



# DELTA STEWARDSHIP COUNCIL

*A California State Agency*

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October 27, 2015

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BDCP/California WaterFix Comments  
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SUBJECT: Delta Stewardship Council Comments  
Bay Delta Conservation Plan Recirculated Draft Environmental Impact  
Statement/Environmental Impact Report

The Delta Stewardship Council (Council) appreciates the opportunity to provide the following comments on the July 2015 Bay-Delta Conservation Plan/CAL Water Fix Partially Recirculated Draft Environmental Impact Statement/Report (Recirculated draft EIR/S). As the Legislature found in enacting the Delta Reform Act of 2009 (Act), the Sacramento-San Joaquin Delta watershed and California's water infrastructure are in crisis and existing Delta policies are not sustainable. The current drought illustrates this crisis. After decades of study, decisions on improved Delta conveyance need to be made promptly to further the coequal goals established by the Act and enshrined by the Council in the 2013 Delta Plan.

As you know, the Council has been watching the BDCP's development since 2010, exercising our consultative and responsible agency roles by commenting on the BDCP's Revised Notice of Preparation, the 2012 and 2013 administrative drafts of BDCP's EIR/S, and the 2013-14 draft EIR/S. Sections of the recirculated draft EIR/S reflect your agency's responsiveness to prior suggestions from the Council and others. Examples include adjustments to Sacramento River diversion facilities that reduce impacts to nearby communities, expanded discussion of impacts to water quality, improved assessment of impacts that may affect Delta wildlife and fish that also rely on habitats downstream in San Francisco Bay, and an improved assessment of cumulative impacts of conveyance improvements and other conservation measures together with other water management actions affecting Bay-Delta water supplies. We thank you for these improvements.

The Council has undertaken its review of the recirculated draft EIR/S: 1) to identify important issues that we believe will need to be more adequately addressed for the BDCP/WaterFix EIR/S to meet the requirements of the California Environmental Quality Act (CEQA) and the

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*"Coequal goals" means the two goals of providing a more reliable water supply for California and protecting, restoring, and enhancing the Delta ecosystem. The coequal goals shall be achieved in a manner that protects and enhances the unique cultural, recreational, natural resource, and agricultural values of the Delta as an evolving place."*

Delta Reform Act (see Water Code section 85320); and 2) to improve understanding of how the California WaterFix initiative – if it is ultimately selected by the Department of Water Resources (DWR) as the project – will further the goals established in the Act, achieve consistency with the Delta Plan’s regulatory policies and carry out the plan’s recommendations.

We recognize that the Council eventually may hear an appeal of DWR’s determination that the Water Fix is consistent with the Delta Plan. Should such an appeal occur, the Council will be relying on DWR’s certification of consistency as well as its administrative record supporting its certification; the Council’s comments on the Recirculated draft EIR/S will not have a pre-decisional effect on the Council’s determination with regard to any possible future appeal.

The first attached document was prepared by Council staff working with our consultant team from ARCADIS. It provides our comments on how the recirculated draft EIR/S addresses key CEQA requirements and the unique EIR/S requirements specified in the Delta Reform Act. The attachment is organized according to CEQA requirements and the requirements of the Delta Reform Act. The requirements often overlap, however, and we have tried not to repeat comments made in one area even though they may apply to other areas as well. Key points include:

- Delta Reform Act requirements. Our comments suggest several additional improvements to address the requirements of Water Code section 85320(b)(2) concerning the BDCP’s EIR/S’s review and analysis of important Delta resources.
- Effects on opportunities to restore habitats in the Cosumnes-Mokelumne high priority habitat restoration area. The new Alternatives 4A (California WaterFix), 2D and 5A, while reducing impacts on Delta communities and their residents’ quality of life, also propose new features, including a new forebay and reusable tunnel material storage site, barge landing, and temporary access road adjoining Snodgrass Slough and an outlet tower/safe haven and temporary access road on the McCormack Williamson Tract. These features’ compatibility with opportunities for habitat restoration within this area, as called for by the Delta Plan’s regulatory policies (CCR 5007), should be assessed.
- Avoiding or better mitigating impacts to water quality, wetlands and other aquatic habitats, and the unique values of the Delta. Some adverse effects of the California WaterFix to the Delta’s unique values may be unavoidable, but better mitigation can reduce harm to agriculture, recreation, communities, aesthetics, and cultural resources, so that the magnitude of change is more compatible with protection of the Delta as an evolving place.

The second attachment is the independent review of the recirculated draft BDCP EIR/S prepared by the Delta Independent Science Board (ISB), which we reference and make part of

the Council's comments on the draft EIR/S. The ISB completed its review pursuant to Water Code section 85320(c), which directs it to review the BDCP's EIR/S and submit its comments to the Council and Department of Fish and Wildlife. The Delta Reform Act provides that the Delta Plan shall be based on the independent scientific advice provided by the ISB (Water Code section 85308(a)). The ISB's recommendation that the final EIR/S should use best available science, while not required by CEQA, may facilitate DWR and DFW's use of best available science for purposes of the Natural Community Conservation Planning Act, certification that the project is consistent with the Delta Plan's regulatory policy requiring use of the best available science (23 CCR 5002(b)(3)), and/or decisions about the project by DWR and other agencies. As you consider the ISB's comments, please respond as if they had been submitted by the Council.

As you know, Council staff meets regularly with WaterFix staff to discuss Council comments and issues of concern, and we have considered your feedback in preparing these comments. We appreciate the pledge that the final EIR/S and related documents will address several key issues raised in the prior comments of the Council and the ISB on the draft EIR/S. These include:

- The adaptive management process, including monitoring and collaborative science.
- Flow criteria and the water available for other beneficial uses (Water Code section 85320 (b)(2)(A)).
- The potential effects of climate change, including sea level rise and changes in precipitation and runoff, on conveyance alternatives considered in the EIR, including their operation (Water Code section 85320 (b)(2)(C)).
- Sacramento and San Joaquin River flood management (Water Code section 85320 (b)(2)(D)).
- The resilience and recovery of Delta conveyance alternatives in the event of catastrophic loss by earthquake, flood, or other natural disaster (Water Code section 85320 (b)(2)(F)).

The Council supports successful development and implementation of conveyance improvements that fulfill the Delta Reform Act's requirements and the Delta Plan. We offer the opportunity for your staff to meet with ours for additional details on any of the comments in the attachments. Through consultation between our agencies, we believe our comments can be addressed satisfactorily. We look forward to working with you over the coming months as you complete the final BDCP/WaterFix EIR/S. Please contact Dan Ray at (916) 445-4294 if you would like to discuss these comments further.

Sincerely,



Randy Fiorini, Chair  
Delta Stewardship Council

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**REVIEW COMMENTS**  
**BAY DELTA CONSERVATION PLAN**  
***July 2015 PARTIALLY RECIRCULATED DRAFT***  
***ENVIRONMENTAL IMPACT REPORT/ENVIRONMENTAL IMPACT***  
***STATEMENT***  
Prepared by the  
**DELTA STEWARDSHIP COUNCIL**  
October 2015

## I. INTRODUCTION

This document presents comments prepared by Delta Stewardship Council (Council) on the July 2015 partially recirculated draft Environmental Impact Report/Environmental Impact Statement (EIR/S) of the Bay Delta Conservation Plan (BDCP). The purpose of our review is to offer constructive suggestions regarding how, in our judgment, the BDCP EIR/S could better meet the requirements of the California Environmental Quality Act (CEQA), the applicable provisions of the 2009 Delta Reform Act, and the Delta Plan's regulatory policies and recommendations.

These comments include:

- A summary of key issues
- A reminder about the Delta Reform Act's provisions with respect to the Delta Stewardship Council's role and DWR's responsibility to certify that its preferred alternative is consistent with the Delta Plan.
- Comments on the recirculated EIR's assessment of impacts and its mitigation proposals for water quality, biological resources, water supplies, agriculture, recreation, community character, aesthetics, and cultural resources.

## II. SUMMARY OF KEY ISSUES AND RECOMMENDATIONS

Relative to our review of the recirculated draft BDCP EIR/S, we offer the following summary of key issues and recommendations:

- A. Delta Plan and Delta Reform Act consistency. *Issue:* If the California WaterFix is ultimately chosen as the project, DWR will need to certify that the California WaterFix is consistent with the Delta Plan. In addition, because the BDCP as originally proposed is still a viable alternative, the BDCP EIR should fulfill the requirements of Water Code section 85320(b)(2). *Recommendation:* Continue consultation with Delta Stewardship Council staff as the final EIR/S is completed and certification of consistency with the Delta Plan is contemplated.
- B. Comprehensive project description. *Issue:* The final EIR/S needs a project description that is complete. Important operational aspects of the preferred project are contingent upon the results of Endangered Species Act and State Water Resources Control Board consultation processes;

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*Recommendation:* The final EIR/S's project description should be consistent with and fully informed by regulatory filings for the project.

- C. Adaptive management. *Issue:* The project needs an adequate adaptive management program. *Recommendation:* Consult with the Delta Science Program and affected regulatory agencies to describe an adaptive management program.
- D. Water Quality. *Issue:* Implementation of measures proposed to mitigate potential impacts to water quality for in-Delta water users may prove cumbersome and protracted. *Recommendation:* Identify a water quality monitoring and compliance program in the final EIR/S and/or its mitigation monitoring and reporting plan. Improve the process and better balance the burdens for identifying and implementing operational changes or other corrective actions to mitigate adverse effects on in-Delta water users or the environment.
- E. Impacts on the Opportunities to Restore Delta Habitats. *Issue:* Alternatives 4A, 2D, and 5A include both permanent and temporary features within areas near the Cosumnes – Mokelumne confluence and the lower San Joaquin River floodplain which the Delta Plan identifies as high priorities for ecosystem restoration. *Recommendation:* More fully assess how project features near the Cosumnes – Mokelumne Confluence and the lower San Joaquin River floodplain may affect planned and potential habitat restoration in these areas. Relocate incompatible features, if feasible, and recommend measures to mitigate conflicts that cannot be avoided.
- F. Mitigation of other effects on wetlands and aquatic habitats. *Issue:* Damage to wetlands, aquatic habitats, and associated wildlife and fish populations should be avoided and/or minimized before compensatory mitigation for unavoidable losses is considered. *Recommendation:* More carefully describe mitigation for impacts to wetlands and aquatic habitats.
- G. Evaluation and mitigation of impacts to unique Delta values. *Issue:* The recirculated draft EIR/S does not adequately evaluate, avoid, or mitigate the cumulative impacts of the California WaterFix alternatives to agriculture, recreation, community character, aesthetics, and cultural resources. In some cases, identification of feasible and enforceable measures to mitigate these impacts is deferred. *Recommendation:* The final EIR/S should more thoroughly identify impacts to agriculture, recreation, community character and cultural resources, further consider opportunities to avoid them, and offer specific, feasible, and enforceable mitigation measures for unavoidable impacts. If specific, feasible, and enforceable mitigation measures for adverse effects cannot be identified at this time, specify performance standards that will mitigate the project's significant impacts.

### III. DELTA PLAN AND DELTA REFORM ACT CONSISTENCY

Our prior letter on the draft EIR/S identifies information that should be included in the final EIR/S to comply with Water Code section 85320. Appendix G of the partially recirculated draft EIR/S provides a useful overview of how DWR anticipates it will approach certification of the California WaterFix' s consistency with the Delta Plan in conformance with Water Code section 85225. To ensure the project uses the best available science (23 CCR section 5002(b)(3)) and includes adequate provisions to assure implementation of adaptive management (23 CCR section 5002(b)(4)), we urge you to pay special attention to the Independent Science Board's reviews of the draft and partially recirculated draft EIR/Ss. Our comments on both the draft EIR/S and the partially recirculated draft EIR/S identify mitigation measures that may need improvement (23 CCR section 5002(b)(2)). Other comments below call

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attention to other aspects of the project where additional information or consideration of further alternatives or mitigation measures may be important to certification of the project's consistency with the Delta Plan.

As the final EIR/S is completed, Council staff anticipates continuing to consult with DWR as provided in Water Code section 85225.5 and 85320(c).

#### **IV. COMPREHENSIVE PROJECT DESCRIPTION**

An accurate, complete, and stable project description is essential to the BDCP's EIR and subsequent certification of the project's consistency with the Delta Plan. A large degree of uncertainty exists in the recirculated draft BDCP EIR/S assessment of the operational impacts because:

- Many key factors are contingent upon the results of Endangered Species Act and State Water Resources Control Board consultation processes;
- Decision criteria and the type and range of operational responses to be utilized by the Real Time Operations (RTO) Team have not been clearly defined or are not provided in the recirculated draft EIR/S. These criteria will not be available until publication of the final EIR;
- The recirculated draft EIR/S Section 4.1.2.4 indicates that the collaborative science and adaptive management processes will be relied upon to identify, assess, and develop necessary changes in the new facility and existing south Delta operations. As the ISB points out, these processes are not yet well described and often take many years to implement, particularly in a dynamic ecosystem with multiple stakeholders. The timeliness and results of these program processes could substantially affect the level of impact;
- The importance of monitoring is discussed with respect to evaluating operational impacts, however, no information is provided on the objectives, types, geographic distributions, data management, assessment and reporting for the monitoring program. Presumably the monitoring requirements will be developed through the consultation and permitting process; and
- Changes in operational criteria are unlikely to benefit all special status species equally and may actually be detrimental to some special status species seasonally or geographically. The same will hold true for impacts to beneficial uses of the Delta water. How these decisions will be weighted or prioritized is a complex process that is not addressed in the recirculated draft EIR/S.

The partially recirculated draft EIR/S describes several operational scenarios with criteria that bookend a range of outflows and other parameters. Judging the reasonableness of the range of operational criteria that will guide project operations is difficult because, as discussed in Chapter 5 Water Supply and in Appendix 5A BDCP EIR/S Modeling, at this stage of the environmental assessment and permitting process there are still a large number of unknowns from a water supply standpoint. The two operational scenarios proposed, providing flows to meet Fall X2 objectives (H3) and providing enhanced spring outflows together with flows to meet Fall X2 objectives (H4,) provide outcomes related to Delta exports, Delta outflow and biological opinion flow criteria that meet the project objectives over a range of water year conditions. In general, focusing on the H3-H4 scenarios provides a range of operational conditions that will facilitate the consultation and permitting processes. The biological assessments being prepared

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for the project's Endangered Species Act consultation can inform more detailed analysis of operational impacts to the Delta ecosystem associated with these scenarios.

To assure the adequacy of the preferred alternative's description, the final EIR/S should fully consider insights gained from consultation with federal and state Endangered Species Act agencies and with the State Water Resources Control Board about the project's Clean Water Act 401 certification and its proposed change in the SWP's point of diversion. The range of project operations should be described with sideboards that reflect reasonably foreseeable regulatory outcomes.

## **V. ADAPTIVE MANAGEMENT**

Adaptive management should be integral to the description of the California WaterFix initiative because, as noted above, it is central to operational decisionmaking, evaluation of the efficacy of the compensatory habitat restoration that mitigates impacts to wetlands and other fish and wildlife habitats, and assesses the need for adjustment in the flow criteria for the North Delta diversions. DWR's certification of California WaterFix's consistency with the Delta Plan will need to demonstrate the adequacy of the project's adaptive management program (23 CCR 5002(b)(4)). The partially recirculated draft EIR/S's description of substantive BDCP Revisions (Appendix D) does not provide important information about adjustments of the adaptive management program for the California WaterFix alternative, despite significant differences in scope and implementation features from the BDCP.

The adaptive management program should include, as the ISB recommends, species-specific thresholds and timelines for action that address both water management and mitigation of construction impacts; an Adaptive Management Team that includes the membership from the State Water Resources Control Board in addition to the agencies described in the partially recirculated draft EIR/S's Section 4.1.2.4; and as the ISB urges, describe the commitments of funding that effective science-based adaptive management will require.

Appendix D includes a new requirement that if the proposed Adaptive Management Team recommends changing a conservation measure or biological objective, it needs to provide "an analysis of the means by which the adaptive resources available to support adaptive management actions will be used to fund the proposed change, if applicable" (Appendix D, page D.3-133). It is not clear if the Adaptive Management Team needs to identify a funding mechanism for any proposed changes. The \$450 million maximum for the Adaptive Management Fund included in 2013-14 version of the BDCP is omitted from the revised Appendix D. However, with the removal of the text, it is not clear if there is no limit or if there is a minimum amount in the fund. With key decisions about the preferred alternative impending, now is the time to address these and other long-deferred decisions about adaptive management of the project.

## **VI. WATER QUALITY**

The Delta Plan recognizes that managing the Delta's resources to accomplish the coequal goals will be a "balancing act."

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“Conditions that affect water quality must be managed and balanced in a way that allows these goals to be met simultaneously. When one use is protected, steps must be taken to minimize impacts on other uses.” (Delta Plan pg. 212).

The Council’s previous comments recommended improving the assessment and mitigation of impacts to water quality. The partially recirculated draft EIR/S responds partly to these comments with its additional analysis of selenium and mercury and more careful evaluation of alternatives’ effects on salinity and *Mycrocystis*. We appreciate this additional analysis and alternative 4A’s retention of the current salinity (EC) compliance point at Emmaton. Impacts to water quality for both in-Delta water users and ecosystem purposes appear reduced from those forecast in the draft EIR/S.

Nevertheless, we noted the statement during DWR’s August 14, 2015 presentation to the ISB that the models presented in the recirculated draft EIR/S are comparative and not predictive. Therefore, their appropriate and intended use is to allow comparisons between the No Action Alternative and the other alternatives, rather than predicting the actual performance of the California WaterFix. If that is the case, then the partially recirculated draft EIR/S may have limited potential to draw firm conclusions regarding potential impacts on beneficial uses of water by in-Delta water users or aquatic organisms and habitats.

The partially recirculated draft EIR/S does not describe the process for identifying operational water quality impacts or the operational changes that would be implemented as corrective actions. A water quality monitoring and compliance program should be described in the final EIR/S and its mitigation monitoring and reporting plan.

In addition, mitigation measures should propose effective responses if water quality objectives established for the project are violated. The potential mitigation measures referenced in the partially recirculated draft EIR/S and outlined in Section 3B.2.1 of the draft EIR/S place much of the burden on in-Delta water users to identify water quality problems and develop solutions as opposed to having the project proponent assume this burden. The document indicates the project’s proponents are committed to assisting in-Delta municipal, industrial, and agricultural water purveyors that may be subject to significant water quality impacts from project operations. The introductory paragraph, however, indicates that alternatives would be developed by the in-Delta water users with input from the project proponents after a thorough investigation and completion of environmental review. The mitigation measures referenced by the recirculated draft EIR/S do not appear to account for the potential adverse effects to in-Delta water users during the time that water quality impacts are investigated and assessed; solutions are evaluated and designed; environmental assessment is performed; permits are acquired; and remedial solutions are implemented. Given the typical timeframe to accomplish these steps for water projects in the Delta, the financial and operational impacts as well as the environmental impacts associated with reoperation or relocation of these diversions could be substantial.

## **VII. IMPACTS ON THE OPPORTUNITIES TO RESTORE DELTA HABITATS**

Restoration of Delta habitat areas is a key to enhancement of the Delta ecosystem consistent with the coequal goals of the Delta Reform Act and the purposes of the BDCP. To encourage restoration, both the BDCP and the Delta Plan identify areas within which habitat restoration is encouraged. These areas, which are similar in both plans, were selected because they provide promising sites for habitat restoration on less subsidized flood basins, river corridors, and brackish marshes at appropriate elevations

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on the Delta's perimeter. Because locales like these that are suitable for restoration are not common, maintaining them in uses compatible with potential future restoration is important. That is why a Delta Plan regulatory policy (23 CCR section 5007) provides, in part:

- (a) Within the priority habitat restoration areas ... significant adverse impacts to the opportunity to restore habitat ... must be avoided or mitigated.
- (b) Impacts referenced in subsection (a) will be deemed to be avoided or mitigated if the project is designed and implemented so that it will not preclude or otherwise interfere with the ability to restore habitat...
- (c) Impacts referenced in subsection (a) shall be mitigated to a point where the impacts have no significant effect on the opportunity to restore habitat... Mitigation shall be determined, in consultation with the California Department of Fish and Wildlife, considering the size of the area impacted by the covered action and the type and value of habitat that could be restored on that area....

The Delta Plan encourages mitigation by allowing temporary uses with requirements for subsequent removal and cleanup afterward to protect opportunities for habitat restoration, elevation of structures so that water can flow underneath to allow restoration of aquatic habitats dependent on tides or periodic flooding, or location of permanent structures on the edge of habitat restoration areas, rather than in the middle, to improve opportunities for habitat restoration (Delta Plan Figure 4-7. p. 150).

A. Cosumnes–Mokelumne Confluence priority habitat restoration area. The new Alternatives 4A (California WaterFix), 2D and 5A, while reducing impacts on Delta communities and to wildlife and farmland on Staten Island, also propose new features within the Delta Plan's Cosumnes – Mokelumne Confluence priority habitat restoration area, including a permanent new forebay and a temporary reusable tunnel material storage site, barge landing, and access road adjoining Snodgrass Slough and a temporary outlet tower/safe haven and access road on the McCormack Williamson Tract. These features' compatibility with opportunities for habitat restoration within this area, as called for by the Delta Plan's regulatory policies, should be assessed. If feasible, the forebay should be relocated outside the restoration opportunity area. If relocation is infeasible, opportunities should be explored to integrate the forebay's open water and shorelines with surrounding wildlife and fish habitats of the Cosumnes Preserve, including the McCormack-Williamson Tract, Stone Lakes National Wildlife Refuge, State Parks' Delta Meadows property, and Snodgrass Slough's aquatic habitats. If the temporary reusable tunnel material storage site, barge landing, and access road cannot be relocated, appropriate mitigation should consider removal of all project features, included stored tunnel material, promptly upon termination of their use during the project's construction, and restoration of disturbed sites as wildlife and fish habitats compatible with the surrounding landscape. Planning to avoid impacts to restoration opportunities in this area should be coordinated with the barge operations plan that would accompany the barge landing, to assure that barge operations do not rely upon dredging or other maintenance that would be incompatible with eventual restoration of the area's habitat values.

Similarly, the temporary outlet tower/safe haven and access road should be relocated off the McCormack Williamson Tract if feasible. We cannot find a consistent description of this feature or an adequate assessment of its impacts in the recirculated draft EIR/S. Chapter 3 of Appendix A (Description of Alternatives) states that safe havens will be implemented during construction of the conveyance

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tunnels, and will involve temporary access roads and disturbance of 1-3 acres of land for a period estimated to be approximately 9-12 months (page 3-41). However, Chapter 17 (Aesthetics and Visual Resources) mentions that these areas will be approximately 10 acres in size (page 17-23). We can find no mention of the impacts of this safe haven on the McCormack-Williamson Tract. Chapter 17 of Appendix A describes the location as “the island located east of Snodgrass Slough and west of the Mokelumne River,” without recognizing that this island is in fact the restoration area on the McCormack-Williamson Tract (page 17-24). Chapter 3 of Appendix A (Description of Alternatives) identifies the tract as a priority habitat restoration area, but disregards current restoration efforts (page 3-83). Table 13-11 in Chapter 13 of Appendix A (Land Use) specifically identifies that 11 acres of planned safe haven work area in Sacramento County will occur on land classified as “Agricultural Cropland,” rather than “Natural Preserve” or “Open Space/Resource Conservation” areas (page 13-4). It does not appear that the restoration efforts on this tract were considered when planning the location of this particular safe haven area.

Restoration of tidal marsh and riparian habitats on the McCormack Williamson Tract as part of the California EcoRestore initiative is scheduled to begin in 2016 and conclude by 2018, according to the recirculated draft EIR/S’s cumulative impact analysis reports (p. 5-3). Further information about the project is available at

[http://resources.ca.gov/docs/ecorestore/projects/McCormack\\_Williamson\\_Tract.pdf](http://resources.ca.gov/docs/ecorestore/projects/McCormack_Williamson_Tract.pdf).

Analysis of potential conflicts with habitat restoration in the area should also consider effects on timely achievement of North Delta flood management benefits, which are a key element of the restoration project. The analysis should also assess flood risks that the constrained height of McCormack-Williamson Tract’s existing levees may pose to the outlet tower/safe haven and access road. Assessment of these flood risks should be coordinated with evaluation of the project’s effects on flood management required by Water Code section 85320(b)(2)(E). Further delay in this long-planned, highly visible restoration project would be regrettable.

If these features cannot be relocated outside the priority habitat restoration area or adverse effects on restoration opportunities cannot be adequately mitigated, this potential inconsistency with the Delta Plan should also be acknowledged in Appendix G.

B. Lower San Joaquin River priority habitat restoration area. The recirculated draft EIR/S’s Appendix G acknowledges that the operable barrier at the head of Old River is located within the Delta Plan’s Lower San Joaquin River priority habitat restoration area. A more thorough explanation should be provided for Appendix G’s conclusion that construction and operation of the operable barrier will not substantially reduce restoration opportunities there. This analysis should include consideration not only of the surface area disturbed by the operable barrier’s construction, but also the barrier’s compatibility with processes, such as periodic flood flows, needed to sustain a mix of tidal marsh, riparian habitat, and wildlife friendly agriculture that the Delta Plan envisions in the area and whether the barriers may contribute to fragmentation of potential restored habitats. Assessment is also needed of the barrier’s compatibility with the proposed Lower San Joaquin Flood Bypass, whose potential to reduce flood risks in nearby urban areas is an important objective for this restoration opportunity area. Assessment of

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these flood risks should be coordinated with evaluation of the project's effects on flood management required by Water Code section 85320(b)(2)(E).

### **VIII. MITIGATION OF OTHER EFFECTS ON WETLANDS, AQUATIC HABITATS, AND WILDLIFE AND FISH HABITATS**

We were pleased to see the recirculated draft EIR/S's additional assessment of potential effects on sandhill cranes and WaterFix's revisions to the tunnel alignment and its power demands that reduce potential impacts on this important wildlife. This was among the improvements in the recirculated draft EIR/S complimented by the ISB.

The ISB, however, also encourages more attention to measures to avoid or reduce effects on wetlands and other aquatic habitats, as well as reassessment of the extent, location, and timing of habitat restoration that compensates for unavoidable damage. The Delta Plan's implementing regulations require, in part, that covered actions not exempt from CEQA must include applicable feasible mitigation measures identified in the Delta Plan's Programmatic EIR ... or substitute mitigation measures that the agency that files the certification of consistency finds are equally or more effective (23 CCR 5002(b)(2)). For adverse effects to sensitive natural communities, including wetlands and riparian habitats, the Delta Plan's mitigation measures generally include:

Avoid, minimize, and compensate for reduction in area and/or habitat quality of sensitive natural communities, including wetlands, by doing the following:

- Selecting project site(s) that would avoid sensitive natural communities.
- Designing, to the maximum extent practicable, project elements to avoid effects on sensitive natural communities.
- Replacing, restoring, or enhancing on a "no net loss" basis (in accordance with U.S. Army Corps of Engineers (USACE) and State Water Resources Control Board (SWRCB) requirements), wetlands and other waters of the United States and waters of the State that would be removed, lost, and/or degraded.
- Where impacts to sensitive natural communities other than waters of the United States or State are unavoidable, compensating for impacts by restoring and/or preserving in-kind sensitive natural communities (Mitigation measure 4-1).

As the ISB notes, the recirculated draft EIR/S does not explain how the project incorporates measures to avoid or minimize effects that would conform to this provision. In addition, the final EIR/s should clarify whether any of the wetland restoration is out-of-kind and how much is in-kind replacement of losses. The ISB agrees that out-of-kind mitigation can be preferable to in-kind when the trade-offs are known and quantified and mitigation is conducted within a watershed context, as described in USACE's guidance. If compensatory wetland mitigation on or near the site of impact is infeasible or ill-advised, offsite opportunities should be considered in a landscape context, including the potential to site mitigation areas within the Delta Plan's priority habitat restoration areas to achieve synergies with other planned restoration projects and to minimize conflicts with agriculture or other uses.

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## IX. EVALUATION AND MITIGATION OF IMPACTS TO UNIQUE DELTA VALUES

In our comments on the draft EIR/S, we noted that the proposed BDCP conveyance and restoration measures will significantly and adversely affect important attributes of the Delta's regional character, including values that the Council's Delta Plan describes as contributing to making the Delta a distinctive and special place. The Delta Reform Act and Delta Plan anticipate that changes to these attributes will occur and may be necessary to achieve the coequal goals, but seeks to accommodate these changes while preserving the fundamental characteristics and values that contribute to the Delta's special qualities and that distinguish it from other places. We also pointed out that the project's effects on the Delta's agricultural, recreational, and cultural resources should be considered in the context of larger past and likely future trends in the Delta threaten the agricultural, recreational, and cultural values of the Delta. Those observations also apply to consideration of the impacts of the California WaterFix initiative.

California WaterFix reduces some the BDCP's adverse effects on unique Delta values because of the revision to diversion and conveyance facilities in the north Delta, which reduces damage to agriculture, recreation, scenic resources, and Delta communities. Separation of most habitat restoration measures into the California EcoRestore initiative further reduces impacts to agriculture. We appreciate these improvements.

Nevertheless, the new alternatives will still have significant adverse effects on the Delta's unique values that should be more thoroughly assessed, avoided where feasible, and better mitigated.

- A. Agriculture. Agriculture is the Delta's primary land use and a valued resource. The amount of land that will be converted from agricultural use by the California WaterFix's construction is unclear. In part, this is because the recirculated draft EIR/S offers differing estimates of the amount of land needed for reusable tunnel material (RTM) storage. For example, Chapter 3 says 2600 acres are needed for RTM storage, Chapter 14 says 3,630 will be needed for RTM storage, and Appendix 3C says 2,570 will be needed for RTM storage. In addition, the acreage permanently converted from farm use is reported in two overlapping measurements: acres of important farmland (which includes some lands in Williamson Act contracts) and farmland in Williamson Act contracts (which may include some farmland not classified as important). These differing and overlapping estimates should be resolved by reporting the total amount of farmland that will be converted including both important farmland and other agricultural land in Williamson Act contracts.

In addition to the farmland converted by project construction, up to 1400 more acres of farmland may be converted for compensatory habitat restoration to mitigate project effects. WaterFix's construction may also potentially impair water quality for some agricultural users, disrupt agricultural infrastructure, and harm the agricultural economy, according to the recirculated draft EIR/S. The final EIR/S should better describe and more carefully avoid or mitigate all impacts to agriculture arising in several ways, as discussed below.

1. *Impacts of compensatory habitat restoration*. The recirculated draft EIR/S evaluates a variety of impacts on Delta agriculture caused by the compensatory habitat restoration to mitigate project effects. This compensatory mitigation is part of the project's environmental commitments.

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However, because the environmental commitments are presented at a programmatic level it is still not possible to fully identify the impacts to agriculture with any degree of certainty. Section 4.3.10 of the recirculated draft EIR/S indicates roughly 15,548 acres of habitat will be restored, including the acreage of farmlands managed especially for sandhill cranes or other wildlife. Because specific locations have not been selected for this restoration, the recirculated draft EIR/S does not identify specific farmlands, or how many acres of them will be impacted.

The final EIR could be improved by more carefully describing how much agricultural land will be converted. For example, the recirculated draft EIR/S's concludes that impact AG-3 "will restore up to 1,400 acres." More careful estimation of requirements for compensatory habitat restoration, as described above, could provide a better basis for identifying the acreage of agricultural easements needed to offset the loss. Information about specific properties to be acquired in the WaterFix right-of-way could also be used to assess project impacts caused by losses of important agricultural infrastructure, such as drainage and irrigation facilities or by fragmenting parcels.

2. *Increased Farm-to-Market Travel Times.* Impact ECON-6 (p. 16-36, lines 2-4 of recirculated draft EIR/S) anticipates an increase in agricultural production costs from "operational constraints and longer travel times due to facilities construction". The final EIR/S should more carefully evaluate how the conveyance construction impacts may affect transportation between key agricultural areas and important processing or marketing facilities.

Chapter 19 (Table 19-25) indicates that the designated "Farm-to-market" corridor (Highway 99 between Bakersfield and Sacramento,) will not be impacted; however, during construction Level of Service (LOS) thresholds will be exceeded (made worse than previous LOS) on 38 other segments of state highways and local roadways (Impact TRANS-1). Further, LOS thresholds will be exceeded to a D or worse on 10 segments for the duration of the construction period. This includes important thoroughfares such as sections of Interstate-5, State Road 4 and 84 (Jefferson Blvd), and important bridges across the Sacramento River. The recirculated draft EIR/S identifies mitigation measures (TRANS 1a-c) to reduce the severity of the impact. However, "the BDCP proponents cannot ensure that the improvements will be fully funded or constructed prior to the project's contribution to the impact," (page 19-122 of recirculated draft EIR/S lines 9-10). The final EIR/S should explain the constraints that limit full funding of these mitigation measures and the basis for determining that mitigation is not feasible.

If all mitigation measures to reduce traffic impacts are not implemented successfully, the impacts to LOS on these roads will remain significant and unavoidable. The impacts of the decrease in LOS on roadways serving key agricultural areas due to construction will likely remain considerable, and the economic effect and any related environmental effects should be acknowledged in Chapter 15, Impacts ECON-5 and ECON-6.

3. *Agricultural Economics.* The recirculated draft EIR/S indicates that construction of the California WaterFix will cause many significant and adverse direct and indirect impacts to agriculture, and that the California WaterFix will significantly alter the agricultural character and regional economy. Impact ECON-3 acknowledges that the project will change the agricultural character

of the Delta region. The long-term footprint of construction and the disruption to infrastructure are expected to decreasing agricultural production valued at \$5.3 million annually, indirectly impact agriculture by increasing production costs (ECON-6), and by causing a decline in agricultural employment during construction by about 40 jobs (Impact ECON 1, Table 16-42). According to the recirculated draft EIR/S, impacts to agriculture under alternative 4 will remain “Significant and Unavoidable.” These impacts could be better assessed by considering the regional significance of the decline in agricultural related income (Table 16-42) and the associated loss of jobs in comparison with the \$795 million value of regional crop and livestock production and 13,179 total agricultural jobs reported in the Delta Protection Commission’s *Economic Sustainability Plan* (p. 112). It would also be helpful to assess whether these impacts cause such significant losses of a particular crop that they affect the viability of that crop in the region as a whole or have particularly significant impacts to high value crops (e.g., vineyards) or heirloom crops (e.g., pears and asparagus).

4. *Integrating Agricultural Mitigation with Other Regional Conservation Strategies.* Mitigation proposed for agricultural impacts generally offers two options: 1) a conventional approach conserves agriculture by acquiring easements on agricultural land in direct proportion to the amount of agricultural land converted to other uses; or 2) an agricultural land stewardship approach. In the land stewardship approach, restoration is implemented by selecting mitigation measures, in particular agricultural land stewardship options that could be integrated into regional conservation strategies. These strategies should include local HCPs, local land trusts’ activities to protect important farmland threatened by development, or actions complementing the California EcoRestore initiative. These regional strategies could: 1) incorporate agricultural considerations into regional environmental commitments; 2) provide a framework for project selection and design; 3) contribute to a system of protected agricultural resources; and 4) provide a framework for evaluating and mitigating impacts to agriculture and other land uses. It could also help avoid or reduce impacts to the most valuable agricultural areas, enable interconnected agricultural zones and habitat corridors, and minimize edge effects. The following techniques should be used in the regional conservation strategies to preserve and protect agriculture:

- Use easements to protect land where development threats are greater. For example, at a minimum, losses of farmlands converted to non-farmed habitat could be mitigated by securing conservation easements that protect other agricultural lands threatened by development, such as land in the Delta’s secondary zone. Lands in the primary zone, on the other hand, are already protected from urban development by state law. The Delta Plan proposes mitigation for farmland losses at a ratio of one acre protected for each acre converted to non-farm use.
- Identify mitigation within the regional conservation strategy framework so that the effects on drainage, cropping systems, etc., can be integrated with restoration strategies.
- Implement safe harbor agreements, as described on pages 143 and 186 of the Delta Plan, and propose other good neighbor arrangements.

5. *Recommendations from the Delta Plan.* Potential mitigation measures included in the Delta Plan’s recommendations for supporting the Delta’s agricultural economy should be considered

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to mitigate environmentally-significant economic impacts to agriculture. For example, the Delta Plan recommends that local governments and economic development organizations, in cooperation with the Delta Protection Commission and the Delta Conservancy, encourage value-added processing of Delta crops in appropriate locations (DP R8 Promote Value-Added Crop Processing). Similarly, DP R9 (Encourage Agritourism) recommends support for agritourism, particularly in and around Delta Legacy Communities.

- B. Recreation. Five million people live within a 20 minute drive of the Delta and Suisun Marsh, the typical distance Californians drive to reach a favorite recreation area. About 12 million visitor days occur in the Delta annually. Demand for recreation that can be provided in the Delta is growing, both with the forecast doubling of the region's population over the next 50 years, and with the potential to attract visitors from other regions. Protecting these valued recreation opportunities is important and measures to do so should be included in the final EIR/EIS. Four types of impacts to recreation need to be addressed, as discussed below.

As measures to mitigate these affects to recreation are proposed and implemented, DWR should consider its responsibilities regarding fish, wildlife, and recreation in state water projects (Water Code sections 11910-11915), especially the duty to coordinate with the Department of Parks and Recreation and local governments (Water Code section 11910-11910.1).

1. *Impacts to recreation facilities in construction zones*. The recirculated draft EIR acknowledges that ten or more years of conveyance construction will result in the long-term reduction of recreational opportunities and experiences in the Delta both on land and in water (Impact ECON 5, REC 2 and 3). Traffic delays, disturbance, noise, and water quality impacts may reduce visits to, or prevent access to specific recreational sites. This, in turn, may cause local recreation related businesses to suffer or close from reduced spending, with potential cumulative effects to private visitor-serving facilities vulnerable to a decline in regional recreational-related economic activity. Nine facilities are within areas the recirculated draft EIR/S identifies. Four are public recreation areas: State Parks' Delta Meadows property, the Cosumnes Preserve, Stone Lakes National Wildlife Refuge, and the Clifton Court Forebay. Five are marinas: Bull Frog Marina, Clarksburg Marina, Lazy M Marina, New Hope Landing Trailer Park and Marina, and Wimpy's Marina. In addition, declining levels of service on roads affected by construction traffic may affect access to and use of additional 101 public recreation areas and marinas within 1 mile of those roads.

Though proposed mitigation measures offer noise abatement programs, detours and temporary roads around construction, protection of navigation on affected waterways, and other activities to minimize disturbances, the impacts of California WaterFix conveyance construction activities on recreation in construction zones are still significant. A more comprehensive assessment of impacts is warranted, and additional mitigation should be offered to offset the impacts that cannot be avoided. For example, impact ECON-5 discusses the qualitative effects on recreational economics as a result of constructing conveyance, and Impacts REC 1-4 discusses general impacts qualitatively. Quantifying the effects on recreational uses and opportunities, for example, by reporting affected facilities' annual visitation levels or recreational capacity (e.g., number of berths or overnight spaces) would enable comparison of alternatives to assess which

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alternative most significantly impacts recreation in the Delta (recirculated draft EIR/S section 16.3.3.9 pages 16-33 and 16-34) and could facilitate proposing mitigation measures that are properly scaled to the magnitude of the impacts. Other mitigation measures that should be considered include promotion, in cooperation with organizations like the Delta Chamber of Commerce or other Delta marketing entities, of alternate access routes to affected recreation areas or areas unaffected by construction. CalTrans' efforts in cooperation with Lake Tahoe tourism agencies during the reconstruction of Highway 50 may provide a model.

2. *Impacts on Recreational Boating.* The Delta Protection Commission's *Economic Sustainability Plan* (2012) and California State Parks' *Recreation Proposal for the Sacramento-San Joaquin Delta* (2011) indicate that boating comprises 60 percent of Delta recreation-days and contributes 80 percent of tourism spending. The recirculated draft EIR/S finds that the construction and operation of conveyance facilities (which will occur in or near recreational boating corridors) will have significant and unavoidable impacts on long term recreational boating opportunities by disrupting boat passage at these sites (Impact REC-3, page 4.3.11-5, recirculated draft EIR/S Sec 15.3.3.9 pages 15-22 through 15-28):

- Three intakes on the Sacramento River.
- Clifton Court Forebay (siphons).
- Head of Old River Barrier.
- Snodgrass Slough, Potato Slough, San Joaquin River, Middle River, Connection Slough, Old River, West Canal.

The scale of these impacts could be better assessed if the length of waterways affected by construction were more clearly described and considered in relation to Delta's 700 miles of navigable waterways. The recirculated EIR/S acknowledges that many sites on the water will also likely see a decline in use during the construction period due to construction noise and/or geotechnical testing as described in impact REC-2. The proposed mitigation emphasizes traffic and aquatic weeds management, but specific mitigation for these negative impacts on boating access should also be provided. Potential approaches could include compensatory improvements to boating facilities that provide access to other Delta regions unaffected by the WaterFix initiative.

3. *Impacts to driving for pleasure.* Driving for pleasure is among Californians' favorite recreations, and the project's effects on it should be addressed. Forty-five percent of Californians participate in driving on paved roads for pleasure, sightseeing, and the enjoyment of natural scenery, according to the Department of Parks and Recreation's *Survey on Public Opinions and Attitudes on Outdoor Recreation in California (SPOA) 2012, Complete Findings* (January 2014). Highway 160, a state Scenic Highway, and the Delta Loop extending from Hwy 160 through Brannan Island and Perry's Island Roads to Highway 12 are key routes for recreational drivers. Construction detours, aesthetic impacts, and construction-related congestion on Highway 160 and Highway 12 will affect both of these recreational driving routes. The final EIR/S should report the miles of these routes affected by construction impacts. In addition, the EIR should assess impacts that noise, traffic congestion, and damage to scenic resources caused by the California WaterFix

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alternatives will have on recreational driving. One useful measure would be to assess what portion of a typical 65 minute recreational drive from Freeport to Antioch along Highway 160 would be impaired by construction detours, aesthetic impacts, and traffic congestion along the route. In addition, the final EIR/S could report the typical construction-related delay a recreational driver would likely encounter trying to reach the Delta Loop. Appropriate mitigations could include landscape treatments along routes degraded by the project, compensation for unavoidable effects by removing aesthetic detractants along parts of the route not affected by the project, development of features, such as vista points, that could be enjoyed by motorists on portions of these pleasure driving routes that are unaffected by the project, support for locally-developed wayfinding systems that help motorists use and enjoy those portions of these pleasure driving routes, or other measures.

4. *Impacts of Construction Work Force Housing Demand on RV Parks and Resorts.* Housing for construction workers may include extended use of recreational vehicle parks and hotels and motels (recirculated draft EIR/S p 16-29 and 16-30), which could displace people seeking recreational opportunities in the Delta. Housing for migrant farm labor may also be affected. The extent of this potential impact to recreation is unclear and no mitigation is currently provided. While the EIR/S does not anticipate a large influx of out-of-area workers, this impact to recreation and need for mitigation should be more thoroughly evaluated.
5. *Mitigation for Recreation Impacts.* The final EIR/S should provide explicit mitigation measures for the significant, unavoidable recreation impacts caused by the California WaterFix construction and operation. Determinations of appropriate mitigation should be made in consultation with the Department of Parks and Recreation, the Delta Protection Commission, and local governments, and appropriate mitigation commitments should be included in the final EIR/S. Potential mitigation measures include the Delta Plan's recommendations for encouraging recreation and tourism. For example, the Delta Plan recommendation DP R11 (Provide New and Protect Existing Recreation Opportunities) asks ecosystem restoration agencies to provide recreation opportunities at new facilities and restored habitat areas whenever feasible, and to protect existing recreational facilities using California State Parks' *Recreation Proposal for the Sacramento-San Joaquin Delta and Suisun Marsh* (2011) and the Delta Protection Commission's *Economic Sustainability Plan* (2012) as guides.

Enhancing recreational access in the vicinity of proposed intakes (recirculated draft EIR/S 3B.3.2, page 3B-75) after construction is completed is a good opportunity to attract visitors to the Delta, and to highlight the legacy of water engineering, which would fit in an overall Cultural Resources Preservation Plan. This environmental commitment could be improved with a reference to good examples of the idea in practice.

Appendix 3B states that Environmental Commitment 3B.3.3 (Fund Efforts to Carry-out the Recreation Recommendations Adopted in the Delta Plan) no longer applies to the new preferred Alternative 4A (or 2D and 5a) because the impacts of the new alternatives will be less than those in the BDCP. The EIR lacks, however, any quantitative assessment of recreation impacts to support this conclusion. On the contrary, a significant reduction in recreation impacts seems unlikely because the extensive areas of restored habitat no longer provided by the preferred

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alternative would have offered many opportunities for nature-oriented outdoor recreation, while adverse effects from construction of conveyance improvements continue to be significant. Because there will be considerable significant and unavoidable impacts to recreation in the Delta, this environmental commitment should apply to the proposed Alternative 4A.

The mitigation that applies to the remaining alternatives in Commitment 3B.3.3 is an example of the vague and unenforceable nature of some proposed mitigation measures. Of the six actions listed, three could not feasibly be implemented during the construction period because they either depend on 1) the outcomes of actions that occur during construction (reusable tunnel material); or 2) later actions no longer included in the preferred alternative (Barker Slough restoration). Three others, Wright- Elmwood Tract and Brannan Island SRA and improvements to the Yolo Bypass Wildlife Area, are distant from the conveyance construction zone where impacts would occur, and therefore do little to lessen or compensate for the project's effects. California State Parks staff familiar with its *Central Valley Vision* and Delta planning should be consulted to assess how a contribution of funds could facilitate meaningful progress at Delta Meadows-Locke Boarding House.

C. Community Character. The Delta's Legacy Communities are valued resources, appreciated by both their residents and by visitors. Special care to protect them is warranted.

Construction of the conveyance facilities will result in numerous impacts, which are described in various places throughout the EIR/S. However, the scale of collective impacts in the construction zone over ten or more years of construction is difficult to estimate. Because the collective construction impacts will have a major effect on numerous resource categories, the final EIR/S should aggregate the description of impacts that affect community character associated with each alternative's construction activities in one location and summarize them, including the time frames for each impact. In this aggregation, the final EIR/S should discuss the combined footprint of construction impacts affecting each community, including effects on agriculture, recreation, noise, traffic congestion, aesthetic resources, and cultural resources. Each alternative should be compared to enable improved evaluation of each alternative's direct and indirect effects.

These combined effects of construction appear especially adverse at Hood and Clarksburg. Other Legacy Communities along Highway 160 are also likely to suffer adverse effects from declining recreation and tourism and highway congestion. South Delta communities will also be affected, especially by construction-related highway congestion along key routes that link residents of Stockton to jobs in Contra Costa County and the Bay area. Access between Contra Costa County's Legacy Communities and the urban areas of the county will also be impaired.

The recirculated draft EIR/S acknowledges that construction and implementation of the California WaterFix will result in significant changes in character of these communities caused by: 1) declining property values; 2) building abandonment near construction activities with associated loss of tax revenue; and 3) changes in the agricultural landscape, regional economy, labor, and employment (impact AG1, 2, and ECON-1 and 3). The recirculated draft EIR/S also anticipates declining economic stability in communities closest to construction activities, such as Hood and Clarksburg, and in those most heavily influenced by agriculture and recreation, which include the remaining towns along Hwy

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160 and in eastern Contra Costa County. These indirect and secondary impacts caused by construction of the conveyance facility will have physical effects on the Delta environment that should be more clearly evaluated and mitigated in the final EIR/S. For example, impacts that cause building abandonment are physical impacts that warrant mitigation. Actions to reduce or mitigate adverse impacts should be taken.

The recirculated draft EIR/S highlights that “notable decreases in population or employment, even if limited to specific areas, sectors, or the vacancy of individual buildings, could result in alteration of community character stemming from a lack of maintenance, upkeep, and general investment.” The recirculated draft EIR/S offers a list of environmental commitments to reduce these effects (16.3.3.9, pages 16-32, lines 17-19), and Appendix 3B); however the environmental commitments may be insufficient.

Precedents elsewhere from local housing authorities and redevelopment agencies may provide successful examples of mitigation that could be offered to further reduce the effects of these significant changes on the character of Delta communities. Examples from blight elimination programs could offer mitigation for community improvement and enhancement including making contributions toward community facilities, or funding programs to curb foreclosures or to address other conditions, such as flood risk, that also threaten the affected communities. A programmatic approach to mitigating these impacts could be provided through funds contributed to the Delta Investment Fund established in Public Resources Code section 29759. The funds provided to North Coast communities by the Redwood National Park Expansion Act may provide an example for a mitigation program for the Delta.

1. *Aesthetics*. Scenic Highway 160 and other riverside roads are important resources, supporting recreational travel, providing a pleasing backdrop for recreational boating, and contributing to the setting of the Delta’s Legacy Communities. The recirculated draft EIR/S indicates that permanent visual changes in the riverside landscape near intakes will dramatically alter the Delta’s scenic character along scenic Highway 160, at Clarksburg, Courtland, and Hood. However, in the current assessment, the magnitude of the visual impacts California WaterFix will have on Highway 160 from both the water and from the road is unclear. The recirculated draft EIR/S’ narrative description of impacts should be enhanced with illustrative images of these impacts as viewed by travelers on Scenic Highway 160 and by recreational boaters. The illustrative images should show conditions before construction and impacts both during construction and after construction is complete. The impacts described in table 17B of the recirculated draft EIR/S suggest that at least nine miles of views along Scenic Highway 160’s 50 mile length (18 percent) will be affected by construction of the intakes and the rerouting of the highway. Though the recirculated draft EIR/S identifies disrupted views at certain observation points, the description of intakes could better communicate the magnitude of the impacts by quantifying the total length of disrupted views along Scenic Highway 160; the final EIR/S should then offer specific mitigation to offset the impacts consistent with CalTrans’ practices for scenic highways and/or the Federal Highway Administration’s report *Scenic Byways: A Guide for Roadside Improvements*.
2. *Cultural Resources*. The entire Delta region is rich in cultural resources with archeological significance, and the recirculated draft EIR/S identifies major impacts in Chapter 18, most of which are considered significant and unavoidable. While the recirculated draft EIR/S identifies specific sites

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of cultural value, the final EIR/S should consider whether areas significantly affected by the California WaterFix construction may qualify for consideration as significant cultural landscapes under the Secretary of the Interior's *Guidelines for the Treatment of Cultural Landscapes*. In cases where the impacts would remain significant and unavoidable, the California WaterFix could offer additional mitigation adequate to preserve and protect the Delta's historic and cultural resources.

Recognizing that impacts to cultural resources from the California WaterFix will likely be similar to impacts caused by other large infrastructure projects in similar environments, the final EIR/S could draw on experience from other infrastructure projects to describe a range of possible impacts on cultural resources and commit to a range of appropriate mitigation measures. There is precedent from large infrastructure projects across the country under section 106 of the National Historic Preservation Act to provide additional mitigation or compensation for lost cultural resources. For example, the California WaterFix could:

- Offer financial support to relocate significant resources to a museum(s).
- Support archaeological research by local universities focused in the Delta.
- Offer financial support to facilitate the listing of eligible artifacts, sites, or structures on the National Historic Registry.
- Offer financial support to preserve or rehabilitate deteriorating buildings and structures of historical significance in the Delta such as in the Locke Historic District, the Japanese School in Clarksburg, or the Bacon Island Road Bridge.

The *Guidelines* developed by the Secretary of the Interior for construction in culturally sensitive landscapes offer an opportunity to better offset project impacts and preserve the Delta's cultural resources than the currently proposed mitigation measures. As written, specific mitigation treatments in the recirculated draft EIR/S are offered on site-by-site, or for nationally- and state-registered buildings or structures, resource-by-resource. However, the Delta's true cultural resources go beyond those identified on the historic registry and the values that make the Delta a special place are not likely to be captured by these piecemeal mitigation measures.

The Secretary of the Interior's *Guidelines* provide direction for the overall treatment and management of the landscape to preserve the Delta's cultural significance as a whole in the face of this large construction project. Using this approach and identifying overarching goals and objectives in the Delta may help ensure that project design, construction, operation, and associated mitigation can be targeted to protect, preserve, and maintain the Delta as an evolving place. An approach in the Delta, for example, could emphasize the region's agricultural sustainability, and rural heritage; its unique legacy towns; and its recreational values, amongst others. The overall treatment plan could seek to preserve the ecological diversity and the rural landscapes that attract visitors and residents to the Delta. Construction, operation, and mitigation of the California WaterFix and its environmental commitments could then be implemented in a way that contributes to achieving these goals and objectives.

**Review by the Delta Independent Science Board of the  
Bay Delta Conservation Plan/California WaterFix  
Partially Recirculated Draft Environmental Impact Report/  
Supplemental Draft Environmental Impact Statement**

September 30, 2015

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## EXPECTATIONS FOR IMPACT ASSESSMENT OF CALIFORNIA WATERFIX

The Sacramento – San Joaquin Delta presents interconnected issues of water, biological resources, habitat, and levees. Dealing with any one of these problem areas is most usefully considered in light of how it may affect and be affected by the others. The effects of any actions further interact with climate change, sea-level rise, and a host of social, political, and economic factors. The consequences are of statewide importance.

These circumstances demand that the California WaterFix EIR/EIS go beyond legal compliance. This EIR/EIS is more than just one of many required reports. Its paramount importance is illustrated by the legal mandate that singles it out as the BDCP document we must review.

It follows that the WaterFix EIR/EIS requires extraordinary completeness and clarity. This EIR/EIS must be uncommonly complete in assessing important environmental impacts, even if that means going beyond what is legally required or considering what some may deem speculative (below, p. 4). Further, the WaterFix EIR/EIS must be exceptionally clear about the scientific and comparative aspects of both environmental impacts and project performance (p. 9).

These reasonable expectations go largely unmet in the Bay Delta Conservation Plan/California WaterFix Partially Recirculated Draft Environmental Impact Report/Supplemental Draft Environmental Impact Statement Draft (herein, “the Current Draft”). We do not attempt to determine whether this report fulfills the letter of the law. But we find the Current Draft sufficiently incomplete and opaque to deter its evaluation and use by decision-makers, resource managers, scientists, and the broader public.

## BACKGROUND OF THIS REVIEW

The Delta Reform Act of 2009, in §85320(c), directs the Delta Independent Science Board (Delta ISB) to review the environmental impact report of the Bay Delta Conservation Plan (BDCP) and to provide the review to the Delta Stewardship Council and the California Department of Fish and Wildlife. On May 14, 2014, we submitted our review of the BDCP’s Draft Environmental Impact Report/Draft Environmental Impact Statement (herein, the “Previous Draft”), which had been posted for review on December 9, 2013. This review<sup>1</sup> contained three main parts: an extended summary, detailed responses to charge questions from the Delta Stewardship Council, and reviews of individual chapters. Although the Previous Draft considered vast amounts of scientific information and analyses to assess the myriad potential environmental impacts of the many proposed BDCP actions, we concluded that the science in the Previous Draft had significant gaps, given the scope and importance of the BDCP.

The proposed BDCP actions have now been partitioned into two separate efforts: water conveyance under California WaterFix<sup>2</sup> and habitat restoration under California EcoRestore<sup>3</sup>. Environmental documents in support of California WaterFix (the Current Draft) were made available for a 120-day comment period that began July 10, 2015. The Current Draft focuses on three new alternatives for conveying Sacramento River water through the Sacramento – San

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<sup>1</sup> <http://deltacouncil.ca.gov/sites/default/files/documents/files/Attachment-1-Final-BDCP-comments.pdf>

<sup>2</sup> <http://www.californiawaterfix.com/>

<sup>3</sup> <http://resources.ca.gov/ecorestore/>

Joaquin Delta. One of them, Alternative 4A, is the preferred alternative, identified as California WaterFix.

The Delta Stewardship Council asked us to review the Current Draft and to provide our comments by the end of September 2015. We are doing so through this report and its summary, which can be found in the cover letter.

The review began in July 2015 with a preliminary briefing from Laura King-Moon of California Department of Water Resources (three Delta ISB members present). The Delta ISB next considered the Current Draft in a public meeting on August 13–14 (nine of the ten members present)<sup>4</sup>. The meeting included a briefing on California EcoRestore by David Okita of California Natural Resources Agency and a discussion of the Current Draft and California WaterFix with Cassandra Enos-Nobriga of California Department of Water Resources (DWR) and Steve Centerwall of ICF International.

The initial public draft of this review was based on our study of Sections 1-4 of the Current Draft and on checks of most resource chapters in its Appendix A. This public draft was the subject of a September 16 meeting that included further discussions with Cassandra Enos-Nobriga<sup>5</sup> and comments from Dan Ray of the Delta Stewardship Council staff. Additional comments on that initial draft were provided by DWR in a September 21 letter to the Delta ISB chair<sup>6</sup>. These discussions and comments helped clarify several issues, particularly on expectations of a WaterFix EIR/EIS.

This final version of the review begins with a summary in the cover letter. The body of the report continues first with a section on our understanding of major differences between the BDCP and California WaterFix. Next, after noting examples of improvement in the Current Draft, we describe our main concerns about the current impact assessments. These overlap with main concerns about the Previous Draft, which we revisit to consider how they are addressed in the Current Draft. Finally, we offer specific comments on several major Sections and Chapters.

## **DIFFERENCES BETWEEN THE BDCP AND CALIFORNIA WATERFIX**

The project proposed in the Current Draft differs in significant respects from what was proposed as the BDCP in December 2013. Here we briefly state our understanding of some main differences and comment on their roles on this review:

- The time period for permitting incidental take under Section 7 of the federal Endangered Species Act (ESA) and Section 2081(b) of the California Endangered Species Act (CESA) is substantially less than the 50 years envisioned as part of a Habitat Conservation Plan (HCP) and Natural Community Conservation Plan (NCCP) in BDCP. As a result, the science associated with many impacts of climate change and sea-level rise may seem less relevant. The permitting period for the project proposed in the Current Draft remains in place unless environmental baseline conditions change substantially or other permit requirements are not met. Consequently, long-term effects of the proposed project remain important in terms of operations and expected benefits (p. 8).

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<sup>4</sup> <http://deltacouncil.ca.gov/docs/delta-isb-meeting-notice-meeting-notice-delta-isb/delta-independent-science-board-isb-august-13>

<sup>5</sup> Written version at [https://s3.amazonaws.com/californiawater/pdfs/63qnf\\_Delta\\_ISB\\_draft\\_statement\\_-\\_Enos\\_-\\_FINAL.pdf](https://s3.amazonaws.com/californiawater/pdfs/63qnf_Delta_ISB_draft_statement_-_Enos_-_FINAL.pdf)

<sup>6</sup> <http://deltacouncil.ca.gov/docs/response-letter-dwr>

- In this shortened time frame, responsibility for assessing WaterFix’s effects on fish and wildlife would fall to resource agencies (National Marine Fisheries Service, U.S. Fish and Wildlife Service, California Department of Fish and Wildlife). Other impacts would be regulated by a variety of federal and state agencies (Current Draft Section 1).
- The proposed habitat restorations have been scaled back. The Current Draft incorporates elements of 11 Conservation Measures from BDCP to mitigate impacts of construction and operations. Most habitat restoration included in the Previous Draft has been shifted to California EcoRestore. Our review of the Previous Draft contained many comments on the timing of restoration, species interactions, ecological linkages of conservation areas, locations of restoration areas and the science supporting the efficiency and uncertainty of effective restoration. Some of these comments apply less to the Current Draft because of its narrower focus on water conveyance.
- There remains an expected reliance on cooperative science and adaptive management during and after construction.
- It is our understanding that the Current Draft was prepared under rules that disallow scientific methods beyond those used in the Previous Draft. The rules do allow new analyses, however. For example, we noticed evidence of further analyses of contaminants, application of existing methods (e.g. particle tracking) to additional species (e.g., some of the non-covered species), and occasional selection of one model in place of the combined results of two models (e.g., fish life cycle models SALMOD and SacEFT).

## IMPROVEMENTS ON THE PREVIOUS DRAFT

A proposed revamping of water conveyance through the Sacramento-San Joaquin Delta involves a multitude of diverse impacts within and outside of the Delta. Unavoidably, the EIR/EIS for such a project will be complex and voluminous, and preparing it becomes a daunting task in its own right. The inherent challenges include highlighting, in a revised EIR/EIS, the most important of the changes.

The new Sections 1 through 4 go a long way toward meeting some of these challenges. Section 1 spells out the regulatory context by discussing laws and agencies that establish the context for the Current Draft. Section 2 summarizes how the Previous Draft was revised in response to project changes and public input. Section 3 describes how the preferred alternative in the Previous Draft (Alternative 4) has been changed. Section 4 presents an impressive amount of detailed information in assessing the sources of habitat loss for various species and discussing how restoration and protection can mitigate those losses. Generally comprehensive lists of “Resource Restoration and Performance Principles” are given for the biological resources that might be affected by construction or operations. For example, page 4.3.8-140 clearly describes a series of measures to be undertaken to minimize the take of sandhill cranes by transmission lines (although the effectiveness of these measures is yet to be determined).

Section 4 also contains improvements on collaborative science (4.1.2.4, mostly reiterated in ES.4.2). This part of the Current Draft draws on recent progress toward collaborative efforts in monitoring and synthesis in support of adaptive management in the Delta. The text identifies the main entities to be involved in an expected memorandum of agreement on a monitoring and adaptive-management program in support of the proposed project.

Appendix A describes revisions to the resource chapters of the Previous Draft. Track-changed versions of the chapters simplify the review process, although this was not done for the

key chapter on aquatic resources (p. 17). We noticed enhanced analyses of contaminants and application of methods such as particle tracking to additional species, including some of the non-covered taxa; a detailed treatment of *Microcystis* blooms and toxicity; more information about disinfection byproducts; improved discussion of vector control arising from construction and operational activities; and revised depiction of surficial geology. Potential exposure of biota to selenium and methylmercury is now considered in greater detail. Evaluations will be conducted for restoration sites on a site-specific basis; if high levels of contaminants cannot otherwise be addressed, alternative restoration sites will be considered (page 4.3.8-118). Incidentally, this is a good example of adaptive management, although it is not highlighted as such. Explanations were provided for why the nitrogen-to-phosphorus ratio was not specifically evaluated, why dissolved vs. total phosphorus was used in the assessment, and how upgrades to the Sacramento Regional Wastewater Treatment Plant would eventually affect phosphorus concentrations.

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These and other strengths of the Current Draft are outweighed by several overarching weaknesses: overall incompleteness through deferral of content to the Final EIR/EIS (herein, "the Final Report"); specific incompleteness in treatment of adaptive management, habitat restoration, levees, and long-term effects; and inadequacies in presentation. Some of these concerns overlap with ones we raised in reviewing the Previous Draft (revisited below, beginning on p. 10).

### Missing content

The Current Draft lacks key information, analyses, summaries, and comparisons. The missing content is needed for evaluation of the science that underpins the proposed project. Accordingly, the Current Draft fails to adequately inform weighty decisions about public policy. The missing content includes:

1. Details on adaptive management and collaborative science (below, p. 5).
2. Modeling how levee failures would affect operation of dual-conveyance systems (below, p. 7). Steve Centerwall told us on August 14 that modeling of the effects of levee failure would be presented in the Final Report.
3. Analysis of whether operation of the proposed conveyance would alter the economics of levee maintenance (below, p. 7).
4. Analyses of the effects of climate change on expected water exports from the Delta. "[A]n explanation and analysis describing potential scenarios for future SWP/CVP system operations and uncertainties [related to climate change] will be provided in the Final Report" (p. 1-35 of the Current Draft).
5. Potential impacts of climate change on system operations, even during the shortened time period emphasized in the Current Draft (below, p. 8 and 11).
6. Potential effects of changes in operations of the State Water Project (SWP) and Central Valley Project (CVP), or other changes in water availability, on agricultural practices in the San Joaquin Valley (p. 12).
7. Concise summaries integrated with informative graphics (below, p. 9 and 13). The Current Draft states that comparisons of alternatives will be summarized in the Final Report (p. 1-35).

While some of the missing content has been deferred to the Final Report (examples 2, 4, and 7), other gaps have been rationalized by deeming impacts "too speculative" for assessment.

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CEQA guidance directs agencies to avoid speculation in preparing an EIR/EIS<sup>7</sup>. To speculate, however, is to have so little knowledge that a finding must be based on conjecture or guesswork. Ignorance to this degree does not apply to potential impacts of WaterFix on levee maintenance (example 3; see p. 7) or on San Joaquin Valley agriculture (example 6; p. 12).

Even if content now lacking would go beyond what is legally required for an EIR/EIS, providing such content could assist scientists, decision-makers, and the public in evaluating California WaterFix and Delta problems of statewide importance (above, p. 1).

### **Adaptive management**

The guidelines for an EIR/EIS do not specifically call for an adaptive-management plan (or even for adaptive management). However, if the project is to be consistent with the Delta Plan (as legally mandated), adaptive management should be part of the design.

The Current Draft relies on adaptive management to address uncertainties in the proposed project, especially in relation to water operations. The development of the Current Draft from the Previous Draft is itself an exercise in adaptive management, using new information to revise a project during the planning stage. Yet adaptive management continues to be considered largely in terms of how it is to be organized (i.e., coordinated with other existing or proposed adaptive-management collaborations) rather than how it is to be done (i.e., the process of adaptive management). Adaptive management should be integral with planned actions and management—the Plan A rather than a Plan B to be added later if conditions warrant. The lack of a substantive treatment of adaptive management in the Current Draft indicates that it is not considered a high priority or the proposers have been unable to develop a substantive idea of how adaptive management would work for the project.

There is a very general and brief mention of the steps in the adaptive management process in Section 4 (p. 4.1-6 to 4.1-7), but nothing more about the process. We were not looking here for a primer on adaptive management. Rather, we expected to find serious consideration of barriers and constraints that have impeded implementation of adaptive management in the Delta and elsewhere (which are detailed in the Delta Plan), along with lessons learned on how adaptive management can be conducted overcome these problems.

The Current Draft contains general statements on how collaborative science and adaptive management under California WaterFix would be linked with the Delta Collaborative Science and Adaptive Management Program (CSAMP) and the Collaborative Adaptive Management Team (CAMT). These efforts, however, have taken place in the context of regulations and permits, such as biological opinions and biological assessments required under the Endangered Species Act. We did not find examples of how adaptive management would be applied to assessing—and finding ways to reduce—the environmental impacts of project construction and operations.

Project construction, mitigation, and operations provide many opportunities for adaptive management, both for the benefit of the project as well as for other Delta habitat and ecosystem initiatives, such as EcoRestore. To be effective in addressing unexpected outcomes and the need for mid-course corrections, an adaptive-management management team should evaluate a broad range of actions and their consequences from the beginning, as plans are being developed, to facilitate the early implementation and effectiveness of mitigation activities.

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<sup>7</sup> [https://s3.amazonaws.com/californiawater/pdfs/bo0lx\\_Delta\\_ISB\\_Draft\\_Statement\\_&\\_Response\\_Letter\\_-\\_Enos\\_-\\_FINAL.pdf](https://s3.amazonaws.com/californiawater/pdfs/bo0lx_Delta_ISB_Draft_Statement_&_Response_Letter_-_Enos_-_FINAL.pdf)

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The Current Draft defers details on how adaptive management will be made to work: “An adaptive management and monitoring program will be implemented to develop additional scientific information during the course of project construction and operations to inform and improve conveyance facility operational limits and criteria” (p. ES-17). This is too late. If adaptive management and monitoring are central to California WaterFix, then details of how they will be done and resourced should be developed at the outset (now) so they can be better reviewed, improved, and integrated into related Delta activities. The details could include setting species-specific thresholds and timelines for action, creating a Delta Adaptive Management Team, and capitalizing on unplanned experiments such as the current drought<sup>8</sup>. Illustrative examples could use specific scenarios with target thresholds, decision points, and alternatives. The missing details also include commitments and funding needed for science-based adaptive management and restoration to be developed and, more importantly, to be effective.

The protracted development of the BDCP and its successors has provided ample time for an adaptive-management plan to be fleshed out. The Current Draft does little more than promise that collaborations will occur and that adaptive management will be implemented. This level of assurance contrasts with the central role of adaptive management in the Delta Plan and with the need to manage adaptively as climate continues to change and new contingencies arise.

### **Restoration as mitigation**

Restoration projects should not be planned and implemented as single, stand-alone projects but must be considered in a broader, landscape context. We highlighted the landscape scale in our review of the Previous Draft and also in an earlier review of habitat restoration in the Delta<sup>9</sup>. A landscape approach applies not just to projects that are part of EcoRestore, but also to projects envisioned as mitigation in the Current Draft, even though the amount of habitat restoration included (as mitigation) in the Current Draft has been greatly reduced. On August 13 and 14, representatives of WaterFix and EcoRestore acknowledged the importance of the landscape scale, but the Current Draft gives it little attention. Simply because the CEQA and NEPA guidelines do not specifically call for landscape-level analyses is not a sufficient reason to ignore them.

Wetland restoration is presented as a key element of mitigation of significant impacts (example below in comments on Chapter 12, which begin on p. 18). We noticed little attention to the sequence required for assessing potential impacts to wetlands: first, avoid wetland loss; second, if wetland loss cannot be avoided, minimize losses; and third, if avoidance or minimization of wetland loss is not feasible, compensate. Much of the emphasis in the Current Draft is on the third element. Sequencing apparently will be addressed as part of the permitting process with the US Army Corps of Engineers (USACE) for mitigation related to the discharge of dredged or fill material.<sup>10</sup> However, it is difficult to evaluate the impacts on wetlands in advance of a clarification of sequencing and criteria for feasibility.

#### *Mitigation ratios*

Restoring a former wetland or a highly degraded wetland is preferable to creating wetlands from uplands<sup>11</sup>. When an existing wetland is restored, however, there is no net gain of

<sup>8</sup> <http://deltacouncil.ca.gov/docs/adaptive-management-report-v-8>

<sup>9</sup> <http://deltacouncil.ca.gov/sites/default/files/documents/files/HABITAT%20RESTORATION%20REVIEW%20FINAL.pdf>

<sup>10</sup> Letter from Cassandra Enos-Nobriga, DWR, September 21, 2015.

<sup>11</sup> <http://www.nap.edu/openbook.php?isbn=0309074320>

area, so it is unclear whether credits for improving existing wetlands would be considered equivalent to creating wetlands where they did not recently exist.

In view of inevitable shortcomings and time delays in wetland restorations, mitigation ratios should exceed 1:1 for enhancement of existing wetlands. The ratios should be presented, rather than making vague commitments such as “restore or create 37 acres of tidal wetland....” The Final Draft also needs to clarify how much of the wetland restoration is out-of-kind and how much is in-kind replacement of losses. It should examine whether enough tidal area exists of similar tidal amplitude for in-kind replacement of tidal wetlands, and whether such areas will exist with future sea-level rise. We agree that out-of-kind mitigation can be preferable to in-kind when the trade-offs are known and quantified and mitigation is conducted within a watershed context, as described in USACE’s 2010 guidance for compensatory wetland mitigation.<sup>12</sup> Since then, many science-based approaches have been developed to aid decision-making at watershed scales, including the 2014 Watershed Approach Handbook produced by the Environmental Law Institute and The Nature Conservancy<sup>13</sup>.

#### *Restoration timing and funding*

To reduce uncertainty about outcomes, allow for beneficial and economical adaptive management, and allow investigators to clarify benefits before the full impacts occur, mitigation actions should be initiated as early as possible. Mitigation banks are mentioned, but are any operational or planned for operation soon? The potential for landowners to develop mitigation banks could be encouraged so restoration could begin immediately, engendering better use of local knowledge, financial profit, and local support for the project. We are told that the timing of mitigation will be coordinated with other review processes that are currently ongoing.<sup>6</sup>

#### **Levees**

A comprehensive assessment of environmental impacts should relate California WaterFix to levee failure by examining the consequences each may have for the other. The interplay between conveyance and levees is receiving additional attention through the Delta Levee Investment Strategy.

On the one hand, the Current Draft fails to consider how levee failures would affect the short-term and long-term water operations spelled out in Table 4.1-2. A rough estimate was proposed under the Delta Risk Management Study<sup>14</sup> and another is part of a cost-benefit analysis for the BDCP<sup>15</sup>. The Final Report should provide analyses that incorporate these estimates.

On the other hand, the Current Draft also fails to consider how implementing the project would affect the basis for setting the State’s priorities in supporting Delta levee maintenance. This potential impact is illustrated by a recent scoring system of levee-project proposals that awards points for expected benefits to “export water supply reliability”<sup>16</sup>. Further efforts to quantify these benefits have been recommended as part of a comprehensive risk assessment that

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<sup>12</sup>[http://www.sac.usace.army.mil/Portals/43/docs/regulatory/Guidelines\\_for\\_Preparing\\_a\\_Compensatory\\_Mitigation\\_Planf.pdf](http://www.sac.usace.army.mil/Portals/43/docs/regulatory/Guidelines_for_Preparing_a_Compensatory_Mitigation_Planf.pdf)

<sup>13</sup> [https://www.eli.org/sites/default/files/eli-pubs/watershed-approach-handbook-improving-outcomes-and-increasing-benefits-associated-wetland-and-stream\\_0.pdf](https://www.eli.org/sites/default/files/eli-pubs/watershed-approach-handbook-improving-outcomes-and-increasing-benefits-associated-wetland-and-stream_0.pdf)

<sup>14</sup> [http://www.water.ca.gov/floodmgmt/dsmo/sab/drmsp/docs/Delta\\_Seismic\\_Risk\\_Report.pdf](http://www.water.ca.gov/floodmgmt/dsmo/sab/drmsp/docs/Delta_Seismic_Risk_Report.pdf)

<sup>15</sup> [http://baydeltaconservationplan.com/Libraries/Dynamic\\_Document\\_Library/Draft\\_BDCP\\_Statewide\\_Economic\\_Impact\\_Report\\_8513.sflb.ashx](http://baydeltaconservationplan.com/Libraries/Dynamic_Document_Library/Draft_BDCP_Statewide_Economic_Impact_Report_8513.sflb.ashx)

<sup>16</sup> [http://www.water.ca.gov/floodsafe/fessro/docs/special\\_PSP14\\_final.pdf](http://www.water.ca.gov/floodsafe/fessro/docs/special_PSP14_final.pdf)

would guide the Delta Levees Investment Strategy<sup>17</sup>. Public safety, a focus of the Delta Flood Emergency Management Plan,<sup>18</sup> is just one asset that levees protect. The Current Draft does not evaluate how the proposed project may affect estimates of the assets that the levees protect.

The Current Draft cites levee fragility mainly as a reason to build isolated conveyance for Sacramento River water (examples, p. 1-1, 1-7, 1-9). In a similar vein, the California WaterFix website states, “Aging dirt levees are all that protect most of California’s water supplies from the affects [*sic*] of climate change. Rising sea levels, intense storms, and floods could all cause these levees to fail, which would contaminate our fresh water with salt, and disrupt water service to 25 million Californians”<sup>19</sup>. Neither the Previous Draft nor the Current Draft, however, provides a resource chapter about Delta levees. Such a chapter would be an excellent place to examine interacting impacts of conveyance and levees.

### Long-term effects

With the shortened time period, several potential long-term impacts of or on the proposed project no longer receive attention. While these effects may not become problematic during the initial permit period, many are likely to affect project operations and their capacity to deliver benefits over the long operational life of the proposed conveyance facilities. In our view, consideration of these long-term effects should be part of the evaluation of the science foundation of the proposed project.

The No-Action alternative establishes the baseline for evaluating impacts and benefits of the proposed alternative(s). It is therefore important to consider carefully how the baseline is established, as this can determine whether particular consequences of the alternatives have costs or benefits. Climate change, for example, is considered under the No-Action alternative in the Current Draft, as is sea-level rise. Climate change is expected to reduce water availability for the proposed northern intakes, and both climate change and sea-level rise are expected to influence tidal energy and salinity intrusion within the Delta<sup>20</sup>. Changes in water temperature may influence the condition of fishes that are highly temperature-dependent in the current analyses. These environmental effects, in turn, are likely to influence environmental management and regulation; from the standpoint of water quality they may even yield environmental benefits if agricultural acreage decreases and agricultural impacts are reduced.

Rather than consider such effects, however, the Current Draft focuses on how the proposed project would affect “the Delta’s resiliency and adaptability to expected climate change” (Current Draft section 4.3.25). Quite apart from the fact that “resiliency” and “adaptability” are scarcely operational terms, the failure to consider how climate change and sea-level rise could affect the outcomes of the proposed project is a concern that carries over from our 2014 review and is accentuated by the current drought (below, p. 11).

The Current Draft states that “Groundwater resources are not anticipated to be substantially affected in the Delta Region under the No Action Alternative (ELT) because surface water inflows to this area are sufficient to satisfy most of the agricultural, industrial, and municipal water supply needs” (p. 4.2-16). This conclusion is built on questionable assumptions; the current drought illustrates how agriculture turns to groundwater when surface-water availability diminishes. Groundwater regulation under the recently enacted Sustainable

<sup>17</sup> <http://deltacouncil.ca.gov/docs/delta-levée-investment-strategy/dlis-peer-review-technical-memorandum-31>

<sup>18</sup> <http://www.water.ca.gov/floodmgmt/hafoo/fob/dreppr/InterdepartmentalDraftDFEMP-2014.pdf>.

<sup>19</sup> <http://www.californiawaterfix.com/problem>

<sup>20</sup> <http://journals.plos.org/plosone/article?id=10.1371/journal.pone.0024465>

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Groundwater Management Act (SGMA) can also be expected to have long-term effects on the proposed project—effects that the Current Draft does not assess. Ending of more than a million acre-feet of overdraft in the southern Central Valley under the SGMA is likely to increase demand for water exports from the Delta in the coming decades. The Current Draft discusses the potential effects of the project on groundwater (for example, in Sections 4.3.3 and 5.2.2.3), but we found only two brief, descriptive mentions of SGMA in the 235 pages of Section 5. The implications of prolonged droughts (e.g., on levee integrity) and of the consequences of SGMA receive too little attention in the Current Draft.

The Current Draft suggests that unnamed “other programs” that are “separate from the proposed project” will use elements of the Previous Draft to implement long-term conservation efforts that are not part of California WaterFix (Current Draft, p. 1-3). The Final Report should provide assurances that such other programs will step in, and could go further in considering their long-term prospects.

### **Informative summaries and comparisons**

According to guidance for project proponents, “Environmental impact statements shall be written in plain language and may use appropriate graphics so that decision-makers and the public can readily understand them” (Code of Federal Regulations, 40 CFR 1502.8). Far-reaching decisions should not hinge on environmental documents that few can grasp.

This guidance applies all the more to an EIR/EIS of the scope, complexity, and importance of the Current Draft. It demands excellent comparative descriptions of alternatives that are supported by readable tables and high-quality graphics, enumeration of major points, well-organized appendices, and integration of main figures with the text. For policy deliberations, the presentation of alternatives should include explicit comparisons of water supply deliveries and reliabilities as well as economic performance. For decision-makers, scientists, and the public, summaries of impacts should state underlying assumptions clearly and highlight major uncertainties. The Current Draft is inadequate in these regards.

The Previous Draft provided text-only summaries for just the two longest of its resource chapters (Chapters 11 and 12). A fragmentary comparison of alternatives was buried in a chapter on “Other CEQA/NEPA required sections” (part 3 of Chapter 31) but fell far short of what was needed. Both the Previous and Current Drafts have been accompanied by a variety of outreach products for broad audiences (e.g., the descriptive overview of the BDCP Draft EIR/EIS<sup>21</sup>). These products do little to compensate for the overall paucity of readable summaries and comparisons in the Previous and Current Drafts.

For over three years, the Delta ISB has been specifically requesting summaries and comparisons: first in June 2012<sup>22</sup>, then in June 2013<sup>23</sup>, and again in a review of the Previous Draft in May 2014 (footnote 1, p. 1). Appallingly, such summaries and comparisons remain absent in the Current Draft. The generally clear writing in Sections 1 through 4 shows that the preparers are capable of providing the requested summaries and comparisons. Prescriptions in CEQA and NEPA in no way exclude cogent summaries, clear comparisons, or informative graphics. And three years is more than enough time to have developed them.

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<sup>21</sup> Highlights+of+the+Draft+EIS-EIR+12-9-13.pdf

<sup>22</sup> [http://deltacouncil.ca.gov/sites/default/files/documents/files/DISB\\_Letter\\_to\\_JMeral\\_and\\_DHoffman-Floerke\\_061212.pdf](http://deltacouncil.ca.gov/sites/default/files/documents/files/DISB_Letter_to_JMeral_and_DHoffman-Floerke_061212.pdf)

<sup>23</sup> [http://deltacouncil.ca.gov/sites/default/files/documents/files/DISB%20Comments%20on%20Draft%20BDCP%20Document.doc\\_.pdf](http://deltacouncil.ca.gov/sites/default/files/documents/files/DISB%20Comments%20on%20Draft%20BDCP%20Document.doc_.pdf)

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On August 14, 2015, representatives of California WaterFix assured us that this kind of content would eventually appear, but only in the Final Report. That will be far too late in the EIR/EIS process for content so critical to comprehending what is being proposed and its potential impacts.

## **PRIOR CONCERNS AND THEIR RELEVANCE TO THE CURRENT DRAFT**

The Delta ISB review of May 14, 2014 emphasized eight broad areas of concern about the scientific basis for the Previous Draft. Each is summarized below, followed by a brief appraisal of how (or whether) the concern has been dealt with in the Current Draft. While the reduced scope of the proposed project has reduced the relevance of some issues, particularly habitat restoration and other conservation measures, other concerns persist.

Our persistent concerns include the treatment of uncertainty, the implementation of adaptive management, and the use of risk analysis. These topics receive little or no further attention in the Current Draft. We also found few revisions in response to points we raised previously about linkages among species, ecosystem components, or landscapes; the potential effects of climate change and sea-level rise; and the potential effects of changes in water availability on agricultural practices and the consequent effects on the Delta. Our previous comments about presentation also pertain.

### **Effectiveness of conservation actions**

Our 2014 review found that many of the impact assessments hinged on optimistic expectations about the feasibility, effectiveness, or timing of the proposed conservation actions, especially habitat restoration.

This is arguably less of a concern now, given the substantially shorter time frame of the revised project and narrower range of conservation actions designed for compensatory restoration. Nonetheless, the Current Draft retains unwarranted optimism, as on page 4.3.25-10: “By reducing stressors on the Delta ecosystem through predator control at the north Delta intakes and Clifton Court Forebay and installation of a nonphysical fish barrier at Georgiana Slough, Alternative 4A will contribute to the health of the ecosystem and of individual species populations making them stronger and more resilient to the potential variability and extremes caused by climate change.” A scientific basis for this statement is lacking, and an adaptive or risk-based management framework is not offered for the likely event that such optimism is unfulfilled.

Is it feasible for even the reduced amounts of mitigation and restoration to be completed within the time period proposed? Perhaps yes. Is it feasible that these actions will mitigate impacts over the long term? This is more problematic. To be effective, mitigation actions should deal with both the immediate and long-term consequences of the project. The proposed permitting should allow for monitoring long enough to assess the effectiveness of habitat restoration measures, which will need to extend beyond the initial permitting period.

### **Uncertainty**

The 2014 review found the BDCP encumbered by uncertainties that were considered inconsistently and incompletely. We commented previously that modeling was not used effectively enough in bracketing uncertainties or exploring how they may propagate or be addressed.

In the Current Draft, uncertainties and their consequences remain inadequately addressed, improvements notwithstanding. Uncertainties will now be dealt with by establishing “a robust program of collaborative science, monitoring, and adaptive management” (ES 4.2). No details about this program are provided, so there is no way to assess how (or whether) uncertainties will be dealt with effectively. Although sensitivity modeling was used to address the effects of changes in the footprint and other minor changes of the revised project, full model runs were not carried out to assess the overall effects of the specific changes. Consequently, modeling that would help to bracket ranges of uncertainties or (more importantly) assess propagation of uncertainties is still inadequate.

Many of our prior concerns about uncertainties pertained to impacts on fish. If those uncertainties have now been addressed in Chapter 11, they are difficult to evaluate because changes to that chapter have not been tracked in the public draft (below, p. 17).

There are also uncertainties with the data generated from model outputs, although values are often presented with no accompanying error estimates. This situation could be improved by presenting results from an ensemble of models and comparing the outputs.

### **Effects of climate change and sea-level rise on the proposed actions**

Our 2014 review stated concerns that the Previous Draft underestimated effects of climate change and sea-level rise across the 50-year timeline of the BDCP. With the nominal duration shortened substantially, most of the projected impacts of climate change and sea-level rise may occur later. But climate-related issues remain.

First, the Current Draft is probably outdated in its information on climate change and sea-level rise. It relies on information used in modeling climate change and sea-level rise in the Previous Draft, in which the modeling was conducted several years before December 2013. The absence of the climate-change chapter (Chapter 29) in the Previous Draft from Appendix A in the Current Draft indicates that no changes were made. In fact, the approaches and assumptions in the Current Draft remained unchanged from the Previous Draft in order to ensure consistency and comparability across all the Alternatives, even though newer scientific information had become available.<sup>6</sup> Yet climatic extremes, in particular, are a topic of intense scientific study, illustrated by computer simulations of ecological futures<sup>24</sup> and findings about unprecedented drought<sup>25</sup>. The Current Draft does not demonstrate consideration of recently available climate science, and it defers to the Final Report analysis of future system operations under potential climate and sea-level conditions. In fact, the Current Draft generally neglects recent literature, suggesting a loose interpretation of “best available science.”

Second, climate change and sea-level rise are now included in the No-Action Alternative, as they will transpire whether or not WaterFix moves forward. A changed future thus becomes the baseline against which Alternative 4A (and the others) are compared. Changes in outflow from the Delta due to seasonal effects of climate change and the need to meet fall X2 requirements are considered in Section 4.3.1. The difference in outcomes then depends on assumptions about the facility and operations of Alternative 4A and the other Alternatives. Sensitivity analyses indicate that the impacts of the different Alternatives are generally similar in comparison to the No Action Alternative under the range of climate projections considered.<sup>6</sup> Thus, “Delta exports would either remain similar or increase in wetter years and remain similar

<sup>24</sup> <http://journals.plos.org/plosone/article?id=10.1371/journal.pone.0024465>

<sup>25</sup> Cook, B.I., Ault, T.R., and Smerdon, J.E., 2015, Unprecedented 21st century drought risk in the American Southwest and Central Plains: *Science Advances*, v. 1, doi:10.1126/sciadv.1400082.

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or decrease in the drier years under Alternative 4A as compared to the conditions without the project.” (p. 4.3.1-4). Such an inconclusive conclusion reinforces the need to be able to adapt to different outcomes. Simply because the Alternatives are expected to relate similarly to a No Action Alternative that includes climate change does not mean that the Alternatives will be unaffected by climate change.

### **Interactions among species, landscapes, and the proposed actions**

The Previous Draft acknowledged the complexities produced by webs of interactions, but it focused on individual species, particular places, or specific actions that were considered in isolation from other species, places, or actions. Potential predator-prey interactions and competition among covered and non-covered fish species were not fully recognized. Confounding interactions that may enhance or undermine the effectiveness of proposed actions were overlooked. In our 2014 review we recommended describing and evaluating the potential consequences of such interactions, particularly in Chapters 11 (Fish and aquatic resources) and 12 (Terrestrial resources).

The Current Draft recognizes that mitigation measures for one species or community type may have negative impacts on other species or communities, and mitigation plans may be adjusted accordingly. But the trade-offs do not seem to be analyzed or synthesized. This emphasizes the need for a broader landscape or ecosystem approach that comprehensively integrates these conflicting effects.

### **Effects on San Francisco Bay, levees, and south-of-Delta environments**

In 2014 we pointed to three kinds of impacts that the Previous Draft overlooked: (1) effects on San Pablo Bay and San Francisco Bay in relation to Delta tides, salinity, and migratory fish; (2) effects of levee failures on the proposed BDCP actions and effects of isolated conveyance on incentives for levee investments; and (3) effects of increased water reliability on crops planted, fertilizers and pesticides used, and the quality of agricultural runoff. The Current Draft responds in part to point 1 (in 11.3.2.7) while neglecting point 2 (above, p. 7) and point 3.

On point 3: Although the Current Draft considers how the project might affect groundwater levels south of the Delta (7.14 to 7.18), it continues to neglect the environmental effects of water use south of (or within) the Delta. Section 4.3.26.4 describes how increased water-supply reliability could lead to increased agricultural production, especially during dry years. Elsewhere, a benefit-cost analysis performed by ICF and the Battle Group<sup>26</sup> calculated the economic benefits of increased water deliveries to agriculture in the Delta. The Current Draft does not fully consider the consequences of these assumptions, or of the projections that the project may enhance water-supply reliability but may or may not increase water deliveries to agriculture (depending on a host of factors). We have been told that to consider such possibilities would be “too speculative” and that such speculations are explicitly discouraged in an EIR/EIS. Yet such consequences bear directly on the feasibility and effectiveness of the project, and sufficient information is available to bracket a range of potential effects. Our previous concerns are undiminished.

The impacts of water deliveries south of the Delta extend to the question of how each intake capacity (3,000, 9,000, or 15,000 cfs) may affect population growth in Southern

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<sup>26</sup> Hecht, J., and Sunding, D., Draft Bay Delta Conservation Plan statewide economic impact report, August 2013.

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California. Section 4.4.1-9 treats the growth-enabling effects of alternative 2D lightly, saying that additional EIS review would be needed for future developments.

### **Implementing adaptive management**

In the Previous Draft, details about adaptive management were to be left to a future management team. In our 2014 review we asked about situations where adaptive management may be inappropriate or impossible to use, contingency plans in case things do not work as planned, and specific thresholds for action.

Although most ecological restoration actions have been shifted to California EcoRestore (p. 5), we retain these and other concerns about adaptive management under California WaterFix. If the mitigation measures for terrestrial resources are implemented as described, for example, they should compensate for habitat losses and disturbance effects of the project. The test will be whether the measures will be undertaken as planned, be as effective as hoped, and continue long enough to fully mitigate effects. This is where adaptive management and having contingency plans in place becomes critically important. It is not apparent that the mitigation plans include these components.

### **Reducing and managing risk**

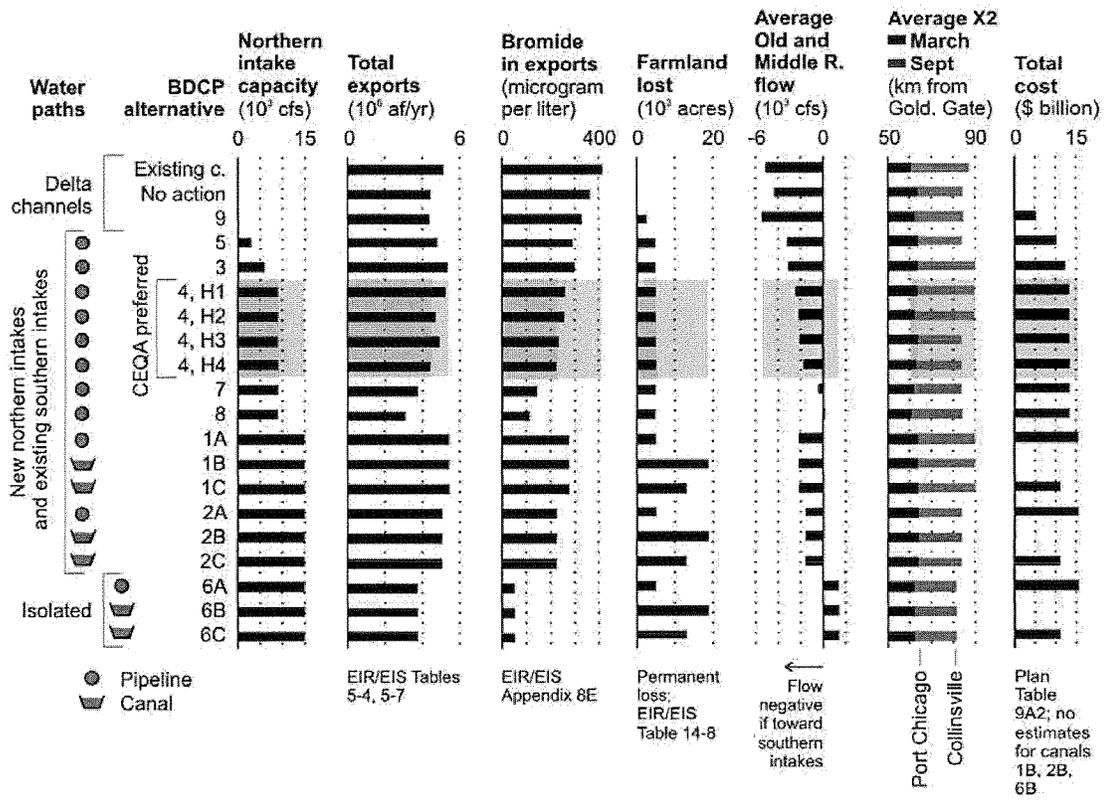
Our 2014 review advised using risk assessment and decision theory in evaluating the proposed BDCP actions and in preparing contingency plans. We noticed little improvement on this issue, just a mention that it might be considered later. This is not how the process should be used.

### **Comparing BDCP alternatives**

The Previous Draft contained few examples of concise text and supporting graphics that compare alternatives and evaluate critical underlying assumptions. Rudimentary comparisons of alternatives were almost entirely absent. The Current Draft retains this fundamental inadequacy (p. 9).

Our 2014 review urged development and integration of graphics that offer informative summaries at a glance. We offered the example reproduced below. If the Current Draft contains such graphics, they would need to be ferreted out from long lists of individual pdf files. Because they are not integrated into the text where they are referenced in the Current Draft, the figures cannot readily illustrate key points.

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## COMMENTS ON INDIVIDUAL SECTIONS AND CHAPTERS

This final section of the review contains minimally edited comments on specific points or concerns. These comments are organized by Section or Chapter in the Current Draft. Many are indexed to pages in the section or chapter named in the heading.

### Alternatives 4A, 2D, and 5A (Section 4)

It is good that the proposed alternatives are seen as flexible proposals, as it is difficult to imagine that any proposal for such a complex and evolving system could be implemented precisely as proposed. Some initial and ongoing modifications seem desirable, and unavoidable.

The operating guidance for the new alternatives seems isolated from the many other water management and environmental activities in and upstream of the Delta likely to be important for managing environmental and water supply resources related to Delta diversions. While it is difficult to specify detailed operations for such a complex system, more details on the governance of operations (such as the Real Time Operations process) would be useful. The operational details offered seem to have unrealistic and inflexible specificity. Presentations of delivery-reliability for different alternatives remain absent. Environmental regulations on Delta diversions have tended to change significantly and abruptly in recent decades, and seem likely to change in the future. How sensitive are project water supply and environmental performance to changes in operating criteria?

The collaborative science ideas seem philosophically attractive, but are not given much substance. Monitoring is mentioned, but details of organization, intent, and resources seem

lacking. Adequate funding to support monitoring, collaborative science, and adaptive management is a chronic problem. Section ES.4.2 states that “Proponents of the collaborative science and monitoring program will agree to provide or seek additional funding when existing resources are insufficient.” This suggests that these activities are lower in priority than they should be.

The three new alternatives, 4A, 2D, and 5A, seem to have modest changes over some previous alternatives, with the exception of not being accompanied by a more comprehensive environmental program. In terms of diversion capacities, they cover a wide range, 3,000 cfs (5A), 9,000 cfs (4A), and 15,000 cfs (2D). The tables comparing descriptions of the new alternatives to previous Alternative 4 are useful, but should be supplemented by a direct comparison of the three new alternatives.

The new Sustainable Groundwater Management Act (SGMA) seems likely to increase demands for water diversions from the Delta to the south to partially compensate for the roughly 1.5-2 maf/year that is currently supplied by groundwater overdraft.

The State seems embarked on a long-term reduction in urban water use, particularly outdoor irrigation. Such a reduction in urban water use is likely to have some modest effects on many of the water-demand and scarcity impacts discussed.

The climate change analysis of changes in Delta inflows and outflows is useful, but isolating the graphs in a separate document disembodies the discussion. The fragmentation of the document by removing each Section 4 figure into a separate file is inconvenient for all, and makes integrated reading practically impossible for many.

The details of the alternative analyses seem mostly relevant and potentially useful. Much can be learned about the system and the general magnitude of likely future outcomes from patient and prolonged reading of this text. An important idea that emerges from a reading of the No Action Alternative is that the Delta, and California water management, is likely to change in many ways with or without the proposed project. The No Action and other alternatives also illustrate the significant inter-connectedness of California’s water system. The range of impacts considered is impressive, but poorly organized and summarized.

The discussion of disinfection by-product precursor effects in Delta waters is improved significantly, but could be made more quantitative in terms of economic and public-health impacts.

The discussion on electromagnetic fields is suitably brief, while the tsunami discussion could be condensed.

The effects of the likely listing of additional native fish species as threatened or endangered seems likely to have major effects on project and alternative performance. These seem prudent to discuss, and perhaps analyze.

Is Alternative 2D, with 15,000 cfs capacity, a serious alternative? Does it deserve any space at all?

Table 4.1-8 implies that tidal brackish/*Schoenoplectus* marsh. Should some of this be considered tidal freshwater marsh?

The dynamics of the Delta are largely determined by water flows. The Current Draft acknowledges that water flows and salinity will change in complex ways. There are statements about how inflows, outflows, and exports will change in Alternative 4A in relation to baseline (No-Action) conditions (p. 4.3.8-13). What is the scientific basis on which these changes will be managed? Will models be used? What confidence should we have in current projections? Have the effects of droughts or deluges been considered?

4.3.7-10, line 13: Text on disturbing sediments and releasing contaminants needs to add nitrogen and phosphorus to the concerns.

### Water quality (Chapter 8)

8-3, line 13: *Microcystis* is singled out as a cyanobacterium that can (but doesn't always) produce the toxin, myrocystin; however, there are other cyanobacteria that sometimes produce other toxins. Different genera can differ in the nutrient that limits their blooms (see 2014 letter by Hans Paerl in Science 346(6406): 175-176). For example, *Microcystis* blooms can be triggered by N additions because this species lacks heterocysts, while toxin-producing *Anabaena* blooms can be triggered by P additions, because *Anabaena* has heterocysts and can fix N. The frequently repeated discussion of cyanobacteria blooms needs to be updated. Also cite Paerl on page 8-45 line 8. Ditto on page 8-103 and 8-106 line 34.

8-8. In our earlier comments, we recommended that carbon be separated into its dissolved and particulate forms for consideration of water quality impacts because dissolved organic carbon (DOC) is the form most likely to react with chloride and bromide and result in formation of disinfection by-products. The section on bromide focuses on interactions with total organic carbon (TOC), rather than DOC. Carbon is primarily considered with respect to formation of disinfection by-products but carbon plays a central role in the dynamics of the Delta, affecting processes such as metabolism, acidity, nutrient uptake, and bioavailability of toxic compounds. Carbon cycling determines ecosystem structure and function in aquatic systems. It also modifies the influence and consequences of other chemicals and processes in aquatic systems. Dissolved organic carbon (DOC), for example, influences light and temperature regimes by absorbing solar radiation, affects transport and bioavailability of metals, and controls pH in some freshwater systems. Respiration of organic carbon influences dissolved oxygen concentrations and pH.

8-18, line 12 says that salt disposal sites were to be added in 2014; were they?

8-19 and 8-20: "CECs" is not defined and seems to be used incorrectly. Change "CECs" to "EDCs" on page 8-19 and to "PPCPs" on page 8-20.

8-21, line 18-19: Such a statement should be qualified. The conclusion that marine waters are N-limited and inland waters are P-limited is outdated. Recent papers, including the above, find more complex patterns.

8-22, lines 18 and 30: Choose either "cyanobacteria" or "blue-green algae;" using both will confuse readers who may perceive them as different.

8-23, lines 15-16: Say how the N:P ratio changed composition, not just that it did change composition.

8-23 through 8-25: Uncertainties (e.g., standard deviation or standard error of the mean) associated with the mean concentrations of DOC should be presented. It is impossible to interpret differences between the values that are presented without knowledge of the variation around the mean values (e.g., without knowledge of variation around the mean, it is difficult to evaluate whether DOC concentrations at south vs. north-of-Delta stations and Banks headworks differ from one another; 3.9 to 4.2 mg/L vs. 4.3 mg/L).

8-65, line 12: Specify if DO is for daytime or night, and for surface, bottom or mid-water column.

8-75, line 6: The failure to consider dissolved P (DP) should be addressed; there is much greater uncertainty. The adherence of some P to sediment does not prevent considerable

discharge of P as DP. Also on page 8-95 line 40, qualify predictions due to lack of consideration of DP.

8-82, line 4-5: It seems unlikely that current levels of *Microcystis* growth in the Delta are dependent on the exclusive uptake of ammonia. Temperature is one of the primary factors driving *Microcystis* blooms and global warming could promote bloom occurrence. Consider revising this section to, “Because it seems unlikely that current levels of *Microcystis* growth in the Delta are dependent on the exclusive uptake of ammonia, the frequency, magnitude and geographic extent of *Microcystis* under future scenarios is difficult to predict.”

8-105, line 8: Would total nitrogen be dominated by nitrate just by increasing ammonia removal? Depending on redox and microbiota, why wouldn't nitrate be converted to ammonium?

A lot of attention is given to factors controlling *Microcystis* blooms in this chapter but little attention is given to its toxicity. Just as factors controlling blooms are not fully understood, the regulating factors of cellular toxin contents remain poorly understood. As a result, the impact of blooms on the environment can vary (e.g., large blooms of non-toxic or low toxin organisms may have impacts on environmental variables such as nutrient uptake and dissolved oxygen consumption while small blooms of highly toxic organisms could impact food webs) [see: Ma et al. (2015) Toxic and non-toxic strains of *Microcystis aeruginosa* induce temperature dependent allelopathy toward growth and photosynthesis of *Chlorella vulgaris*. Harmful Algae 48: 21–29].

## **Fish and aquatic resources (Chapter 11)**

We found individual conclusions or new analyses difficult to identify in this key chapter because changes to it were not tracked in the public version of the Current Draft and there was no table of contents that could have assisted in side-by-side comparison with the Previous Draft.

### *Effects of temperature*

We noticed more emphasis on temperature concerning the fish ‘downstream’ impacts (but without tracked changes this becomes difficult to document).

The main temperature variable used expresses the percentage of time when monthly mean temperatures exceed a certain rate or fall within a certain boundary. The biological impact, however, is difficult to assess with these numbers. If all of the change occurred just during operations or just during one day, the biological impact could be much different than a small change every day (provided by using means). Graphs of changes and listing of extreme highs and lows during a model run would have more biological meaning. Also, comparisons were made using current baseline conditions and did not consider climate change effects on temperatures.

### *Fish screens*

It is unclear how (and how well) the fish screens would work. The description of fish screens indicates that fish >20 mm are excluded, but what about fish and larvae that are <20 mm, as well as eggs? Table 11-21 seems out of date, because some fish screens appear to have been installed, but data on their effects are not given. Despite the lack of specific data on how well screens function, the conclusion that there will be no significant impact is stated as certain (e.g., page 1-100 line 38).

Here, as in many other places, measures are assumed to function as planned, with no evidence to support the assumptions. The level of certainty seems optimistic, and it is unclear whether there are any contingency plans in case things don't work out as planned. This problem persists from the Previous Draft.

*Invasive plants*

Cleaning equipment is mentioned, but it is not specifically stated that large machinery must be cleaned before entering the Delta. Section 4.3.8-358 says equipment would be cleaned if being moved within the Delta. Cleaning is essential to reduce transfer of invasive species; a mitigating measure is to wash equipment, but it must also be enforced.

Weed control (fire, grazing) is suggested, but over what time frame? It may be needed in perpetuity. That has been our experience at what is considered the world's oldest restored prairie (the 80-yr-old Curtis Prairie, in Madison, WI).

Weed invasions can occur after construction is completed; how long will the project be responsible for weed control? 3-5 years won't suffice.

4.3.8-347. Herbicides are prescribed to keep shorebird nesting habitat free of vegetation, but toxic effects of herbicides on amphibians etc. are not considered.

4.3.8-354. Impacts of invasive plants seem underestimated. Impact analysis implies that the project disturbance area is the only concern, when dispersal into all areas will also be exacerbated. At the Arboretum, a 1200-ac area dedicated to restoration of pre-settlement vegetation, invasive plants are the main constraint. A judgment of no significant impact over just the disturbance area is overly optimistic.

4.3.8-356. Does not mention need to clean equipment to minimize import of seeds on construction equipment.

*Cryptic acronym and missing unit*

Figure 2: SLR x year: y axis lacks units; reader has to continue on to table 11-20 to find that it is cm.

**Terrestrial biological resources (Chapter 12)***Effects on wetlands and waters of the United States (WOTUS)*

Page 12-1, line 18-19 says: "Under Alternatives 2D, 4, 4A, and 5A, larger areas of non-wetland waters of the United States would be filled due to work in Clifton Court Forebay; however, the Forebay would ultimately expand by 450 acres and thus largely offset any losses there." Is the assumption that, acre for acre, all jurisdictional waters are interchangeable, whether of different type or existing vs. created? The literature does not support this assumption.

The text argues that the wetlands would be at risk with levee deterioration, sea-level rise, seismic activity, etc. But the solution is for "other programs" to increase wetlands and riparian communities. What if this project causes the problem, e.g. via vibration?

CM1 alternative 4A would fill 775 acres of WOTUS (491 wetland acres); Alt 2D would fill 827 (527 wetland) + 1,931 ac temporary fill at Clifton Court Forebay; Alt 5A would fill 750 (470 wetland). That's a lot of area. The timing and details of mitigation measures are not provided. References to the larger Delta Plan suggest that compensations would come at unknown times. Piecemeal losses such as indicated here: "Only 1% of the habitat in the study area would be filled or converted" (Chapter 12, line 29, page 12-22) is how the US has lost its historical wetlands. What are the overall cumulative impacts of wetland losses in the Delta? What is the tipping point beyond which further wetland losses must be avoided? The proposed project is one part of the broader array of management actions in the Delta and should be considered in that broader context.

### *Habitat descriptions*

How will mudflats be sustained for shorebirds? Exposed mud above half-tide can become vegetated rapidly. In the Delta, the bulrush *Schoenoplectus californicus* tolerates nearly continuous tidal submergence.

Are soils clayey enough for the proposed restoration of up to 34 acres of vernal pool and alkali seasonal wetland near Byron? These areas will need to pond water, not just provide depressions.

12-243, line 18: How would adding lighting to electrical wires eliminate any potential impact to black rails? This mitigation is overstated.

Several of the species accounts (e.g., bank swallow) indicate that there is uncertainty about how construction or operations will impact the species. In most cases, monitoring is proposed to assess what is happening. But to be effective, the monitoring results need to be evaluated and fed into decision-making, as visualized in the adaptive-management process. There is little explicit indication of how this will be done or funded.

### **Land use (Chapter 13)**

Alternative 4A would allow water diversion from the northern Delta, with fish screens, multiple intakes, and diversions limited to flows that exceed certain minima, e.g., 7000 cfs. This would reduce flood-pulse amplitudes and, presumably, downstream flooding. How does this alter opportunities for riparian restoration? Which downstream river reaches are leveed and not planned to support riparian restoration? Where would riparian floodplains still be restorable?

Over what surface area does the pipeline transition to the tunnel? At some point along the pipeline-tunnel transition, wouldn't groundwater flow be affected?

Up to 14 years of construction activities were predicted for some areas (e.g., San Joaquin Co.); this would have cumulative impacts (e.g., dewatering would affect soil compaction, soil carbon, microbial functions, wildlife populations, and invasive species). What about impacts of noise on birds; e.g., how large an area would still be usable by greater sandhill cranes?

State how jurisdictional wetlands have been mapped and how the overall project net gain or net loss of wetland area has been estimated. If mitigation consists only of restoration actions in areas that are currently jurisdictional wetlands, then there would be an overall net loss of wetland area due to the project. A mitigation ratio >1:1 would be warranted to compensate for reduced wetland area. This was also a concern for Chapter 12.

Up to 277 ac of tidal wetlands are indicated as restorable; text should indicate if these are tidal freshwater or tidal brackish wetlands (or saline, as is the typical use of "tidal wetlands").

13-19. On the need to store removed aquatic vegetation until it can be disposed: there are digesters for this purpose, and they might be efficient means of mitigation if management of harvested aquatic plants will be long-term. A waste product could be turned into a resource (methane fuel).

13-19, line 12: Text says that "predator hiding spots" will be removed. What are these?

13-19, line 20: What are the E16 nonphysical fish barriers? An electrical barrier?

13-20, line 19: Boat-washing stations are mentioned; would these discharge pollutants (soap, organic debris?)



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