project Alternatives, Near-Field Effects, South Delta Exports, Juvenile Entrainment	12-93	The DEIR states "The risk of winter-run Chinook salmon entrainment under existing conditions and all alternatives would be minimized by the inclusion of the various regulatory requirements from the existing permits noted above (e.g., take limits for number of winter-run Chinook salmon lost to entrainment at the south Delta export facilities) (p. 93)". However, it is unclear how these existing regulations will minimize future Project impacts currently shown as they were designed to minimize impacts from other projects.	CDFW recommends providing additional information to explain how existing regulatory requirements that were designed in the context of south Delta facility operations without the NDD will minimize potential Project impacts. It is unclear from the current analysis how measures at the south Delta will minimize the additional impacts that could occur due to the addition of the NDD. The EIR should consider means to minimize NDD entrainment of Chinook Salmon.
Chapter 12- 12.3.3.2, Impact AQUA-2; Operations and Maintenance Far-Field Effects, Indirect Mortality Within the Delta, Hydrodynamic Effects; Table 12-28	12-96	The DEIR is missing discussion regarding the results in Table 12-28 Mean Channel Velocity (feet per second) in the Sacramento River Downstream of Intake C.	CDFW recommends including a discussion of the results shown in Table 12-28 to help the reader interpret them. For example, why is the velocity in April not impacted to the extent that the rest of the months are by Proposed Project operations?

Chapter or Appendix and Section/ Figure	Page	Comment: Issue	Comment: Recommendation
Chapter 12- 12.3.3.2, Impact AQUA-2; Operations and Maintenance, Indirect Mortality Within the Delta, Through-Delta Survival, Table 12-30, and Table 12-31	12-101 through 12-104	Based on the results presented in Table 12-30 and Table 12-31 it is unclear if juvenile routing was separated for Sutter and Steamboat sloughs or if these two paths were assigned as one route. Perry et al. (2018) shows that as Sacramento River flows increase, a greater proportion of fish enter the sloughs. There is a higher likelihood that fish will enter Sutter Slough because it is north of Steamboat Slough. However, as flows decrease Sutter Slough has overall lower survival compared to Sacramento River and Steamboat Slough (Perry et al. 2018). Results from Perry et al. (2018) are particularly interesting in the context of Condition of Approval 8.9.2 of the 2020 SWP ITP that requires investigations into the use of guidance structures to help entrain juveniles into Sutter and Steamboat sloughs.	CDFW recommends the EIR thoroughly explain the assumptions included in the Perry et al. (2018) model. Specifically, please explain the assumptions regarding survival rates through Steamboat and Sutter sloughs. CDFW also requests that EIR include separate analysis of these sloughs to better understand how juvenile routing and survival would be impacted from reduced outflow because of Project operations.
Chapter 12- 12.3.3.2, Impact AQUA-2; Operations and Maintenance, Indirect Mortality Within the Delta, Through-Delta Survival, Tables 12-30, and Table 12-31	12-101 through 12-104	The DEIR is missing a discussion of the modeling results from Tables 12-30 and 12-31. Specifically, it is not clear what is driving minimum changes in through-Delta survival in the months of April and May.	CDFW recommends the EIR include a clear discussion of how Proposed Project operations are dictating minimum changes in through-Delta survival in April and May.
Chapter 12- 12.3.3.2, Impact AQUA-2; Operations and Maintenance, Indirect Mortality Within the Delta, Through-Delta Survival, Table 12-32	12-105	Table 12-32 is missing Delta Passage Model results presented by month and water year type. This presentation is needed to understand how juvenile through-Delta survival is expected to change during peak presence in the Delta. This comment also applies to Appendix 12C, Table 12C-10.	CDFW recommends the EIR include results of the Delta Passage Model (both for 2020 and 2040 scenarios) by month in addition to water year type to be consistent with how results are presented throughout the section "Through-Delta Survival."
Chapter 12- 12.3.3.2, Impact AQUA-2; Operations and Maintenance Far-Field Effects, Habitat Suitability, Riparian and Wetland Bench Inundation, Table 12-33 Mean Riparian and Wetland Bench inundation Index by Geographical Group, Season, and Water Year Type	12-108 through 12-114	The DEIR is missing a thorough discussion of modeling results. Specifically, why are there more frequent events of increased wetland bench inundation than riparian? Are increased diversions expected to make these areas more suitable by increasing the area with lower inundation? If so, this result is not intuitive given that the benefits are also incurred in drier water years when less flow would likely cause a more substantial negative impact (i.e., make the area less suitable).	CDFW recommends the EIR expand the discussion on modeling results presented in Table 12-33 Mean Riparian and Wetland Bench inundation Index by Geographical Group, Season, and Water Year Type. Specifically, text should address why there are more frequent events of increased wetland bench inundation than riparian.

Chapter or Appendix and Section/ Figure	Page	Comment: Issue	Comment: Recommendation
Chapter 12- 12.3.3.2, Impact AQUA-2; Operations and Maintenance Far-Field Effects, Habitat Suitability, Water Temperature	12-115	The DEIR is missing discussion in context of the effects of various climate change scenarios on water temperature in the Sacramento-San Joaquin Delta.	CDFW recommends framing this analysis in the context of the effects of various climate change scenarios on water temperature in the Sacramento-San Joaquin Delta. Multiple studies suggest water temperatures will rise in the Delta leading to an increase in high mortality days for listed species and a decrease in successful adult maturation and spawning.
Chapter 12- 12.3.3.2, Impact AQUA-2; Adult Straying	12-120	The statement that "hatchery fall-run Chinook salmon straying rates of fish returning to the Sacramento River are always low" (p. 120), does not accurately capture the findings of Marston et al. (2012). The study found that while average stray rates for Sacramento Basin fish released upstream from the Delta is <1%, the range was between 0% - 6%. While it is true that this is comparatively lower than for the San Joaquin Basin (average of 18%; range of 0% - 70%), the range indicates that there are some years in which stray rates are higher than others in the Sacramento River. It is also important to note that the stray rates used in this study do not account for the altered hydrology in the Delta due to the Proposed Project. Therefore, it is inappropriate to use this study to conclude that Sacramento Basin stray rates would remain relatively low given that the north Delta exports will reduce Delta inflow from the Sacramento River. Furthermore, the study clearly shows that San Joaquin River stray rates are negatively correlated with pulse flow magnitude and positively correlated with Delta exports. In other words, reduced flow is the primary factor resulting in increased stray rates.	CDFW recommends that the EIR revise the text to reflect the conclusions in Marston et al. (2012) pertaining to Sacramento River Chinook salmon straying rates and the influence of reduced flows on increased stray rates. The EIR should also include a discussion of how returning adult salmonids find their way back to spawning grounds using a combination of olfactory and velocity/discharge cues (Keefer et al. 2006). It should also note that reduced flows in the Sacramento River because of the Project could be associated with a reduction of these cues, and subsequently increased straying. CDFW requests that the EIR include a flow change analysis for Sacramento River flows at Freeport during the period of adult upstream migration to better understand potential straying rates for adult salmon. Additionally, the EIR should include a discussion on the potential for increased straying into the Yolo Bypass because of the Project. It is hypothesized that tidal action provides attraction flows into the Yolo Bypass during non-flood periods, and that low Sacramento River flows amplify this by decreasing attraction to the main stem Sacramento River for adults passing through the North Delta (Gahan et al. 2016).
Chapter 12- 12.3.3.2, Impact AQUA-2; Riparian and Wetland Bench Inundation	12-106	The DEIR does not provide a clear description of whether there is other "unrestored" (e.g., natural) juvenile rearing habitat that would be impacted by the Project.	CDFW requests that the EIR describe whether there is additional juvenile rearing habitat (other than restored benches) that would be impacted by the Proposed Project. If so, additional analyses should be conducted, so that potential impacts to all juvenile rearing habitat are assessed.

Chapter or Appendix and Section/ Figure	Page	Comment: Issue	Comment: Recommendation
Chapter 12- 12.3.3.2, Impact AQUA-2; Riparian and Wetland Bench Inundation	12-106	In the DEIR's bench inundation analysis, the suitability of bench habitat is based entirely off the suitable depth criteria for juvenile winter-run Chinook salmon from USFWS (2005). Typically, approximation of suitable juvenile rearing habitat includes a velocity component as well. If water depth is suitable but velocities are too high, juveniles are unable to utilize the habitat for rearing. Additionally, the analysis represents bench habitat in only one dimension (length). Juvenile rearing habitat should be quantified as an area, given that fish will theoretically utilize the habitat along its entire length and width, as long as it meets whatever criteria you have specified (in this case, suitable depth).	CDFW recommends that the EIR either justify the exclusion or include the use of a suitable velocity criteria in the calculation of bench inundation indices. Additionally, the EIR should either justify why using length only (and not width as well) is appropriate for this analysis or include a width dimension for the calculation of bench habitat indices and mitigation calculations.
Chapter 12- 12.3.3.2, Impact AQUA-2; Riparian and Wetland Bench Inundation, Table 12-34	12-106; 12-115	The text in the DEIR provides percent differences relative to existing conditions for changes in bench inundation, but Table 12-34 only provides changes in linear feet. It is difficult to understand where the greatest percent change in bench inundation is located without having data presented as percent change.	CDFW requests that the EIR express the difference from existing conditions of bench lengths provided in Table 12-34 as percent differences.
Chapter 12- 12.3.3.2, Impact AQUA-2; Operations and Maintenance, Life Cycle Modeling, Table 12-43. OBAN Winter-Run Chinook Salmon Escapement Results	12-123	It is unclear how to interpret the OBAN modeling results in Table 12-43, as the DEIR-mentions median abundance in the discussion but shows mean escapement in the tables.	CDFW recommends including discussion to help the reader-interpret OBAN modeling results in Table 12-43. Additionally, CDFW recommends including results broken down by water years to serve as a comparison with the IOS results. CDFW also recommends including OBAN results for egg to juvenile survival for comparison with the IOS results provided.
Chapter 12- 12.3.3.2, Impact AQUA-2; Operations and Maintenance, Maintenance Effects	12-125	The DEIR is missing an analysis of impacts because of woody debris removal at each intake for long-term maintenance and associated mitigation. Removal of woody debris may impact species by eliminating cover, potentially increasing localized water temperatures, and or decreasing food sources.	CDFW recommends including analysis of impacts because of woody debris removal at each intake and mitigation for those impacts.

Chapter or Appendix and Section/ Figure	Page	Comment: Issue	Comment: Recommendation
Chapter 12- 12.3.3.2, Impact AQUA-3; Operations and Maintenance	12-132	The DEIR is missing a thorough discussion and/or analysis of the risks of impingement and increased predation for spring-run Chinook salmon at the NDD. Although spring-run size distribution may be larger than winter-run Chinook salmon, there is still a risk of impingement and predation the NDDs.	CDFW recommends including a thorough discussion and analysis of risks of impingement and increased predation for spring-run Chinook salmon at the NDD.
Chapter 12- 12.3.3.2, Impact AQUA-3; Operations and Maintenance	12-132	Table 12-48 should display data by month and water year type as opposed to total average for the water year only. Assessment of the results by water year type and month will provide greater clarity on potential impacts to spring-run Chinook salmon survival. Specifically, it is not clear why only Alternatives 2b and 4b show variation in the change of through-Delta survival in wet and below normal water year types when all other year types and Alternatives show the same change in survival irrespective of diversion capacity. Through-Delta survival is generally understood to be strongly influenced by flow through the Delta and the insensitivity of these results to variation in diversion rates is difficult to understand (Singer et al. 2020; Cordoleani et al. 2018). Additionally, modeling results and model uncertainty are not thoroughly discussed making it hard for the reader to understand what is driving some of these results.	CDFW recommends including results broken down by month and water year, consistent with results provided for winter-run Chinook salmon. This comment applies to Tables 12-48, 12-49, 12-50, and 12-51.CDFW also recommends including a thorough discussion of modeling results to help readers understand what is driving the results presented.
Chapter 12- 12.3.3.2, Impact AQUA-3; Operations and Maintenance; Table 12-51	12-134	Table 12-51 shows changes in through-Delta survival of spring-run Chinook salmon originating in the San Joaquin River, where survival is historically very low. Slight changes in the San Joaquin survival rate (as noted in the table with the same absolute values but different percent change values) can impact through-Delta survival to a much greater extent. It would be helpful to see more decimal places and results broken down by month and water year type.	CDFW recommends the EIR display through-Delta survival results with a greater number of significant digits so that small, yet potentially biologically significant, impacts can be identified and mitigated.

Chapter or Appendix and Section/ Figure	Page	Comment: Issue	Comment: Recommendation
Chapter 12- General comment on non-CESA listed species impacts	Multiple	The DEIR states that operation and maintenance effects will be less than significant for non-CESA/ESA listed special status species. However, the DEIR only utilizes the Salvage-Density Method to determine whether operations and maintenance activities will impact non-CESA/ESA listed special status species and does not analyze far-field impacts (e.g., aquatic weed establishment, decreased riparian habitat, decreased stream width) to non-CESA/ESA listed special status species.	CDFW recommends that the EIR analyze far-field effects to non-CESA/ESA listed special status species and develop specific enforceable measures to decrease all significant impacts to less than significant.
Chapter 12-12.3.3.2, Impact AQUA-6, Operations and Maintenance -All Project Alternatives, North Delta Exports	12-155	The DEIR states "The low population abundance of Delta smelt in recent years suggest that few Delta smelt would be exposed to potential near-field effects of the north Delta diversion intakes, including entrainment, impingement, predation, and upstream passage restriction" (p. 155). This species' extremely low abundance warrants very careful consideration of potential Project impacts. In addition, the discussion provided in this section has not addressed if the trend will continue after ongoing experimental releases of cultured Delta smelt.	CDFW recommends incorporating an analysis which establishes assumptions of Delta Smelt supplementation into the EIR to better address impacts of the Proposed Project on Delta smelt population abundance with hatchery supplementation.
Chapter 12- 12.3.3.2, Impact AQUA-6, Operations and Maintenance -All Project Alternatives, North Delta Exports, Upstream Migration effects and Predation	12-156, 12-157	The DEIR states "…the cylindrical tee fish screens and their associated manifolds, as well as the support piles for the log boom structure may provide velocity refuge for upstream migrating adult Delta smelt occurring near the intakes, thereby reducing the extent of the potential negative effect" (p.12-156,157). This language conflicts with the description of a bow wave effect stated on pg. 12-90; no explanation is provided addressing why bow waves would deter salmonids but provide a refuge for Delta smelt.	CDFW requests that the EIR clarify whether the hydraulic effects will provide refuge, or deter fish, and provide further analysis of the effect in Appendix 12b.11

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Chapter 12- 12.3.3.2, Impact AQUA-6, Operations and Maintenance -All Project Alternatives, North Delta Exports, Entrainment, and Impingement	12-159	Smelt eggs are demersal and adhesive, but their risk of entrainment depends upon what substrate they were spawned over. If spawned over a fixed substrate, then the risk of entrainment for eggs is zero, as long as they were not mechanically displaced (e.g., scoured off by high flows). If spawned on a sand substrate, they might be subject to suspension at higher flows. Smelt larva are demersal but swim into the water column to feed, and thus would be vulnerable to entrainment if hatched upstream on the same side of the river as the diversions (or were transported by flow to the same side as the diversions).	CDFW recommends that the EIR include language that acknowledges that eggs may have reduced entrainment risk relative to other life stages, but are still at risk of entrainment, depending on the substrate over which they are spawned.
Chapter 12- 12.3.3.2, Impact AQUA-6, Operations and Maintenance -All Project Alternatives, North Delta Exports, Entrainment, and Impingement	12-160	In discussing Entrainment and Impingement risk (Impact Aqua-6) the DEIR estimates the overall Delta smelt population exposed to the North Delta Diversion. The DEIR should recognize that climate change will likely result in rising sea level and salinity intrusion, which could expose a greater proportion of the Delta smelt population to the effects of the NDD in the future if X2 is shifted east.	CDFW recommends that the EIR acknowledge that rising sea level and salinity intrusion may affect the number Delta smelt that could be exposed to the effects of the NDD.
Chapter 12- 12.3.3.2, Impact AQUA-6, Operations and Maintenance -All Project Alternatives, North Delta Exports, Entrainment and Impingement, Table 12-88	12-160	The data presented in Table 12-88 is difficult to interpret. It is unclear how "minimum percent" is defined, and subsequently, how it defines the additional percentiles listed.	CDFW recommends that the EIR include a table listing the minimum percentiles for each month.
Chapter 12- 12.3.3.2, Impact AQUA-6, Operations and Maintenance -All Project Alternatives, Habitat Effects, Food Availability	12-167	The DEIR does not explain why less outflow is needed for meeting Delta salinity requirements under the Project alternatives. It is CDFW's understanding that south Delta exports would not be reduced to compensate for increased diversions from the north.	CDFW recommends that the EIR clarify whether the south Delta exports will or will not be reduced to compensate for increased diversions from the north. If south Delta exports will not be reduced CDFW recommends that the EIR explain why less outflow would be needed for meeting delta salinity requirements under the Project alternatives.
Chapter 12- 12.3.3.2, Impact AQUA-6, Operations and Maintenance -All Project Alternatives, CEQA Conclusions	12-179	While the north Delta intakes could result in a low percent reduction in sediment entering the Delta, even this small change could be impactful because sediment increases turbidity which is an important Delta smelt habitat attribute.	CDFW recommends further discussion on resuspension of sediment and the effect of available habitat for Delta smelt.

Chapter or Appendix and Section/ Figure	Page	Comment: Issue	Comment: Recommendation
Chapter 12- 12.3.3.2, Impact AQUA-7, Operations and Maintenance -All Project Alternatives, South Delta Exports	12-189	The DEIR notes that overestimates of Longfin smelt entrainment loss are only likely to occur in very wet years. However, Longfin smelt entrainment loss would likely be underestimated in dry years, as most fish are in Suisun and upstream regions and not in the bay. Impacts from the underestimate of Longfin smelt entrainment are further compounded by poor survival in drier years. Additionally, the DEIR did not include an analysis describing variation in downstream habitat suitability with changes in flow caused by Project operations. There is the potential for the Project to reduce downstream habitat suitability by reducing Delta outflow and thereby increasing salinity above levels that larval Longfin smelt can tolerate.	CDFW recommends that the EIR include language acknowledging that Longfin smelt entrainment loss is likely underestimated in drier years. Additionally, the EIR should include a detailed analysis assessing variation in downstream habitat suitability with changes in flow caused by Project operations.
Chapter 12- 12.3.3.2, Impact AQUA-7, Habitat Effects, Delta Outflow - Abundance	12-195	In 2019, CDFW considered DWR's application of the Nobriga and Rosenfield (2016) Longfin Smelt flow abundance model (Rosenfield 2020). The same model approach is used here in the DEIR. The model used in the DEIR, presents violin plots which include the variability of all factors that affect Longfin Smelt abundance (in addition to Delta outflow) and, as a result, do not provide a true comparison of flow scenarios. Additionally, changes in flow result in disproportionate changes in the modeled indices. Thus, the application of this model is not appropriate as prediction error is high, and the model consistently underestimates the FMWT index.	CDFW requests that the EIR address previous critiques of the model application by comparing alternatives for each run rather than all runs for each alternative. Additionally, results should be presented as a proportion of change in modeled indices for each run and should provide a full discussion of the uncertainty associated with the results.

Chapter or Appendix and Section/ Figure	Page	Comment: Issue	Comment: Recommendation
Chapter 12- Impact AQUA-11: Effects of Operations and Maintenance on Water Conveyance Facilities on Native Minnows (Sacramento Hitch, Sacramento Splittail, Hardhead, and Central California Roach)	12-214	The statement made in the DEIR is true, but only in wet years. Additionally, the contribution of reproduction in the Sutter Bypass can be sizable (Feyrer et al. 2005) and reproduction above the north Delta intakes is sizable as well, particularly as water levels decline in spring (Feyrer et al. 2005). Although young-of-the-year are recognized to move downstream at 25-50 mm, this may be a function of gear selectivity; larvae are also dispersed from floodplains (Baxter et al.1996) in the 7-12 mm range (Baxter unpublished). Also, historical USFWS beach seining shows substantial age-0 densities (the bulk of the catch) upstream of proposed north Delta intakes in 3 of 6 years investigated and these fish only represent those >=25 mm (Sommer et al. 1997), even though splittail <25 mm are caught (historically, records of some <25 mm splittail remain in the USFWS database; a 25 mm minimum size was implemented in the 1990s to speed field and lab identification). Splittail of all ages tend to be edge oriented, which would put them in proximity to shoreline or nearshore intakes (Baxter unpublished).	CDFW recommends revising splittail effects to include the likelihood of periodic events where larval and small juvenile splittail are encountering the proposed north Delta intakes. If screen porosity and approach velocities are as specified, entrainment and impingement should not have large effects.
Chapter 12- Impact Aqua-13: Effects of Operations and Maintenance of Water Conveyance Facilities on Northern Anchovy	12-222	Northern anchovy distribution in the upper estuary will likely be affected by reduced food availability (see Kimmerer 2006) in some water year types as noted in Table 12-0.	CDFW recommends that the EIR acknowledge and analyze this potential impact.
Chapter 12- Impact Aqua-13: Effects of Operations and Maintenance of Water Conveyance Facilities on Northern Anchovy	12-222	Citation should be Fleming 1999 rather than Baxter 1999.	CDFW requests that the EIR revise the citation.
Chapter 12- Impact Aqua-14: Effects of Operations and Maintenance of Water Conveyance Facilities on Striped Bass Impact Aqua-14: Effects of Operations and Maintenance of Water Conveyance Facilities on Striped Bass	12-224	To be consistent with previous text (e.g., salvage density results pg. 12-223, lines 39-40), this sentence should acknowledge that results indicate similar or negative effects on survival and abundance for all alternatives.	CDFW recommends that the EIR revise the text for consistency and cumulative effects.

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Chapter 12- Impact Aqua-14: Effects of Operations and Maintenance of Water Conveyance Facilities on Striped Bass	12-227	The conclusions presented in AQUA-14, generally acknowledge lower entrainment under Project alternatives. However, the conclusions do not acknowledge that the results also show generally lower survival or abundance.	CDFW recommends acknowledging lower survival and abundance for consistency and cumulative effects.
Chapter 12- Impact AQUA-15: Effects of Operations and Maintenance of Water Conveyance Facilities on American Shad	12-230	American shad are broadcast spawners so their larvae have a high chance of being entrained through the fish screens and removed from the Sacramento River, which would have impacts to the system and the species.	CDFW recommends that the EIR more thoroughly analyze American shad larval impacts.
Chapter 12- Impact Aqua-15: Effects of Operations and Maintenance of Water Conveyance Facilities on American Shad	12-231	The conclusions presented in AQUA-15, correctly acknowledge little difference in abundance between Project alternatives and existing conditions, but do not acknowledge that all those differences are negative.	CDFW recommends revising the EIR conclusions presented in AQUA-15 to point out consistently negative differences in abundance indices between existing conditions and project alternatives.
Chapter 12- Impact AQUA-16: Effects of Operations and Maintenance of Water Conveyance Facilities on Threadfin Shad	12-235	Threadfin larvae could potentially be entrained in Project intakes, which could adversely impact juvenile salmonids, as they are a food source.	CDFW recommends that the EIR discuss and analyze the potential for threadfin larvae entrainment into the Project intakes, as this could impact juvenile salmonids.
Appendix 12A- 12A.1 Fish and Aquatic Resources	12A-1	The DEIR states that the rationale to include species for description is that they were dealt with in previous env. documents. This seems like a citation/source of information, not a rationale for inclusion.	CDFW recommends revising the EIR to include species for description because of one or more of the following rationale:1) survival or abundance of one or more life stages is linked to a measure of flow,2) one or more life stages is known to be entrained or anticipated to be entrained in planned or current export facilities, or3) species that are listed or candidate for Threatened or Endangered Species status.

Chapter or Appendix and Section/ Figure	Page	Comment: Issue	Comment: Recommendation
Appendix 12A- 12A.1.1 Delta Smelt	12A-2	To this point in the section there has been no mention that Delta smelt are batch spawners capable of repeatedly spawning in a single spawning season, nor what proportion of females achieve spawning size through the spawning season.	CDFW recommends the EIR include: 1. additional text describing batch spawning and the potential for Delta smelt to spawn repeatedly during the spawning season if water temperatures remain in the range of about 9-18°C.; 2. that a sizable portion of the population achieves spawning size prior to the start of spawning, usually February; most achieve spawning size by March and all by April; 3. some mention should be made that females spawning in February could be prepared to spawn again in March or April. That all females achieve spawning size by April indicates that all are likely to spawn successfully at least once (Damon et al. 2016).
Appendix 12A- 12A.1.1 Delta Smelt	12A-2	Spring Kodiak Trawl begins in December to document Delta smelt distribution prior to high winter flows, smelt pre-spawning movements, and high exports which could increase risk of entrainment.	CDFW recommends that the text in the EIR be corrected to state that Spring Kodiak Trawl begins in December.
Appendix 12A- 12A.1.1 Delta Smelt	12A-3	Bennett et al. (2002) is a better citation for larval and juvenile depth distribution.	CDFW recommends using Bennett et al. (2002) as a reference.
Appendix 12A- 12A.1.1 Delta Smelt	12A-3	The text does not begin by explaining the primary reason for the high frequency of zeros.	CDFW recommends stating that a large number of zero catches occurs primarily because Delta smelt aggregate into relatively tight schools located in large areas of open water (Polansky et al. 2018).
Appendix 12A- 12A.1.1 Delta Smelt	12A-6	The DEIR states "Delta smelt are most vulnerable to entrainment at the SWP and CVP pumps when, as adults, they move from upstream into the central/southern Delta or as larvae, when they move from fresh water in the southern and central Delta downstream into the west Delta and Suisun Bay/Marsh" (p.12A-6). This is not quite the correct description for Delta smelt entrainment.	CDFW recommends: 1. Remove the 1st “from" in line 25, to read: "…they move upstream into the central/southern Delta…". 2. Revise the text to note that as larvae, Delta Smelt are most at risk as soon as they hatch until they successfully migrate west, not just during the movement.
Appendix 12A- 12A.1.1 Delta Smelt	12A-8	Unpublished gear comparisons from the 1990s onward and more recent gear evaluation work confirm primary, not exclusive, surface orientation of Delta smelt from about 30 mm (see Mitchell et al. 2017). Juvenile, sub-adult and adult fish move laterally (and vertically) with the tides to reposition or maintain	CDFW recommends changing the language to reflect results in published research, with associated citations.

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		position longitudinally in the estuary (Bennett and Burau 2015).	
Appendix 12A- 12A.1.2 Longfin Smelt	12A-21	Catchability may be a minor issue, because for most of the estuary light penetration is limited to the upper 2-3 m, particularly when longfin smelt are present. Rosenfield and Baxter (2007) do not mention any biases. Differences in catches between Mid Water Trawl (MWT) and Otter Trawl (OT) reflect differences in fish distribution and net deployment (MWT doesn't get to channel bottom or remain there long; OT does on both accounts). Lastly, CDFW does not understand what is meant by the DEIR stating "...used in surveys that suffer from mismatches in location and timing with the longfin smelt spawning season (Mahardja et al. 2017)" or this statement's relation to detection bias.	CDFW recommends that this section be revised as the implication is that the surveys are doing as poor job of capturing Longfin smelt due to a mismatch in locations and timing. CDFW does not believe Mahardja et al. 2017 supports this statement. CDFW recommends elaborating on this statement in the EIR or consider removing it.
Appendix 12A- 12A.1.3 - Winter-Run Chinook Salmon -Sacramento River ESU, Figure 12A-6	12A-22	Data from 2019 and 2020 was included in Figure 12A-6 in the DEIR, but not data from 2021.	CDFW recommends that the EIR include data from 2021 in Figure 12A-6.
Appendix 12A- 12A.1.3 - Winter-Run Chinook Salmon -Sacramento River ESU	12A-22	The quoted sentence implies that predation is the leading cause of mortality for juvenile salmonids in the Delta.	CDFW recommends that the EIR include a more comprehensive description of the factors that lead to increased mortality in the Delta, alongside analyses (e.g., acoustic telemetry) that identify through-Delta survival across different environmental conditions.
Appendix 12A- 12A.1.3 - Winter-Run Chinook Salmon -Sacramento River ESU	12A-23	The DEIR misrepresents the timing of when juvenile winter-run Chinook salmon enter the Delta. Rotary screw trap (RST) data at Knights Landing has shown that juvenile winter-run Chinook salmon begin entering the Delta as early as August.	CDFW recommends that the EIR be revised to show that juvenile winter-run Chinook salmon have been documented entering the Delta as early as August, as shown by RST data at Knights Landing.
Appendix 12A- 12A.1.3 - Winter-Run Chinook Salmon -Sacramento River ESU	12A-25	The DEIR only mentions water temperatures impacting winter-run embryo incubation. However, high water temperatures in the Sacramento River are a stressor for all life stages of winter-run Chinook salmon.	CDFW recommends that the EIR include language acknowledging that high water temperatures affect all life stages of winter-run Chinook in the Sacramento River.
Appendix 12A- 12A.1.3 - Winter-Run Chinook Salmon -Sacramento River ESU	12A-26	The DEIR does not fully characterize the primary factors that contribute to redd superimposition and predation in the upper Sacramento River. Redd superimposition is associated with reduced availability of suitable spawning habitat (due to temperature and	CDFW recommends that the EIR include language acknowledging that superimposition is associated with reduced availability of suitable spawning habitat (due to temperature and flow), and increased predation is associated with increased temperatures

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		flow). Increased predation is associated with increased temperatures (Nobriga et al. 2021) and increased SAV/in-stream structures.	(Nobriga et al. 2021) and increased SAV/in-stream structures.
Appendix 12A- 12A.1.3 - Winter-Run Chinook Salmon -Sacramento River ESU	12A-26	Dudley (2018) indicates that flow varies on a daily basis, and this can obscure its effect on juvenile stranding on an annual basis. Daily analysis shows that the risk of stranding increases as flow decreases. Dudley (2019) indicates that higher flow rates increased the out-migrant count. Dudley (2019) does indicate high flows can open more shallow pools that would not normally be inundated. However, it is important to note that flows in the Sacramento River are highly managed and shallow pools can become stranding pools when flow releases from Shasta Reservoir are reduced. Dudley (2019) also indicates that the density of outmigrants may impact the relationship with flow (low densities - strong effect of flow).	CDFW recommends revising section 12A.1.3 for clarity and to ensure that the citations provided (e.g., Dudley 2019) fully support the information being conveyed.
Appendix 12A- 12A.1.3 - Winter-Run Chinook Salmon -Sacramento River ESU	12A-26	The statement "flow increases velocity, increasing spawner energy expenditure and thereby reducing the time spent guarding the redd, allowing other spawners to make redds on top of the existing redds" p.12A-26) is not validated by field observations. Additionally, this sentence mischaracterizes the occurrence of superimposition. Regardless of how long a female guards its redd (1 day vs 7 days), there is always the opportunity for redd superimposition due to limited available (and suitable) habitat.	CDFW recommends revising the EIR to acknowledge that there is always the chance for superimposition of redds, as available and suitable spawning habitat is severely reduced.
Appendix 12A- 12A.1.3 - Winter-Run Chinook Salmon -Sacramento River ESU, Table 12A-2	12A-27	Table 12A-2 presents the temporal occurrence of Sacramento winter-run Chinook salmon by life stage in the Sacramento River. Data in the table only reflects the temporal occurrence of winter-run Chinook salmon based on when monitoring programs are operational. This likely does not capture the full range of winter-run Chinook salmon occurrence, as sampling is often limited in the summer months (June-August) due to elevated temperatures and the need to reduce handling of species exposed to those conditions. Lack of sampling does not indicate no presence. When Knights Landing Rotary Screw Trap	CDFW recommends that Table 12A-2 be updated to show that some of these monitoring locations are not able to be surveyed each month, but that this does not indicate that there is no winter-run Chinook presence during these months. For example, when Knights Landing rotary screw trap sampling has occurred in August, juvenile winter-run Chinook were captured. Additionally, the table should be updated to reflect recent changes to catch data at the sampling sites shown in the table. Specifically, September and October (and possibly November) at Red Bluff Diversion Dam should be changed to

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		sampling has occurred in August, juvenile winter-run Chinook salmon were captured.	"High" based on the catch data, while a "Low" classification in August and September for Knights Landing should be shown in the table. As analyses included in Chapter 12 rely on the timing of species presence to understand impacts, it's important to update these tables to accurately depict exposure time.
Appendix 12A- 12A.1.12 Sacramento Splittail	12A-63	Developmentally, the young-of-the-year present in April (and many in May) are all larvae.	CDFW recommends adding "Larvae" to considerations of this section in addition to juveniles. Because larvae are small and shore oriented, they will be vulnerable to entrainment and impingement at NDDs. The addition of larvae will recognize that very small fish will be migrating too, at least in the April and May period.
Appendix 12A- 12A.1.12 Sacramento Splittail	12A-63	The citation for this Sommer et al. 2007 is not present in the literature cited. This citation will need to include an "a" to separate it from one that discusses the Pelagic Organism Decline.	CDFW recommends including the associated full reference.
Appendix 12A- 12A.1.20.2 Smallmouth Bass	12A-73	Section 12A.1.20.1 is missing information that is important to characterizing the role of smallmouth bass in the environmental setting: Introduced species (Dill and Cordone 1997). No distribution in the system: lower portions of main rivers (Moyle 2002). Distribution in Delta and lower rivers (see Brown 2000, Brown and Michniuk 2007, Seesholtz et al. 2004, May and Brown 2002). Citations not already present in "References (as applicable)" column.	CDFW recommends including the topics listed, along with their associated citations: 1) Introduced species (Dill and Cordone 1997). 2) No distribution in the system: lower portions of main rivers (Moyle 2002). 3) Distribution in Delta and lower rivers (see Brown 2000, Brown and Michniuk 2007, Seesholtz et al. 2004, May and Brown 2002). Citations not already present in doc listed column L.
Appendix 12A- 12A.1.21 California Bay Shrimp	12A-74	Commercial trawling is not allowed in Suisun Bay nor the Delta. From title 14 section 119 of California Code of Regulations: "Trawl nets may be used only in the portions of Districts 2 and 3 lying westerly of a projected straight line beginning at Point Edith on the south and extending through Buoy "6" to the shoreline on the north."	CDFW recommends revising statement to clarify that trawling is limited to Carquinez Strait west of Buoy 6.
Appendix 12A- 12A.2.2.2.2, Habitat Conditions and Environmental Stressors in Sacramento River Area	12A-82	The DEIR does not clarify whether floodplains are accessible from Red Bluff to Chico Landing. Additionally, no discussion is provided regarding Project impacts to weirs and the Sutter Bypass.	CDFW suggests including discussion of weirs and Sutter Bypass.

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Appendix 12B- 12B.1- Juvenile Chinook Salmon Screen Passage Duration	12B-2	The DEIR states "Water temperature was assumed to be 12° Celsius, consistent with “winter and spring” conditions noted by Swanson et al. (2004)" (p. 12B-2). Results for a range of temperature values are necessary to determine if temperature influences screen passage time.	CDFW recommends that the EIR include an analysis and discussion of how different temperature ranges may impact screen passage time for juvenile Chinook salmon so that potential impacts can be disclosed and mitigated as necessary.
Appendix 12B- 12B.2 Salvage-Density Method, Table 12B-2	12B-4	The DEIR is unclear on why the Salvage-Density Method shows increased juvenile Chinook salmon entrainment at CVP under Project alternatives. Increases in entrainment under this modeling approach are attributed to increases in exports.	CDFW recommends that the EIR include a more thorough discussion regarding the results of the Salvage-Density Method. It would be beneficial for the reviewer to understand why the Proposed Project results in entrainment increases at CVP in the spring.
Appendix 12B- 12B.3 Juvenile Winter-Run Chinook Salmon Salvage Based on Zeug and Cavallo (2014)	12B-51	The DEIR is unclear regarding whether the Zeug and Cavallo (2014) models only salvage or if both entrainment and salvage are being modeled. This is important as entrainment and salvage are two different things.	CDFW recommends updating the text of the EIR to clarify if only salvage is being quantified in the model or if both entrainment and salvage are being modeled.
Appendix 12B- 12B.3 Juvenile Winter-Run Chinook Salmon Salvage Based on Zeug and Cavallo (2014)	12B-52	Fish are released to coincide with high flow events, which is known to increase survival probability. Based on the description in the DEIR it is unclear on whether this timing is reflected in the model. The presented findings seem to result from larger fish surviving outmigration and the salvage process. This model does not account for far- field effects to determine if fish are observed in salvage under other conditions, nor does it consider or explain the effects of exports particularly during low flows. Additionally, it is unclear if operation of the Delta Cross Channel Gates is closely correlated to this parameter.	CDFW recommends that the EIR include a more thorough discussion of the predictor variable in the selected model. For example, fish are released to coincide with high flow events, which is known to increase survival probability. It is unclear if this potential bias is reflected in the model. Additionally, the model does not account for far-field effects to determine if fish make it to salvage under other flow conditions, nor does it consider or explain the effects of exports, particularly during low flows. These issues should be addressed in the EIR. Lastly, CDFW requests that the EIR state whether operation of the Delta Cross Channel Gates is closely correlated to this parameter.
Appendix 12B- 12B.3 Juvenile Winter-Run Chinook Salmon Salvage Based on Zeug and Cavallo (2014), Figure 12B-2	12B-54	Figure 12B-2 is difficult to visually interpret, as the box plots for each water year type are too small to discern differences between the alternatives.	CDFW recommends that the EIR provide separate figures for each water year type and make each box plot much larger.
Appendix 12B- 12B.4 Hydrodynamic Effects Based on DSM2-HYDRO	12B-56	Figures 12B-2 through 12B-42, presented in Appendix 12B, are incomprehensible to people who are red/green color blind.	CDFW recommends that these figures be updated, in the EIR, with changes shown along a different

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Data, Figure 12B-3 through Figure 12B-42			color scale (for example blue/red or blue/yellow or grey scale) to meet ADA compliance.
Appendix 12B- 12B.4 Hydrodynamic Effects Based on DSM2-HYDRO Data, Figure 12B-13 through Figure 12B-31	12B-61 through 12B-65	The DEIR does not explain why modeled DSM2-Hydro Velocity results are grouped as averages across a three-month increment. Based on the entrainment and loss tables included earlier in Appendix 12B, it would be helpful to have velocity results for December, January, and February separated out, as the earlier modeling results show little difference in December, only slight differences in January, and more frequently a difference in February. Combining all of these months together could make it difficult for the reviewer to understand the magnitude of potential changes to specific time periods during juvenile salmonid migration. Additionally, it is difficult to understand the magnitude of the change observed and the direction of the change in the figures.	CDFW requests that the EIR describe how the months for these averaging periods were chosen and suggests breaking the months out separately, as the magnitude of the potential changes to specific time periods during juvenile migration is harder to understand when the months are grouped, potentially leading readers to misunderstand the results. Additionally, CDFW recommends that the EIR include tables or other graphical presentation to accompany the figures presented in this section.
Appendix 12B- 12B.4 Hydrodynamic Effects Based on DSM2-HYDRO Data, Figure 12B-28 through Figure 12B-32	12B-68 through 12B-70	DSM2-Hydro velocity modeling results presented in Figures 12B-28 through 12B-32 appear to conflict with entrainment results (Salvage-Density Methods). The model results show little to no change in velocities in the south Delta between March and May across all water year types and Project alternatives. However, Salvage-Density Method results showed up to an 8% increase in winter-run and up to a 9% increase in spring-run Chinook salmon entrainment/loss at the CVP as compared to Existing Conditions.	CDFW requests that the EIR add a discussion that links velocity results to the entrainment modeling results. The velocity modeling results in the south Delta show no changes, however the Salvage-Density Method showed increase salvage at CVP. Clarification needs to be provided to explain how the results should be interpreted when considered together.
Appendix 12B- 12B.4.2- Flow into Junctions, Figure 12B-44	12B-78	The results presented in Figure 12B-44 box plots for each water year type would be easier to interpret if accompanied by tabulated data.	CDFW recommends presenting results from this section in a table to assist in the interpretation of the data.
Appendix 12B- 12B.5 Delta Passage Model	12B-96	The DEIR discussion of the Delta Passage Model does not clearly identify which position the Delta Cross Chanel Gates were modeled (i.e., open or closed).	CDFW recommends that the EIR include a discussion describing what position the Delta Cross Channel Gates were modeled in for the Delta Passage Model.
Appendix 12B- 12B.5 Delta Passage Model	12B-102	The DEIR is unclear whether the Delta Passage Model includes salvage (trucking) as an emigration	CDFW requests that the EIR include detailed modeled documentation on the Delta Passage Model clarifying if salvage (trucking) is a emigration

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		pathway, and if so, whether it assumes 100% fish survival with handling.	pathway and if 100% fish survival with handling is assumed under this pathway.
Appendix 12B- 12B.7 Interactive Object-Oriented Simulation, Figure 12B-81 and Figure 12B-82	12B-127, 12B-128	The DEIR's IOS modeling results lack a thorough discussion of the flow management changes that will occur to increase egg and fry survival under the Proposed Project in critical water years. It is unclear from the Project Description what features of the Proposed Project would cause such results.	CDFW requests that the EIR include a discussion of the IOS modeling results to better explain increased survival under the Proposed Project during critical water years.
Appendix 12B- 12B.9 San Joaquin River Juvenile Chinook Salmon Through-Delta Survival (Structured Decision Model Routing Application)	12B-137	CDFW is concerned with the assumptions made in the Structured Decision Model Routing Application. The model assumes a positive relationship between survival and exports, which is based on research that suggests juvenile salmon entering the south Delta have higher survival if they are captured in the CVP salvage facility and re-released more seaward than those remaining in the Delta (Buchanan et al. 2013; Windell et al. 2017). However, little information exists to support this hypothesis, and data on post-release survival of salvaged fish is scarce (Allison et al. 2020). Only a subset of entrained fish is salvaged, and an even smaller subset of these fish survive the salvage process. Mortality rates prior to salvage can be high due to predation or poor water quality conditions, and handling can cause stress and injuries that reduce both short and long-term survival. The suggestion that survival is higher through the salvage process highlights the extremely poor survival rate of juveniles in the south Delta, which is hypothesized to result from poor rearing conditions (e.g., low refuge habitat and food availability) and high predation risk (Windell et al. 2017).	CDFW requests that the EIR include a detailed explanation to support the validity of the assumption that a positive relationship exists between juvenile survival and exports in the context of survival through the salvage process and after release and describe the potential uncertainties underlying this assumption.
Appendix 12B- 12B.11, Delta Smelt Upstream Migration Past North Delta Diversions	12B-143	The method chosen implies a speculative assumption – that Delta smelt are strong enough swimmers to swim past the screen. This assumption is inconsistent with the current conceptual model of Delta smelt swimming behavior as weak swimmers due to behavioral limitations on their ability to maintain steady swimming rates in lab studies (Swanson et al. 1998).	CDFW recommends including an analysis with two scenarios: one where Delta smelt are assumed to be stronger swimmers than previously described, and one where they display characteristically weaker swimming consistent with the current conceptual model of Delta smelt swimming behavior.

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Appendix 12C- 12C.2 Impact Analysis Impact AQUA-2: Effects of Operations and Maintenance of Water Conveyance Facilities on Sacramento River Winter-Run Chinook Salmon	12C-2	The DEIR states "Throughout this appendix, similar is generally taken to mean differences within a few percentage points (i.e., relative percentage difference between the project alternatives and No Project Alternative in 2040 compared to relative percentage difference between the project alternatives and existing conditions at 2020), although this is not necessarily applied in situations where small changes to low absolute differences may give relatively large relative changes" (p.12C-2). The statement is unclear on what range of percentages "similar" covers. It is also not clear why small changes in absolute values resulting in relatively large relative changes would be deemphasized.	CDFW requests that the EIR define the range of percentages in which "similar" covers when referring to the differences between the 2020 and the 2040 scenarios for winter-run Chinook salmon (and all other runs and species). CDFW also requests that the DEIR not devalue instances where large changes in relative values result from small absolute differences. A small change in absolute abundance when species are at historic low levels could result in a large relative difference and would have large biological implications.
Appendix 12C- 12C.2 Impact Analysis Impact AQUA-2: Effects of Operations and Maintenance of Water Conveyance Facilities on Sacramento River Winter-Run Chinook Salmon, Table 12C-3 and Table 12C-5	12C-3; 12C-5	The DEIR provides no explanation as to why there will be an anticipated increase in salvage, as presented in the Salvage-Density Method results in Table 12C-3, at the CVP facilities for below normal and dry years, given that the project description indicates that there will be no changes to CVP operations. There is also no discussion provided for Table 12C-5 to explain why entrainment loss at CVP increases much more in March of below normal and dry years, when compared with other months.	CDFW recommends that the EIR include a detailed discussion of the modeling results that address this issue.
Appendix 12C- 12C.2 Impact Analysis Impact AQUA-2: Effects of Operations and Maintenance of Water Conveyance Facilities on Sacramento River Winter-Run Chinook Salmon, Table 12C-6	12C-7	Table 12C-6 shows that juvenile winter-run Chinook salmon entrainment at the south Delta export facilities will decrease by a factor of 18% under the Proposed Project in wet years. The DEIR does not provide a discussion of what flow management will lead to a reduction in salvage in wet years.	CDFW recommends that the EIR include a detailed discussion of the modeling results that address this issue. Such a discussion is needed to help the reader to understand the DEIR's conclusions, as this result is not intuitive based on the Project Description.
Appendix 12C- 12C.2 Impact AnalysisImpact AQUA-2: Effects of Operations and Maintenance of Water Conveyance Facilities on Sacramento River Winter-Run Chinook Salmon, Table 12C-7	12C-7	The DEIR does not describe how there will be an increase in flows in February, March, and April of wet years under the Proposed Project according to the DSM2 modeling results. Additionally, no description is provided to explain what is driving positive velocity changes in May and June.	CDFW recommends that the EIR include a detailed discussion of the modeling results that address this issue. Such a discussion is needed to help the reader to understand the DEIR's conclusions, as this result is not intuitive based on the Project Description.

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Appendix 12C- 12C.2 Impact Analysis Impact AQUA-2: Effects of Operations and Maintenance of Water Conveyance Facilities on Sacramento River Winter-Run Chinook Salmon, Table 12C-8	12C-9	The DEIR does not provide an explanation of what is driving the increase in hours with reverse flows in some months. For example, Table 12C-7 shows increases in flow downstream of the intakes in February, March, and April of wet years under Alternative 5. However, Table 12C-8 shows an increase in reverse flows during that same time frame when flows are anticipated to be greater than the No Project Alternative. CDFW's understanding is that reverse flows can increase in November and January, because of shifting from south Delta to north Delta export operations to pull from excess flows. Additionally, it would be helpful to also have summary results from Appendix 12C (2040 scenario) compared to summary results for the 2020 scenario.	CDFW recommends the EIR include an explanation that addresses whether excess flows under the climate change scenario are anticipated to increase in the other months listed (September, February, and May). Such a discussion is needed to help the reader to understand the DEIR's conclusions, as this result is not intuitive based on the Project Description. Additionally, CDFW recommends that the EIR include a summary table that compares the 2020 to the 2040 scenario for reverse flows in the Sacramento River analysis.
Appendix 12C- 12C.2 Impact Analysis Impact AQUA-2: Effects of Operations and Maintenance of Water Conveyance Facilities on Sacramento River Winter-Run Chinook Salmon, Table 12C-9	12C-11	The DEIR includes the Perry et al. (2018) through-Delta survival analysis for both the 2020 and 2040 scenario, but only includes the assumption that Georgiana Slough BAFF reduces entry into Georgiana Slough by 50% for the 2020 scenario. It is unclear why the assumption that the BAFF will reduce entrainment was not modeled for the 2040 scenario.	CDFW requests that the DEIR include the through-Delta survival analysis based on Perry et al. (2018) with the assumption that the Georgiana BAFF reduces entry into Georgiana Slough by 50% for the 2040 scenario.
Appendix 12C- 12C.2 Impact Analysis Impact AQUA-2: Effects of Operations and Maintenance of Water Conveyance Facilities on Sacramento River Winter-Run Chinook Salmon, Table 12C-13	12C-21	The DEIR provides no explanation of why modeling results do not predict temperature changes associated with flows downstream of the Sacramento River, as compared to 2020, given that more flow will move down the river earlier in the season as precipitation instead of snow melt later in the season. Additionally, the benched habitat analysis shows potential increases in suitable bench habitat because of climate change; however, it is unclear how drought conditions associated with climate change impact habitat availability and water temperatures, or even if drought conditions were included in the model.	CDFW requests that the EIR explain why it anticipates that there will be no differences in temperature changes associated with flows immediately downstream of Intake C, Sacramento River at Rio Vista, and San Joaquin River at Jersey Point for all alternatives in the 2020 and the 2040 scenarios. Additionally, CDFW requests that the EIR include an analysis that compares existing conditions to all alternatives under the 2040 scenario.

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Appendix 12C- 12C.2 Impact Analysis Impact AQUA-2: Effects of Operations and Maintenance of Water Conveyance Facilities on Sacramento River Winter-Run Chinook Salmon, Table2 12C-14 and 12C-15	12C-23, 12C-24	The DEIR does not explain why modeled temperatures in the Sacramento River and San Joaquin River are unaffected by the Proposed Project.	CDFW recommends conducting a sensitivity analysis to determine at what change in outflow (if any), water temperatures will differ on the Sacramento River and the San Joaquin River.
Appendix 12C- 12C.2 Impact AQUA-3: Effects of Operations and Maintenance of Water Conveyance Facilities on Central Valley Spring-Run Chinook Salmon, Table 12C-26	12C-31	The DEIR does not include a clear discussion of Table 12C-26 explaining why the Proposed Project will lead to a decrease in loss of juvenile spring-sun Chinook salmon in wet and below normal water year types in March and April.	CDFW recommends that the EIR include a detailed discussion of the modeling results that address this issue with information regarding flow management.
Appendix 12C- 12C.2 Impact AQUA-3: Effects of Operations and Maintenance of Water Conveyance Facilities on Central Valley Spring-Run Chinook Salmon, Table 12C-27	12C-33	The DEIR does not provide an explanation of Table 12C-27 results that show Alternatives 2a/4a have modeled less loss of juvenile spring-run Chinook salmon than Alternatives 2b/4b and Alternatives 2c/4C. Alternatives 2a/4a have a higher diversion rate than the other alternatives modeled, but also show lower juvenile spring-run Chinook salmon modeled loss.	CDFW requests that the EIR provide an explanation for modeled loss of juvenile spring-run Chinook salmon under Alternatives 2a/4a regarding flow management.
Chapter 13- General Comment	Multiple	The DEIR does not address, or analyze, the potential conflict (under all alternatives) resulting from the project alignment across conserved lands, including the Cosumnes River Preserve, Woodbridge Ecological Preserve, and Bethany Reservoir Conservation Easement. The DEIR does not evaluate an alternative route for the Bethany Reservoir Aqueduct siting in a manner that could reduce impacts to the Bethany Reservoir Conservation Easement by following existing roadways and other highly disturbed areas and/or one that will avoid impacts to conserved lands similar to the alignments identified in the Delta Conveyance Project Final Draft Engineering Project Report (Delta Conveyance Design and Construction Authority 2022; Figure 10).	A comprehensive evaluation of conservation lands impacted by the Proposed Project (both temporary and permanent impacts) and alternatives should be included in the EIR. The evaluation should include identification of the number of acres to be impacted by each alignment including access areas, the biological quality and value of those acres, and the property owner and/or other holders of conservation interests in the property if possible. Additionally, a discussion of the Project's potential to obtain in-kind mitigation for impacts to conserved lands should be included with appropriate lands identified.

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Chapter 13- General Comment	Multiple	The DEIR includes mitigation measures to avoid and minimize impacts that include the language “to the extent feasible”, for numerous species including some that are fully protected (e.g., sandhill cranes), when discussing Project activities. If a mitigation measure is caveated as “to the extent feasible” it is difficult to analyze the likely benefits of the associated measure, and mitigation measures generally should be proposed and relied on only if they are feasible. It should also be noted that take of sandhill crane, which is a fully protected species under Fish and Game Code, section 3511, is prohibited.	CDFW requests that the EIR commit to mitigation measures identified or clearly specify when a measure would not be met or maintained, so that CDFW and other users of the EIR can better understand the specific mitigation activities to which DWR is committing.
Chapter 13- General Comment	Multiple	The DEIR generally commits to installing exclusion fencing no more than 14 days prior to the start of construction activities (e.g., California tiger salamander and giant garter snake).	CDFW recommends the EIR commit to a timeline for installation that is linked to and follows preconstruction surveys, to reduce the likelihood of species moving into the area after a survey has been conducted (i.e., within 24 hours of preconstruction surveys).
Chapter 13- 13.1.7.1 Habitat Conservation Plans Setting Overview	13-44	The DEIR does not clarify whether the Study Area contains conserved lands such as conservation easements, mitigation banks, and Natural Community Conservation Plan lands. Without this information disclosed in the DEIR, it is unclear how the Proposed Project will impact existing land use designated for conservation value.	CDFW recommends the EIR include whether the Study Area contains conserved lands and include figures detailing locations of conserved lands and how they interact with the Proposed Project alignment. CDFW suggests including a section that discusses potential impacts associated with the Proposed Project activities to conserved lands. Any impacts to conserved lands could impact special-status species, as these areas were designed to protect species and their habitat in perpetuity.
Chapter 13- General Comment Special-Status Plant Species	Multiple	The DEIR commits to conducting special-status plant species surveys consistent with protocols outlined in CDFW (2018), or the most current protocols, specifically with respect to the timing the surveys in the appropriate season and at the appropriate level of ground coverage. The DEIR indicates that the extent of mitigation for direct loss and indirect impacts on special-status plants will be based on survey results but lacks commitment to conduct floristic surveys across multiple years before evaluation of a negative finding (Mitigation Measure BIO-2a). CDFW (2018) concludes that surveys over several years may be	CDFW requests that the EIR commit to rare plant surveys within the entire Proposed Project footprint where habitat is present, and over multiple growing seasons, before assuming that a species is not present within the Proposed Project footprint.

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		needed for annual or short-lived plants before a negative finding can be made. Surveys for rare annual plants need to consider compounding influences from low rainfall and rainfall timing conditions. Many annual species of rare plants may not germinate during a prolonged drought or may be affected by rainfall timing. In some instances, it may be feasible to assume the species are present, especially if habitat is present and the species have been reported on the habitat in a previous year's surveys.	
Chapter 13- 13.3.1.2, Methods Used to Assess Impacts on Special-Status Species	13-57	The DEIR does not include non-riparian habitat in the impact analysis for elderberry longhorn beetles. Habitat for valley elderberry longhorn beetle includes both riparian and non-riparian areas where elderberry shrubs are present. Elderberry shrubs can be a common understory plant in non-riparian habitats. Riparian habitat provides more connectivity, because the elderberry is the sole host plant of the species, however, significant impacts to elderberry shrubs, at the individual shrub scale, can extirpate a local population in non-riparian habitats.	CDFW recommends the EIR revise the impact analysis, for elderberry longhorn beetles, to include non-riparian habitats where elderberry shrubs are present.
Chapter 13- 13.3.1.2, Methods Used to Assess Impacts on Special-Status Species	13-57	The DEIR includes dates (September 15 through March 15) that are narrow for when sandhill cranes may be present in the study area. Sandhill cranes have shown up within the study area during the month of August and may remain into April.	CDFW recommends the EIR includes additional language that states that sandhill cranes may arrive earlier and stay later than the specified dates. This is especially relevant in the context of changing climate conditions. Those dates are used throughout the chapter and should all be updated. Expanding Sandhill crane presence may impact minimization measures or mitigation required by the Project.
Chapter 13- 13.3.3.3, Impact BIO-11, CEQA Conclusions - All Project Alternatives, Mitigation Measure BIO-2b	13-122	"Mitigation Measure BIO-2a" is possibly a typo throughout the document under the "Mitigation Measure BIO-2b: Avoid and Minimize Impacts on Terrestrial Biological Resources from Maintenance Activities" headers.	CDFW recommends revising from "Mitigation Measure BIO-2a" to "Mitigation Measure BIO-2b" throughout the EIR when referencing Mitigation Measure BIO-2b.
Chapter 13- 13.3.3.4, Impact BIO-21: Impacts of the Project on Crotch and Western Bumble Bees	13-167	Crotch and western bumble bee species are designated candidates for endangered status under CESA. The Project is likely to impact areas overlapping with known ranges and suitable habitat for these species. However, the DEIR does not clearly	CDFW requests that the EIR include a clear description of potential impacts to, and planned mitigation for the loss of Crotch and western bumble bee modeled suitable habitat.

Chapter or Appendix and Section/ Figure	Page	Comment: Issue	Comment: Recommendation
		state how many acres of habitat for these species would be impacted or how grasslands mitigation identified in the CMP will reduce the level of impacts to less than significant with mitigation, nor does it state if the protection of grasslands will be within the range of known populations of Crotch and western bumble bee.	
Chapter 13- 13.3.3.4, Impact BIO-22: Impacts of the Project on California Tiger Salamander,Table 13-58	13-174	The DEIR should clarify why there are no identified permanent impacts on California tiger salamander aquatic habitat for Alternatives 1-4A given that permanent impacts are expected for vernal pool aquatic invertebrates. Vernal pools are a preferred breeding habitat for California tiger salamander. Based on the DEIR, is it unclear if these habitats are not currently occupied or deemed suitable for tiger salamander.	CDFW recommends the EIR analyze and provide a detailed discussion on whether there will be permanent impacts to California tiger salamander resulting from the impacts to vernal pools occupied by aquatic invertebrates, and if necessary, include minimization and/or mitigation.
Chapter 13- 13.3.3.4, Impact BIO-22: Impacts of the Project on California Tiger Salamander, Mitigation Measure BIO-22a	13-179	The DEIR does not include avoidance measures during maintenance operations, such as preconstruction surveys in suitable habitat and vehicle speed limits, for California tiger salamanders.	CDFW recommends the EIR includes avoidance measures for California tiger salamander during maintenance operations such as preconstruction surveys in suitable habitat and vehicle speed limits.
Chapter 13- 13.3.3.4, Impact BIO-22: Impacts of the Project on California Tiger Salamander, Mitigation Measure BIO-22a	13-179	The DEIR does not include measures to mow vegetation to aid in preconstruction surveys, nor conduct burrow surveys and develop measures to collapse burrows if not occupied by California tiger salamander.	CDFW recommends the EIR includes measures to mow vegetation to aide in preconstruction surveys. CDFW also recommends conducting burrow surveys and developing measures to collapse unoccupied burrows, if appropriate.
Chapter 13- 13.3.3.4, Impact BIO-22: Impacts of the Project on California Tiger Salamander, Mitigation Measure BIO-22a	13-179	Ground-disturbing activities may occur between April (May in wet years) through October 31. However, this period overlaps with the California tiger salamander breeding season.	CDFW recommends the EIR includes measures to limit ground disturbance to the dry season (non-breeding season for California tiger salamander), June 15 through October 15.
Chapter 13- 13.3.3.4, Impact BIO-22: Impacts of the Project on California Tiger Salamander, Mitigation Measure BIO-22a	13-180	The DEIR states that clearing habitat in California tiger salamander habitat could continue when rain is forecasted under supervision of a USFWS and CDFW approved biologist. CDFW does not support any ground disturbing activities occurring within suitable habitat during a rain event when California tiger salamanders are known to increase activity.	CDFW requests removal of this language in the EIR and commit to no ground disturbing events within suitable habitat for California tiger salamanders during a rain event due to the increased risk of impacts.

Chapter or Appendix and Section/ Figure	Page	Comment: Issue	Comment: Recommendation
Chapter 13- 13.3.3.4, Impact BIO-22: Impacts of the Project on California Tiger Salamander, Mitigation Measure BIO-22a	13-180	The text in the DEIR is unclear as to whether dewatering will only occur in aquatic habitats once USFWS and CDFW approve of the action.	CDFW recommends limiting dewatering in aquatic habitats for California tiger salamander to occur only after USFWS and CDFW approve of the specific dewatering activity.
Chapter 13- 13.3.3.4, Impact BIO-22: Impacts of the Project on California Tiger Salamander, Mitigation Measure BIO-22a	13-181	The DEIR states the perimeter of construction sites within or adjacent to California tiger salamander habitat will be fenced with fencing material suitable for excluding amphibians by no more than 14 days prior to the start of construction activities.	CDFW recommends the EIR commit to a deadline following preconstruction surveys in which exclusion fencing must be installed to reduce the likelihood of California tiger salamanders moving into the area after a survey has been conducted (for example, within 24 hours of preconstruction surveys).
Chapter 13- 13.3.3.4, Impact BIO-30: Impacts of the Project on Giant Garter Snake, Mitigation Measure BIO-30	13-239	The period listed in the DEIR to install the exclusionary fence does not assure CDFW that the worksite has been cleared of giant garter snake and will remain clear until exclusion fencing is installed.	CDFW recommends the EIR commit to a deadline following preconstruction surveys in which exclusion fencing must be installed to reduce the likelihood of giant garter snakes moving into the area after a survey has been conducted (for example, within 24 hours of preconstruction surveys). Additionally, the exclusion fencing should be placed between May 1 and September 1 in advance of giant garter snakes seeking overwintering refugia.
Chapter 13- 13.3.3.4, Impact BIO-30: Impacts of the Project on Giant Garter Snake, Mitigation Measure BIO-30	13-239	The DEIR does not include a buffer zone around the edge of the exclusion fencing to discourage giant garter snakes from using the vegetation along the fence.	CDFW recommends the EIR include maintaining a buffer zone around the edge of the exclusion fencing to discourage giant garter snakes from using vegetation along the fence.
Chapter 13- 13.3.3.4, Impact BIO-30: Impacts of the Project on Giant Garter Snake, Mitigation Measure BIO-30	13-239	The DEIR does not include surveying of all small mammal burrows within suitable habitat of giant garter snakes to determine occupancy.	CDFW recommends the EIR include a measure to survey all small mammal burrows within suitable habitat to determine if they are occupied. If they are unoccupied, CDFW suggests collapsing the burrows as long as they are less than 3 ft long.
Chapter 13- 13.3.3.4, Impact BIO-30: Impacts of the Project on Giant Garter Snake, Mitigation Measure BIO-30	13-240	The DEIR does not consider if giant garter snakes and California tiger salamanders may be present at the time ground clearing takes place with heavy machinery.	CDFW recommends the EIR include a measure for a biological monitor to clear vegetation ahead of heavy machinery ground clearing or mowing. This measure would also benefit both giant garter snakes and California tiger salamanders in upland habitat.
Chapter 13- 13.3.3.4, Impact BIO-30: Impacts of the Project on Giant Garter Snake	13-240	The DEIR is missing a commitment to report giant garter snake observations to the CNDDB within a specified timeframe or timely manner.	CDFW recommends the EIR include a commitment to report GGS observations to CNDDB in a specified timeframe.

Chapter or Appendix and Section/ Figure	Page	Comment: Issue	Comment: Recommendation
Chapter 13- 13.3.3.4, Impact BIO-30: Impacts of the Project on Giant Garter Snake, Mitigation Measure BIO-30	13-240	The DEIR allows for the dewatering of suitable giant garter snake habitat in the inactive season of giant garter snake and does not require a CDFW-approved relocation plan. This is potentially problematic as giant garter snakes are more sensitive to impacts than on snake species because they overwinter in underground burrows.	CDFW recommends the EIR include an analysis of the potential impacts of dewatering giant garter snake habitat during the inactive season (October 2 - April 30) and any other construction measures (ground disturbances) that will occur during the inactive season when giant garter snakes are overwintering in underground burrows. CDFW recommends mitigating for potential impacts by prohibiting dewatering during the inactive season and adhering to a CDFW-approved relocation plan, regardless of construction timing.
Chapter 13- 13.3.3.4, Impact BIO-30: Impacts of the Project on Giant Garter Snake, Mitigation Measure BIO-30	13-240	The DEIR is missing a commitment to consult with a CDFW biologist prior to work being conducted outside of the giant garter snake active season.	CDFW recommends the EIR include a commitment to meet with a CDFW biologist when work is conducted outside of the active season.
Chapter 13- 13.3.3.4, Impact BIO-33: Impacts of the Project on Greater Sandhill Crane and Lesser Sandhill Crane, Construction	13-269	The included reference in the DEIR supports the claim that cranes exhibit high roost site fidelity, but does not support the statement that they, in some cases, may still use artificially lit sites due to roost site fidelity.	CDFW recommends the EIR include a reference that supports the claim that cranes may still use artificially lit sites due to roost site fidelity.
Chapter 13- 13.3.3.4, Impact BIO-33: Impacts of the Project on Greater Sandhill Crane and Lesser Sandhill Crane, Mitigation Measure BIO-33	13-275	The language in the DEIR is unclear as to the frequency of surveys for sandhill cranes.	CDFW recommends the EIR includes measures for additional annual surveys of sandhill cranes. Surveys should be conducted annually, starting with the first winter prior to project implementation due to changing habitat conditions and the potential for sandhill cranes to use alternate sites.
Chapter 13- 13.3.3.4, Impact BIO-39: Impacts of the Project on Swainson's Hawk, Operations	13-335	The language in the DEIR is unclear if the proposed powerlines will be designed and constructed to follow APLIC guidelines.	CDFW recommends the EIR uses APLIC guidelines to design and construct powerlines and to clearly state that these guidelines were used.
Chapter 13- 13.3.3.4, Impact BIO-39: Impacts of the Project on Swainson's Hawk, Mitigation Measure BIO-39	13-338	The DEIR states that construction may occur within 0.5 miles of an occupied Swainson's hawk nest tree. CDFW has concerns that increased disturbance near an occupied nest site may lead to adult hawks abandoning the nest and/or reduced fledging success.	CDFW recommends the EIR include a measure to consult with CDFW prior to conducting construction work within 0.5 miles of a known Swainson's hawk nesting tree. CDFW also strongly recommends all construction activities wait until after the nesting season has ended (once young have fledged) when inside a nesting area.
Chapter 13- 13.3.3.4, Impact BIO-39: Impacts of the Project on Swainson's Hawk, Mitigation Measure BIO-39	13-340	The DEIR allows the removal of suitable or known nesting trees for Swainson's hawk when deemed necessary. CDFW has concerns that removing known nest trees will reduce nesting success.	CDFW requests the EIR include a measure to notify CDFW and get CDFW permission before removing suitable or known nesting trees for Swainson's hawk.

Chapter or Appendix and Section/ Figure	Page	Comment: Issue	Comment: Recommendation
Chapter 13- 13.3.3.4, Impact BIO-44: Impacts of the Project on Tricolored Blackbird, CEQA Conclusion	13-381-13-382	The DEIR finds impacts of the Proposed Project to be less- than- significant with mitigation for tricolored blackbird. However, while the DEIR states the Compensatory Mitigation Plan (CMP) would be required to offset the impacts to nesting and foraging habitat, it states that no mitigation is specifically proposed for foraging habitat impacted by construction activities. While mitigation projects proposed to offset impacts to other resources may provide for suitable tricolored blackbird habitat, it is important to also include a commitment to tricolored blackbird foraging habitat mitigation given that habitat loss in the Delta is a limiting factor for the species, particularly due to constant land use changes and deterioration of habitat. Reduced presence of tricolored blackbird in the Delta reflects the ongoing need to provide habitat protection and improvements. To avoid incurring significant project-specific and cumulative impacts to the species from habitat loss.	CDFW recommends the EIR mitigate for both nonbreeding and breeding foraging habitat in addition to nonbreeding roosting habitat. CDFW suggest using the following ratios: 1:1 for breeding and nonbreeding foraging, 2:1 for roosting, and 3:1 for nesting. Mitigation should be applied to both temporary and permanent impacts caused by the Proposed Project.
Chapter 13- 13.3.3.4, Impact BIO-44: Impacts of the Project on Tricolored Blackbird, Operations	13-383	The DEIR is missing a commitment to conduct surveys during the nonbreeding season of tricolored blackbird prior to construction to better understand roosting habitat use within the study area.	CDFW recommends the EIR include measures to conduct surveys during the nonbreeding season of tricolored blackbird (August 1 – March 14) one year prior to the start of construction and the year of construction to establish use of roosting habitat. CDFW also recommends the EIR commit to 3 surveys within 15 days prior to construction and another survey 5 days prior to the state of construction. CDFW also recommends commitment to avoid roosting sites during construction with the use of a 300-ft no-activity buffer surround the roasting sites.
Chapter 13- 13.3.3.4, Impact BIO-44: Impacts of the Project on Tricolored Blackbird, Operations	13-385	The DEIR states that helicopters will not be used between 30 minutes before sunset to 30 minutes after sunrise to avoid disturbing tricolored blackbird roosting. While CDFW agrees, the restrictions should be expanded to include operational buffer zones (i.e., horizontal, and vertical feet) within which helicopters will not fly relative to a tricolored blackbird roosting site.	CDFW recommends that the EIR include the exclusion of helicopters within 200 horizontal feet or 150 vertical feet of a tricolored blackbird roosting site.

Chapter or Appendix and Section/ Figure	Page	Comment: Issue	Comment: Recommendation
Chapter 13 Appendix B-13B.58.5.3 Habitat Value Categories, Table 13B.58-1. Greater Sandhill Crane Habitat Values and Table 13B.59-1 Lesser Sandhill Crane Habitat Values	13B-379	The DEIR devalues freshwater emergent wetland habitat for greater and lesser Sandhill cranes by classifying it as high or moderate as opposed to very high, although roosting habitat in the Delta is considered to be a priority for sandhill crane conservation.	CDFW recommends the EIR increase the habitat value class for emergent wetlands to very high value for the greater sandhill crane, consistent with Shuford and Dybala (2017) and Littlefield and Ivey (2000).
Chapter 13 Appendix B- 13B.59.5.3 Habitat Value categories, Table 13B.59-1 Lesser Sandhill Crane Habitat Values	13B-390	The DEIR classifies freshwater emergent wetlands as "moderate" habitat value class, rather than "high," although roosting habitat in the Delta is a priority for sandhill crane conservation.	CDFW recommends the EIR increase the habitat value class for emergent wetlands to high value for the lesser sandhill crane, consistent with Shuford and Dybala (2017) and Littlefield and Ivey (2000).
Chapter 13 Appendix B- 13B.72.2 Range and Distribution within the Study Area	13B-483	The DEIR states that over 75% of the statewide population of Swainson's hawk occurs within Yolo, Sacramento, Solano, and San Joaquin counties, but the reference included (Anderson et al. 2007) says 60%.	CDFW recommends the EIR update the percentage of Swainson's hawks that occur within Yolo, Sacramento, Solano, and San Joaquin counties in the EIR. The percentage listed in the DEIR does not match the reference included. Additionally, consider updating these population numbers with more recent publications such as, Battistone et al. (2019) or Furnas et al. (2022).
Chapter 13 Appendix B- 13B.72.3 Habitat Requirements	13B-483	The DEIR is missing a discussion on foraging patch size for the Swainson's hawk.	CDFW recommends the EIR include a discussion on foraging patch size, as it helps the reader understand why modeled foraging habitat layers with patch sizes of at least 5 acres were chosen.
Chapter 13 Appendix B- 13B.72.5.3 Habitat Value Categories, Table 13B.72-1. Swainson's Hawk Foraging Habitat Value Classes	13B-488	The DEIR updates Swainson's hawk foraging habitat values in Appendix 13B from the previous classification used in the California WaterFix EIR and ITP Appendix 4 (HM Lands Criteria) by removing very high value and no value habitat and reclassifying some habitat types previously identified as high value as medium value. For example, the habitat value class table in the DEIR does not include native pasture, mixed pasture, clover, miscellaneous grasses, non-irrigated native pasture and pasture, and native vegetation as High Value foraging habitat for the Swainson's Hawk.	CDFW recommends the EIR increase the habitat values to be consistent with standard valuations or provide clear justification for why habitat values have decreased. CDFW recommends the EIR include native pasture, mixed pasture, clover, miscellaneous grasses, non-irrigated native pasture and pasture, and native vegetation as High Value foraging habitat types for Swainson's hawk and mitigate accordingly.
Chapter 13 Appendix B- 13B.72.5.3 Habitat Value Categories,Table 13B.72-1. Swainson's Hawk Foraging Habitat Value Classes	13B-488	In the DEIR, mixed pasture and miscellaneous grasses were classified as Medium Value foraging habitat for Swainson's Hawk. CDFW considers these habitat types to be high value.	CDFW recommends the EIR classify mixed pasture and miscellaneous grasses as High Value foraging habitat for Swainson's hawk and mitigate accordingly.

Chapter or Appendix and Section/ Figure	Page	Comment: Issue	Comment: Recommendation
Chapter 16- General Comment	Multiple	Chapter 16 of the DEIR currently does not include a discussion of impacts to recreational fishing because of the Proposed Project construction and operation. As the Proposed Project spans the Sacramento River through the Delta and encompasses the south Delta, Proposed Project operations could impact recreational fishing opportunities via impacts to recreationally important fish species, such as striped bass, fall-run Chinook salmon, late fall-run Chinook salmon, white sturgeon, black basses, and steelhead.	CDFW recommends the EIR include an analysis and discussion of the potential impacts to recreational fishing opportunities and boating access from the Proposed Project and include minimization and mitigation as appropriate.
Chapter 30- 30.2.3.2 Climate Change Impacts in the Study Area Precipitation and Runoff	30-17	The DEIR states that Shasta Reservoir could be slightly more resilient to climate change due to its greater inflow of rain, rather than snowmelt. However, Shasta Reservoir is likely to be more resilient due to its uniquely high inflow of groundwater baseflow, not rainfall. The volcanic groundwater aquifers of the Shasta, McCloud and Pit Rivers provide years of additional storage, which creates resilience against extremes. Higher rainfall proportion does not increase resilience.	CDFW recommends correcting this statement in the EIR and ensuring any assumption included in the analysis are adjusted as needed.
Chapter 30- 30.4.2 Impacts of the Project Alternatives with Climate Change	30-24	CDFW was provided the 2040 CT climate scenarios but has not been provided with any of the modeling associated with the 2040 Median climate scenario.	CDFW requests receipt of the complete model files for all scenarios described in the DEIR.

Appendix B: References

14 California Code of Regulations § 119.

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UNITED STATES DEPARTMENT OF COMMERCE
National Oceanic and Atmospheric Administration
NATIONAL MARINE FISHERIES SERVICE
West Coast Region
650 Capitol Mall, Suite 5-100
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October 5, 2021

Carrie Buckman
DCP Environmental Program Manager
Department of Water Resources
Delta Conveyance Office
P.O. Box 942836
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Marcus Yee
DCP Environmental Compliance Manager
Department of Water Resources
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Re: NMFS comment memorandum on the Delta Conveyance Project, preliminary Draft Environmental Impact Report, Chapters 3, 12, and associated appendices

Dear Ms. Buckman and Mr. Yee,

We are writing this memo in response to the September 7 and 10, 2021, disclosures of the Delta Conveyance Design and Construction Authority (DCA) and the California Department of Water Resources (DWR) Draft Environmental Impact Report (EIR) Chapter 3, *Description of the Proposed Project and Alternatives*, Chapter 12, *Fish and Aquatic Resources*, and associated appendices for the Delta Conveyance Project (Project). NOAA's National Marine Fisheries Service (NMFS) has reviewed the relevant portions of these chapters and appendices, and we are providing technical assistance comments on the disclosures as they pertain to anadromous fishes under our jurisdiction. We acknowledge that these comments are on a preliminary Draft of the EIR for DWR's consideration to produce a public document. Furthermore, we have agreed to work closely with the U.S. Army Corps of Engineers as a Cooperating Agency under the National Environmental Policy Act (NEPA) to evaluate key sections of the second administrative draft of the Environmental Impact Statement (EIS) prior to public release. In this response, NMFS staff provide feedback regarding the level of analysis in the Draft EIR and identify those elements of the project that may need further scrutiny during the development of a Biological Assessment and initiation of consultation pursuant to section 7 of the Endangered Species Act (ESA). As such, we view the analyses presented in the disclosed chapters of the Draft EIR and the EIS as foundational for any additional analysis necessary to support the ESA consultation for the Project.

In our review of the preliminary Draft EIR chapters and in the sections most pertinent to species under our jurisdiction, NMFS staff have compiled a number of comments made directly to the disclosed documents and which have been uploaded to the DCP SharePoint website as requested by DWR. Our comments are also summarized here, and we anticipate that a continued dialogue will allow us to build on our understanding of the Project and its potential impacts. Our comments relate to the following key considerations.

Key considerations:

- There is a need to update some information, especially with regards to the current status of NMFS species. Without a complete description of the suite of threats faced by the species and an accurate estimation of the associated extinction risk posed by those threats, the status of these species could be misinterpreted as less severe/imperiled than is observed. This misinterpretation could then lead to an incorrect estimation of the level of effect attributed to project impacts on populations' and the species' extinction risk.
- Because proposed operations would become progressively less restrictive throughout the season (re: limited number of pulse protections and decreasing bypass flow criteria), there would be a disproportionate negative effect on those species, populations, and life- history strategies that migrate later in the season.
- More information and understanding is needed with regard to the near-field effect of the proposed T-screen design. The potential for adverse and beneficial effects associated with the hydrodynamics around the T-screens is not well understood or supported.
- The conclusions of "less than significant effect" for spring-run, fall-/late fall-run, and green sturgeon are less certain than described in the EIR. At a minimum, the magnitude of potential effect should be considered uncertain and given the imperiled status of these species the effect should be viewed "progressively greater with increasingly reduced population status" as is described in Section 12.4.2 *Thresholds of Significance*.

General comments:

- Not all referenced materials (e.g., additional chapters and appendices) were available at the time of the September review of EIR Chapters 3 and 12. This has limited our ability to provide substantive comment on certain elements of the project and disclosures in the EIR.
    - For example, we cannot comment on the determination of areas for which screening analysis showed minimal differences and no additional analysis of fish and aquatic resources was necessary without Appendix 12C, *Upstream Methods and Results*.
- NMFS acknowledges that the thresholds of significance (Section 12.4.2 of the EIR) which are determined by the lead agency have been defined such that some effects of the project are determined to be less than significant. Therefore, the CEQA requirement to consider alternatives that would avoid or substantially lessen any of the significant impacts of the proposed project (Section 15126.6(a) of the CEQA Guidelines) would not

apply to those impacts that are less than significant. However, those effects may be considered significant in an ESA context where the threshold for determining an insignificant effect is such that the effect would not result in 'take' as defined in section 3(19) of the Act.

Chapter 3 comments:

- The presentation of the alternatives is based on current conditions, with the effects of climate change (and sea-level rise) provided with the No Project Alternative (NPA). Although not a CEQA requirement, it would be useful to provide a qualitative assessment of the alternatives with climate change, similar to the way it is presented for the NPA.
- There needs to be greater clarity with regards to the terms "export" and "exports." When used in the EIR is it specific to the "E" of the E:I ratio, or is it used more generally to describe exports at the Tracy and Banks pumping plants?
    - More clarity is also needed with regards to the decision to include the diversions at the NDD in the "E" term of the E:I ratio instead of also subtracting those diversions from the "I" since they would not 'contribute' to inflow. Also needed is an explanation of how the diversions at the NDD are "included" in the calculation (assumed additive).
    - Confirm that the CalSim-modeled south Delta exports conform to whatever definition of export is used.
- Section 3.16.1.3 Pulse Protection could benefit from some further clarification. Although the description of Pulse Protection is "initiated when a large number, and relatively high concentration, of winter-run-sized juvenile salmonids begin migrating into the Delta from upstream locations" it is in actuality based on an environmental surrogate. If the intent is to ultimately base the Pulse Protection on species presence (i.e., monitoring) then it should be stated as such.

Chapter 12 comments:

- There needs to be a description of how a Freemont Weir notch and increased length of Sacramento Weir would interact with and influence DCP operations.
    - How does increased Yolo access through these facilities affect fish exposure at the NDD?
    - How might operations of a Freemont Weir notch affect conditions that could otherwise trigger pulse protections? Bypass flow criteria?
- Information should be updated to reflect new understanding of the suite of threats facing NMFS trust resources, including for example:
    - Discussion of the Thiamine Deficiency Complex (TDC) issue
    - Effects of climate change on salmon (including catastrophic wildfires)
    - Effects of current (2020-21) drought conditions
        - IEP 2021 Drought Flow Alteration Management Analysis and Synthesis Team (FLOAT MAST)

- The language used to define the thresholds of significance is vague and could benefit from a more detailed description (e.g., substantially reduce, threaten to eliminate, significant impact, or interfere substantially). Further clarification is also needed to describe how the identified threshold for assessing potential significance of the alternatives' operations effects of 'approximately 5%' was considered to be 'progressively greater with increasingly reduced population status'.
- More detail is needed regarding the design and hydraulic effect of the T-screens.
    - Will the leading drum face have a cone on it to streamline the flow field along the leading edge of the first screen? How far apart is each set of drums? These design elements can affect the possibility of predators hiding between them and could affect hydraulic approach velocity into the screen at the leading edge resulting in hotspots in the screen face. Are there any mitigation measures intended to reduce the potential hydrologic shadow behind the screens and the manifold that would otherwise provide potential areas for predators to hide?
    - Typically "bow waves" are formed when an object is moving through the water at a greater speed than the speed of a wave moving across the water. More analysis is needed to determine the effect of the disturbance on the leading drum and how far along the face of the screens it may extend. Along with this determination, the hydraulics at the face of the screen should be analyzed to determine if this effect creates unequal approach velocity along the face of the screen. This is especially important if the effect is being described as a benefit.
    - For juvenile Chinook salmon subjected to prolonged exposure at a single large screened diversion or repeated exposures to multiple screens in their habitat or along their migratory route, the cumulative energetic costs could be substantial.
- Additional discussion of how the 2-D modeling result will be used to describe project effects would support NMFS understanding of the project. Discussion of 'Table streak1' would be particularly useful. The conclusion seems to equivocate in that the two-dimensional modeling does not account for fish behavior or the distribution of fish in the channel. It would seem that for the streakline analysis to support an understanding of screen exposure more information is needed regarding fish behavior and the distribution of fish in the river. As identified in the EIR, these topics/questions are well suited for fisheries studies, adaptive management, and the future refinement of operations.
- Please note the definition of 'impingement' used (i.e., prolonged screen contacts >2.5 minutes) is not the same as what is used in the NMFS 2011 fish screening guidelines (i.e., Impingement - the consequence of a situation where flow velocity exceeds the swimming capability of a fish, creating injurious contact with a screen face or bar rack).
- Conclusions of less than significant effect for spring-run Chinook salmon, fall-/late fall-run Chinook salmon, and green sturgeon are too strong based on the limited analysis. At a minimum these statements should be revised to include a similar measure of uncertainty as what was ascribed to winter-run Chinook salmon effects.

- Specific to steelhead, the use of the Buchanan et al. (2021) study of steelhead survival, which is not sensitive to the changes in operations represented in the different DCP alternatives, may mean that it is a poor tool to assess the effect of those changes.
- Specific to green sturgeon, while the surrogate relationship between white sturgeon recruitment and flow is uncertain, it is unclear how it was determined that impacts to green sturgeon are less than significant.

We appreciate the opportunity to comment on this important document and for the continued engagement on the development of the public draft. If you have any questions regarding our input, please contact Evan Sawyer at evan.sawyer@noaa.gov and (916) 930-3656.

Sincerely,

A. Catherine Marcinkevage

Cathy Marcinkevage
Assistant Regional Administrator
California Central Valley Office

Delta Conveyance Project Agency Coordination - DRAFT BA/ITPA Materials 5/11

Garwin Yip - NOAA Federal <garwin.yip@noaa.gov> Wed, Jun 8, 2022 at 3:32 PM
To: "Jones, Gardner@DWR" <Gardner.Jones@water.ca.gov>
Cc: Jean Castillo - NOAA Federal <jean.castillo@noaa.gov>, Evan Sawyer - NOAA Affiliate <evan.sawyer@noaa.gov>, Kim Squires <kim_squires@fws.gov>, "Jacobs, Brooke@Wildlife" <brooke.jacobs@wildlife.ca.gov>, "Simmons, Zachary M SPK" <zachary.m.simmons@usace.army.mil>, christopher.geach@water.ca.gov, "Jana Affonso (Jana_Affonso@fws.gov)" <Jana_Affonso@fws.gov>, "Kimberly (Sheena) Holley" <Kimberly.Holley@wildlife.ca.gov>, katherine.marquez@water.ca.gov, robert.sherrick@wildlife.ca.gov, "Goude, Leif M" <leif_goude@fws.gov>, Elizabeth Keller - NOAA Federal <elizabeth.keller@noaa.gov>, "Singh, Amardeep" <amardeep@water.ca.gov>, "Greenwood, Marin" <Marin.Greenwood@icf.com>, marcus.yee@water.ca.gov, mike.hendrick@icf.com, carolyn.buckman@water.ca.gov, "Bogdan, Kenneth M.@DWR" <Kenneth.Bogdan@water.ca.gov>, "Sloan, Rebecca" <Rebecca.Sloan@icf.com>

Gardner,

Thanks for the opportunity to review the second batch of draft DCP BA/ITPA materials and provide technical assistance on the development of the BA for eventual ESA section 7 consultation. NOAA's National Marine Fisheries Service (NMFS) has reviewed relevant portions of these chapters and appendices, and are providing high-level comments as they pertain to anadromous fishes under our jurisdiction. We acknowledge that these comments are on a preliminary draft of the BA for USACE and DWR's consideration, and as such, we have agreed to work closely with USACE and DWR to consider and refine key elements of the Project prior to the USACE's request to initiate ESA section 7 consultation. The following comments pertain to a number of Project elements that would benefit from additional detail and/or continued discussion to build on our understanding of the Project and its potential impacts on NMFS trust resources.

1. Action Agency for Operations: It is understood that USACE will consult on the Proposed Action (PA) but that its jurisdiction does not extend beyond construction. NMFS may consult on Project operations as "other actions" (formerly known as interrelated and interdependent), but that operations-focused Reasonable and Prudent Measures/Alternative and Terms and Conditions would be directed to the applicant (DWR). However this is a significant departure from previous consultations which include the ongoing effects of operations and as such, should be considered and discussed among the agencies at the appropriate policy level. One specific concern related to this issue is accountability for reinitiation of consultation after construction. There is currently no federal nexus for the operation of the DCP, and therefore, no current mechanism to reinitiate the consultation (50 CFR 402.16).

2. Life-cycle Modeling: NMFS recommends the use of the Winter-run Life Cycle Model (WRLCM) for a project of this nature to adequately integrate effects of the DCP on the species. This recommendation is made based on multiple factors, including: (a) the extensive review that the WRLCM has undergone; (b) the improved understanding of temperature impacts and Delta passage/survival which have been incorporated into the WRLCM; and (c) the consideration of Yolo Bypass as a rearing habitat and migration corridor. Currently, WRLCM results are unavailable but it is understood that initial results will be shared this Friday (6/10).

3. Adaptive Management Program/Framework: A complete Adaptive Management Program (AMP) should be developed prior to section 7 consultation. Currently, certain elements of the AMP are proposed to be developed after the Section 7 consultation is complete, which would preclude its consideration in the USACE's and NMFS' assessment of DCP effects. Similar to our concern regarding the inclusion of WRLCM results, we hope to resolve this issue soon. However, without commitment to an AMP, our review and analysis of the DCP will be limited to what's described in the PA and without expectation of any improvement to design and operational criteria could be in an AMP that may benefit the species.

4. Intent of existing regulatory requirements: The PA commits to meeting the current "regulatory requirements" as a means of limiting DCP impacts. However, it is unclear whether the intent of existing requirements (many of which are minimums) will be achieved when DCP effects are added to the baseline. For example, would the *intent* of the Export to inflow ratio requirement be met when DCP operations are considered part of the exports term? Furthermore, it remains uncertain how temporary changes to Delta water quality or CVP & SWP operations would affect DCP operations (e.g., TUCP/Order, drought, etc.).

5. Understanding of operational effects: NMFS is concerned regarding the extent of impacts associated with specific elements of proposed operations. Specific concerns include: (a) the diminishing bypass flow protection, levels 1-3, which reduce the level of bypass flow later in the year/spring, potentially increasing the negative effect on later juvenile anadromous fish migrants and species; and (b) the limited number of pulse protections, which disproportionately favor early juvenile anadromous fish migrants and certain Chinook salmon runs (e.g., winter-run Chinook salmon) relative to later juvenile anadromous fish migrants and later runs (e.g., limited protection for spring-run and fall-run Chinook salmon).

-Garwin-

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---------- Forwarded message ---------
From: **Jones, Gardner@DWR** <Gardner.Jones@water.ca.gov>
Date: Thu, May 19, 2022 at 2:01 PM
Subject: RE: Delta Conveyance Project Agency Coordination - DRAFT BA/ITPA Materials 5/11
To: jean.castillo <jean.castillo@noaa.gov>, evan.sawyer <evan.sawyer@noaa.gov>, squires, kim <kim_squires@fws.gov>, Jacobs, Brooke@Wildlife <Brooke.Jacobs@wildlife.ca.gov>, Simmons, Zachary M.@usace <Zachary.M.Simmons@usace.army.mil>, Geach, Christopher@DWR <Christopher.Geach@water.ca.gov>, Affonso, Jana @FWS <jana_affonso@fws.gov>, Holley, Kimberly(Sheena)@Wildlife <Kimberly.Holley@wildlife.ca.gov>, Marquez, Katherine@DWR <Katherine.Marquez@water.ca.gov>, Sherrick, Robert@Wildlife <Robert.Sherrick@wildlife.ca.gov>, Goude, Leif M <leif_goude@fws.gov>, elizabeth.keller <elizabeth.keller@noaa.gov>
Cc: Singh, Amardeep@DWR <Amardeep.Singh@water.ca.gov>, Greenwood, Marin <Marin.Greenwood@icf.com>, Yee, Marcus@DWR <Marcus.Yee@water.ca.gov>, Hendrick, Mike <Mike.Hendrick@icf.com>, Buckman, Carolyn@DWR <Carolyn.Buckman@water.ca.gov>, Bogdan, Kenneth M.@DWR <Kenneth.Bogdan@water.ca.gov>, Sloan, Rebecca <Rebecca.Sloan@icf.com>

Good afternoon,

Please see the links below for the second batch of draft DCP BA/ITPA materials:

- CDFW
- NMFS
- USFWS
- DCP_BA2081_AquaticsDeliveryReport_5_19_22.docx

Additional information

- ITPA 4C (2040 Appendix) will be renamed “4E” in next draft
- Batch 2 can be found in the “5_19_22” sub folders

Aside from a few lagging items, this comprises the remainder of draft BA/ITPA materials. We are asking that the review be complete by 5/27 – but understand that delays are likely.

Let us know if there are questions.

Thanks,

Gardner

(*he/him/his*)

[Quoted text hidden]

As described in Chapter 3 of the BA, there would be a maximum of two pulse protection periods during a year. If the initial pulse protection period begins before December 1, there may be a second pulse protection period that year; alternatively, if the first pulse protection period occurs after December 1, only one pulse protection period could occur that year. The proposed zero to two pulse protection periods would result in pulse protection periods occurring primarily during migration timing for migrants early in the water year, leaving later/spring migrants (i.e., spring-run and fall-run Chinook salmon and steelhead) without similar protection. For the five years of example operations data provided by DWR, four of the five years had one pulse protection period, while one year had no pulse protection periods. None of the years had two pulse protection periods. Three of the four pulse protection periods occurred in December, while one occurred in March.

NMFS used proposed DCP operations data for example years (provided by DWR), along with the Delta Juvenile Fish Monitoring Program (DJFMP) Sherwood Harbor trawl catch data as a proxy for fish presence and timing near the proposed DCP intakes, to analyze potential exposure of salmonids to the near-field effects of the intakes. Table 1 shows the percentage of each Chinook salmon run passing the DCP intake region during each NDD operation level.

Table 1. Exposure of Chinook salmon runs to different NDD levels in example years

Species	Water Year	NDD Level	Catch during NDD Level	Annual catch at all NDD Levels	Percent of annual catch at NDD Level
Fall-run Chinook salmon	2016	0	1	982	0.1
		1	291		29.63
		2	277		28.21
		3	413		42.06
	2018	0	45	850	5.29
		1	447		52.59
		2	358		42.12
	2019	0	15	3322	0.45
		1	500		15.05
		2	557		16.77
		3	2250		67.73
	2020	0	7	1492	0.47
		1	1485		99.53
	2021	1	297	297	100

Species	Water Year	NDD Level	Catch during NDD Level	Annual catch at all NDD Levels	Percent of annual catch at NDD Level
Late Fall-run Chinook salmon	2016	0	1	2	50
		3	1		50
	2018	1	1	1	100
	2019	0	1	9	11.11
		1	7		77.78
		3	1		11.11
	2020	0	6	8	75
		1	2		25
Spring-run Chinook salmon	2016	1	3	206	1.46
		2	5		2.43
		3	198		96.12
	2018	0	11	148	7.43
		1	50		33.78
		2	87		58.78
	2019	0	2	489	0.41
		1	17		3.48
		2	14		2.86
		3	456		93.25
	2020	0	8	677	1.18
		1	669		98.82
	2021	1	91	91	100
Winter-run Chinook salmon	2016	0	4	14	28.57
		1	2		14.29
		2	1		7.14
		3	7		50
	2018	0	3	20	15
		1	17		85

Species	Water Year	NDD Level	Catch during NDD Level	Annual catch at all NDD Levels	Percent of annual catch at NDD Level
	2019	0	14	103	13.59
		1	24		23.3
		2	5		4.85
		3	60		58.25
	2020	0	55	78	70.51
		1	23		29.49
	2021	1	5	5	100

Pulse protection periods, denoted by an NDD Level of zero, account for time periods of relatively low catch for runs such as spring-run and fall-run Chinook salmon; on average across example data years, spring-run and fall-run Chinook salmon have less than 2% of their runs migrate past the proposed intake area during pulse protection periods (Table 2). These runs have the majority of their catch during periods when the NDD Level is higher, which could result in greater negative effects due to the higher diversion rate.

Table 2. Average exposure of Chinook salmon runs to different NDD levels across example years

Species	NDD Level	Average % catch at NDD Level
Fall-run Chinook salmon	0	1.262
	1	59.36
	2	17.42
	3	21.958
Late Fall-run Chinook salmon*	0	34.0275
	1	50.695
	2	0
	3	15.2775

Species	NDD Level	Average % catch at NDD Level
Spring-run Chinook salmon	0	1.804
	1	47.508
	2	12.814
	3	37.874
Winter-run Chinook salmon	0	25.534
	1	50.416
	2	2.398
	3	21.65

***Late fall-run Chinook salmon did not have catch data for water year 2021 and had very low sample sizes across all years.**

The addition of a spring pulse protection period could provide protection for a large portion of spring- and fall-run Chinook salmon by reducing their exposure to near-field effects of the NDD. Figure 1 illustrates the percentage of the yearly juvenile spring-run cohort (again, using trawl catch as a proxy) that could be protected by a spring pulse of varying length. Each line represents a pulse protection period of a different length; potential pulse protection periods of 1, 3, 5, 7, 9, 11, and 13 days are shown. For comparison, pulse protection periods in DWR example data years occurred for durations of five to 13 days. Plotted pulse protection periods are centered around the day with maximum spring-run Chinook salmon catch for that water year in the Sherwood Harbor Trawl.

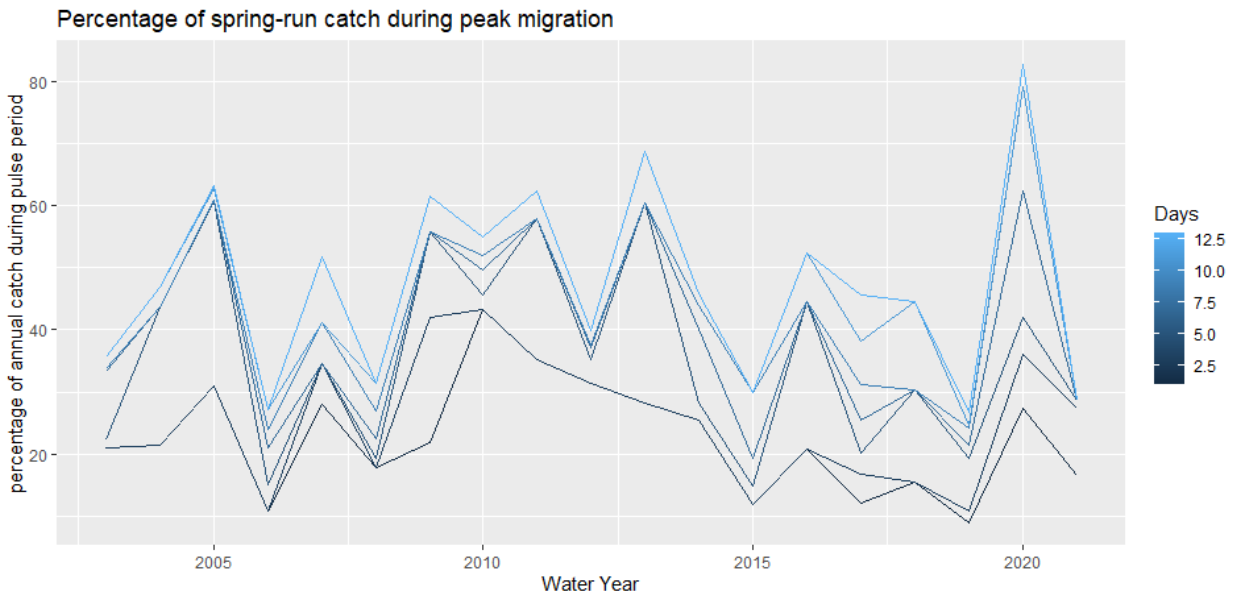

Figure 1. Spring-run exposure of a potential spring pulse protection period

There is overlap in some of the lines of differing pulse protection period lengths, where changes in the length of the pulse protection period does not change the catch. This could be due to no additional catch during those additional days or no trawl samples collected in those additional days since the Sherwood Harbor trawl does not sample daily (sampling is generally three times per week).

Evan Sawyer - NOAA Federal <evan.sawyer@noaa.gov>

Delta Conveyance Project draft BA/ITPA Review - NMFS Comments

2 messages

Amanda Cranford - NOAA Federal <amanda.cranford@noaa.gov> Fri, Oct 14, 2022 at 12:30 PM
To: Gardner.Jones@water.ca.gov
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Gardner,

Thank you for the continuing opportunity to provide technical assistance on the development of the draft DCP BA/ITP application materials. NMFS has reviewed the most relevant chapters and appendices, and are providing additional high-level comments as they pertain to anadromous fishes and their habitat under our jurisdiction. We have also attached a spreadsheet of more specific comments that reference the chapter, page, and line to which the comments refer (including Chapters 1, 2, 3, 4, 5 & 7, as well as Appendices 3A, 3A-OAMMP, 3B, 3B-1, 5A-supplemental, and 5B). Lastly, and to inform discussion of the operation of the North Delta Diversions (NDD), we've shared a preliminary analysis of species exposure that is based on proposed DCP operations and juvenile Chinook salmon migration timing. Together, the following and attached comments and analyses constitute the current extent of NMFS' understanding of the DCP and potential effects of NDD operations.

The following comments refer to project elements or analyses that could benefit from additional detail and/or continued technical discussion to refine our shared understanding of the DCP and its potential impacts on anadromous fishes and their habitat under NMFS' jurisdiction.

1. Action Agency for Operations: NMFS previously acknowledged that the ESA section 7 consultation with the USACE is limited to construction of the DCP. We continue to have concerns regarding consulting on DCP operations without a federal action agency that has the jurisdictional discretion and authority over operations. Of particular concern is the durability of commitments made regarding operations and adaptive management. Because there is no federal nexus for the operation of the DCP, and therefore, no current mechanism to reinitiate the consultation (50 CFR 402.16), there is considerable uncertainty regarding the commitment to mitigating or minimizing the operational effects through adaptive management.

2. Operations Adaptive Management and Monitoring Plan (OAMMP): The OAMMP provides a well thought out approach to applying adaptive changes to the DCP. However, certain elements of the OAMMP remain underdeveloped, particularly those elements that are proposed to be developed after ESA section 7 consultation is complete (see comment #1, above). Specifically, the OAMMP lacks sufficient detail as to which specific project uncertainties may be addressed through adaptive management, which in turn may preclude their consideration in the USACE's and NMFS' assessment of DCP effects. Furthermore, Chapters 5 and 7 of the draft BA identify the following four specific topics for adaptive management consideration that are not reflected in the OAMMP:

- Hydrologic cues upstream of, and in, the Delta for triggering, duration, and conclusion of pulse protection;
- Behavioral cues upstream of and in the Delta for triggering, duration, and conclusion of pulse protection;
- Level 1, Level 2, and/or Level 3 bypass flow criteria and transitions; and
- Diel (night/day) behavior in the intake reaches.

While NMFS understands that there will be some degree of uncertainty regarding which project elements may benefit from adaptive management refinement, whatever specificity can be added now, during pre-consultation, will accommodate its consideration later, during consultation and the formulation of the final biological opinion.

3. Treatment of potential changes to the baseline conditions and regulations affecting the DCP: It remains uncertain how temporary or regulatory changes to Delta water quality objectives and/or CVP & SWP operations would affect DCP operations. Specifically, how the DCP would operate under a drought-related Temporary Urgent Change Order, or a revised operation of the CVP/SWP. Given the ongoing drought, update to the Delta Plan, and the reinitiation of

consultation on the Long-Term Operation of the CVP/SWP; these changes are reasonably certain to occur and, when implemented, will modify the baseline conditions on which DCP operations are based.

4. Understanding of operational effects: NMFS appreciates the continued opportunity to participate in the interagency technical meetings facilitated by DWR, so as to improve our understanding of the DCP and its potential effects. While these meetings have been extremely helpful in developing a shared understanding, NMFS reiterates our concern regarding the extent of impacts associated with specific elements of proposed operations. Specific concerns include:

- The limited number and timing of pulse protection periods, which disproportionately focus on early juvenile anadromous fish migrants (e.g., winter-run Chinook salmon) early in the water year relative to later juvenile anadromous fish migrants (e.g., limited protection for spring-run and fall-run Chinook salmon);
- The diminishing bypass flow protection, Levels 1-3, throughout the water year, which reduce the level of bypass flow later in the year/spring, potentially increasing the negative effect on later juvenile anadromous fish migrants; and
- A potential misrepresentation that the majority of hatchery fall-run Chinook salmon releases are being made in San Francisco Bay. This misrepresentation may diminish the extent of DCP effects on fall-run Chinook salmon such that it leads to inaccurate effects analysis for Southern Resident killer whales prey base.

We appreciate the opportunity to comment on the draft DCP BA/ITP application materials and for the continued engagement. If you have any questions regarding our input, please contact Evan or me.

Attachments:

1. Fall 2022 NMFS DCP BA comments spreadsheet
2. 2022-10-07 Preliminary Pulse Protection Period Analysis

Thanks again,

Amanda

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****SPECIAL NOTE: PLEASE DO NOT SEND PHYSICAL MAIL TO OUR OFFICE****
NMFS staff is on full-time telework until further notice. Any correspondence that would normally be sent by hardcopy should be directed to ccvo.consultationrequests@noaa.gov. Thank you for your cooperation!

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2 attachments

Fall 2022 NMFS DCP BA comments.xlsx
57K

2022-10-07 Attachment_ Preliminary Pulse Protection Period Analysis.docx
321K

Jones, Gardner@DWR <Gardner.Jones@water.ca.gov> Fri, Oct 14, 2022 at 1:27 PM
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Hi Amanda,

Thank you for providing the detailed comments on the Draft DCP BA/ITP Application materials, and the summary of comments that will benefit from additional detail and discussion. We also appreciate the overall effort from the NMFS team in providing technical assistance for the DCP to date. We will reach out with any questions as we review the materials provided and consider opportunities/methods to address outstanding concerns.

Thanks again,

Gardner

(*he, him, his*)

Aquatic Resources Program Manager

Delta Conveyance Project, DWR

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Subject: Delta Conveyance Project draft BA/ITPA Review - NMFS Comments